Appendix F. Public Comments

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A. Public Scoping Comments Notice of Intent

Members of the public were invited to participate in the scoping process for this draft environmental impact statement (EIS) through an announcement of a notice of intent (NOI) to prepare an EIS in connection with making a determination on the status of the Monsanto Company and Forage Genetics International (FGI) alfalfa lines J101 and J163 (Docket Number 2007-0044, 73 FR 1198-1200). In this NOI, the Animal and Plant Health Inspection Service (APHIS) asked for comments, data, and information regarding 18 broad, overlapping issues. APHIS also requested the public to provide suggestions for other issues to be discussed or alternatives to be analyzed in the draft EIS. The comment period for the NOI opened on January 7, 2008. During this comment period, which closed on February 6, 2008, APHIS received 242 comments. Comments were made by interest groups, industry representatives, industry trade organizations, farmers, private individuals, State agency representatives, scientists, agricultural producers, and marketing groups. Full text of the comments received during the open comment period is available online at www.regulations.gov.

APHIS received a number of similar comments from glyphosate-tolerant (GT) alfalfa farmers that identified general issues with growing GT alfalfa, and provided information regarding their specific farming operation. Each of these comments addressed the benefits of using glyphosate instead of other, more toxic herbicides on alfalfa, and that these benefits extended not to just the environment, but also to worker safety. These comments also spoke to the high quality of GT alfalfa, and how this improved quality improves farm revenue. The growers included specific information on the crops grown on their farm, acres of GT alfalfa planted, how many applications and types of other herbicides used prior to GT alfalfa, and documented the number of applications of glyphosate these growers used on their GT alfalfa. These comments concluded with a statement that these growers have neighbors that farm using organic farming practices and/or export their product overseas. According to the comment, these GT alfalfa growers have spoken to their neighbors and these non-GT alfalfa growers do not feel that the use of GT alfalfa is jeopardizing their farming operations, and they strongly support the right to choose which products are used by each farmer on their farm.

Other comments received from the public typically were not in direct response to any of the 18 questions specifically identified in the NOI. Therefore, we grouped the comments into 19 main themes. Below is a summary of the comments received for each theme.

1. Potential of Gene Flow between GT and Non-GT Alfalfa

Association of Official Seed Certifying Agencies (AOSCA) submitted a comment describing the seed certification process for alfalfa. AOSCA further describes this certifying process as a long-standing, voluntary, industry-driven approach to certify seed, including GT alfalfa seed. Seed certifying agencies have developed, and AOSCA has approved, the Alfalfa Seed Production Stewardship Program that uses seed certification standards as its foundations, then augments them with additional considerations intended to promote the stewardship of genetically-engineered (GE) traits. Seed producers, whether intending to contain GE traits in their own seed or acting defensively to keep GE traits out, may contact seed certifying agencies to learn more about the Stewardship Program. AOSCA agencies will work with the producer to identify

specific needs they may have and assist in tailoring the program to meet producer or market requirements. Seed certifying agencies will provide third-party oversight and we are confident that this approach will protect the integrity of the alfalfa seed market.
The California Crop Improvement Association (CCIA), a third party certifier of conventional, GE, and organic seed crops, included comments on their:

- work with the alfalfa seed industry to assure the continued integrity and purity of all crops;
- stewardship plans that include voluntarily set isolation distances that are well in excess of the AOSCA/Federal and State Seed Act minimal requirements;
- pinning map program, which documents the presence, location, and size of fields producing GE seed crops;
- certifying several thousand acres of organic alfalfa hay production;
- reading of National Organic Program (NOP) in that the law does not set a zero tolerance for the unintended low level presence of foreign DNA in an organically produced crop;
- belief that producers of a crop need assurance of the genetic purity of their planting stock, and recommends organic seed producers to use organic seed produced under AOSCA certification; and
- record that CCIA has never had an application from a certified organic producer to produce alfalfa seed under an AOSCA seed certification program.

Several GT alfalfa farmers, conventional farmers, scientists, researchers, and those representing farming interests acknowledge that gene flow is not unique to transgenic plants but a natural process. Commenters acknowledge that gene flow from GT alfalfa can occur; however, it is highly unlikely or is minimized due to:

- the current agronomic practice of harvesting alfalfa prior to flowering, and, therefore, no pollen is produced for gene flow to occur;
- production of hay primarily for the dairy market is typically cut a bug stage, economically the best stage;
- use of boundaries;
- alfalfa that is in production for hay or silage is not allowed to fully mature and set seed—alfalfa is typically harvested months before seed could possibly be set;
- seed-seed and hay-seed are the minority (<2 percent) of potential gene flow situations;
- hay-to-hay is the most common situation; scientific evidence shows this situation is manageable and provides the least opportunity for gene flow;
- best management practices in the cleaning and management of seed harvesting and processing equipment are effective in managing admixtures between GE and conventional alfalfa seed;
- coupled with cultural and rotational practices to manage volunteer seedlings, it is likely that seed-mediated gene flow will be very low;
- feral plants have a large disadvantage over commercial fields as they are not managed; there is a reduced chance of synchronous flowering and a high chance they are destroyed by insect, and thus they seldom produce viable seed. The low relative abundance of pollen and pollinators and the high degree of environmental stress on feral plants relative to those within commercial seed production fields will help reduce the likelihood and commercial importance of seed-to-feral and subsequent feral-to-seed or feral-to-hay gene flow risks to near zero;

- better alfalfa growers who have planted GT Alfalfa and their aggressive cutting schedule do not allow the alfalfa plants or weeds to flower and produce seed; and
- some geographical separation for different marketing strategies would minimize pollen flow.

Some commenters were concerned that non-GT alfalfa will contain GT traits, and thus alfalfa seed growers would not be able to sell non-GT alfalfa seed, or GT traits will always be found in non-GT alfalfa. Other commenters were concerned that this issue was not well studied. Conventional and organic alfalfa growers commented on specific alfalfa management processes that result in alfalfa seed set in hay fields, which would thus encourage gene flow from GT alfalfa into their fields. Some conventional or organic alfalfa growers, members of the public, and interest groups believe that gene flow between GT and non-GT is a hazard and likely to occur. The reasons below were provided by the commenters:

- Alfalfa is a perennial species that flowers over an extended period and requires pollination by bees.
- A small number of alfalfa seed growers that are concentrated in comparatively small geographic areas.
- GT alfalfa has dormant seed and plants will come up year after year even when there is no new seed source.
- Inclement weather prevents farmers from harvesting, thus allowing additional time for the alfalfa to reach sexual maturity and produce pollen.
- Impacts of flooding on gene flow.
- Research contradicts the assertion that transgene flow produces offspring of lower fitness.
- Weed seeds get by in seed cleaning and virtually all of the serious Midwestern weeds have been introduced through hay or hay seed.
- GE pollen will be released to the natural environment and transported via animals, birds, and insects.
- Equipment such as swathers, balers, hopper boxes, harrow-beds, truck, barns, compressors, and containers will provide a pathway for gene flow.
- There are no feasible measures to protect crops from GT alfalfa gene flow.
- Seed movement is through manure spread on fields.
- Honey bees are present in every seed production area yet are ignored for isolation distances when contracting GT alfalfa seed production except California.
- Alfalfa plants can be very long lived and easily become feral and spread pollen.
- Alfalfa hay production with non-tenant landowners and inattentive growers allows alfalfa hay fields to go to excessive bloom.

Interest groups, organic farming interests and members of the public were concerned that organic farmers are considered responsible for protecting organic alfalfa from GT alfalfa gene flow. These commenters wanted to focus the responsibility back to the developer of GT alfalfa, or other farmers who grow GT alfalfa. One commenter believed that regulations protecting non-GE alfalfa seed producers should be enacted before allowing widespread dissemination of GT alfalfa.

Concerning gene flow, interest groups, organic and conventional non-GT alfalfa farmers, and organic farming interests wanted the following assessments conducted or questions answered in the EIS:

- Document the genetic diversity decrease from widespread GT alfalfa seed contamination.
- Effects of GE pollen on conventional alfalfa and alfalfa grass hay fields that are also used to produce alfalfa seed.
- Isolation distance requirements to prevent contamination of non-GT alfalfa fields.
- To what extent can organic or conventional alfalfa farmers prevent their crops from being commingled with unwanted, unintended, or unexpected GT alfalfa.
- How will seed be kept separate so that farmers can be assured they are not getting GT alfalfa seed.
- An assessment of gene transfer and the extent to which deregulation of GT alfalfa will affect hybridization between cultivated and feral alfalfa.
- At what gene flow level does APHIS consider the use of mitigation measures such as stewardship practices as a failure due to increasing levels of GT genetic contamination.
- An interest group wanted APHIS to avoid relying on external gene flow scientists who have been paid by Monsanto and FGI to avoid the appearance of bias and unethical research motives.
- Independent research analyzing how long it takes for hard seed to break down in the soil.
- Could a 'marker' be included in GT alfalfa that would have permitted GT alfalfa to have been cleaned out of the conventional seed by special seed cleaning equipment.
- Transfer of GT seed residues from seed cleaning facilities into conventional seed that is subsequently cleaned at the same facility.
- The feasibility of thoroughly removing GT alfalfa seed residues from farm equipment and seed cleaning facilities, given the size of alfalfa seed.
- Assess establishment of volunteer GT alfalfa in fields rotated from GT alfalfa seed or forage production to conventional alfalfa seed or forage production.
- Assess the quantity of alfalfa seed left on the ground after harvest, and the viability of such seed in various rotation scenarios.
- If the GT alfalfa stand is plowed under, what is the viability of unharvested and hard seed after plowing.
- Further study of the soil or other environmental factors fostering increased hard seed prevalence in GT alfalfa.
- APHIS should commission testing of a representative range of conventional alfalfa seed varieties in various alfalfa-producing regions to determine the extent of GT trait presence, and determine the route and cause of contamination wherever possible.
- An assessment of the route and cause of unwanted GE traits in other crops.
- Examine other bees that have not yet been addressed in gene flow studies.
- How long is alfalfa pollen proven viable to zero viability.

2. Difference in Weediness Traits between GT and non-GT Alfalfa

Several commenters felt strongly that the presence of GT alfalfa in agriculture is not likely to increase the weediness traits of sexually compatible and/or feral populations of alfalfa since common agricultural practice for alfalfa is to harvest prior to flowering, and, therefore, the chance of gene flow occurring and creating glyphosate-resistant alfalfa weeds is unlikely.

One commenter was concerned that GE plants will become invasive species, and because the GE versions of non-GE plants look similar, it will be difficult to determine which version is invasive. This commenter advocated the precautionary approach.
An interest group believes that gene flow from GT alfalfa to feral alfalfa may increase its weediness potential. Interest groups also called for the following issues related to weediness to be analyzed in the EIS:

- weediness traits evolving in organic alfalfa versus GT alfalfa.
- differences in weediness traits between organic and conventional alfalfa.
- the potential impacts of GT alfalfa introduction on agricultural lands other than alfalfa because it has been reported that alfalfa can be a weed problem in sugar beets, onions, vegetable seeds, orchards, vineyards and in rangeland plants grown for seed.
- according to an interest group, because a tendency to dormancy (i.e. hard seed) correlates with the weediness potential of a crop, the EIS should include a follow up on Monsanto's finding of a two to fourfold increase in the percentage of hard seed in GT alfalfa vs. controls.

Another commenter believed that, although introduced to North America hundreds of years ago, alfalfa is not a weed because alfalfa—

- is difficult to establish;
- does not tolerate unfertile soils, soils that are too acid or too alkaline or soils that are poorly drained; and
- must be nodulated with the proper strain of *Rhizobium*, which is seldom found off-farm.

3. Weed Management Practices in Alfalfa Production

Members of the public, some organic and conventional farmers, and interest groups stated that control of weeds in alfalfa is best done through:

- crop rotations;
- companion crops (oats or grass mixtures were suggested);
- stubble with no-till agriculture;
- vinegar;
- healthy stands of alfalfa;
- light use of glyphosate early in the growing season and between cuttings;
- fertile soil and proper soil pH;
- non-glyphosate herbicides;
- more phosphorus in soil; and
- adequate brix levels.

Interest groups also commented about:

- the assessment of voluntary weed resistance management or stewardship;
- use of mandatory herbicide resistant weed management programs administered by APHIS;
- an assessment of the success or failure of past efforts to limit the spread of resistant weeds through voluntary weed management or stewardship programs;
- why the great majority of alfalfa hay acreage is not treated with any herbicides

- an assessment of weed control should include “best management practices” in conventional and organic alfalfa production; and
- why is herbicide used on the minority of alfalfa hay acreage. One interest group stated that deficient soil fertility, unfavorable soil pH, overly prolonging the life of thinning alfalfa stands, and attacks by disease or nematodes are factors that may make alfalfa more susceptible to weed invasions.

GT alfalfa growers felt that glyphosate herbicide is less toxic, both to humans and the environment, than other herbicides used to control weeds in alfalfa, and needs to be applied less frequently than other, more harmful chemical herbicides. Alfalfa farmers growing GT alfalfa additionally commented on:

- Their compliance with the stewardship requirements for GT alfalfa grown for hay or seed
  - Some farmers mentioned the amount of oversight on the stewardship requirements
  - A seed production manager commented that the GT alfalfa growers he interacted with were good stewards of the technology and followed the strict guidelines imposed by Monsanto and FGI.
- Lack of weed problems related to GT or feral alfalfa in fields or road ways
- Using glyphosate with GT alfalfa allowed them to control weeds that were not easily controlled in conventional alfalfa production, particularly in areas of flood irrigation. A weed scientists notes that growers who have problems with perennial weeds cannot use conventional herbicides to control these weeds in alfalfa. The commenters felt that the use of glyphosate in these areas provides an opportunity to economically produce alfalfa and control perennial weeds. Some of the weeds mentioned include:
  - Russian knapweed
  - Tall white top
  - Field bindweed
  - Jenny
  - Chinese lettuce
  - Morning glory
  - Canada thistle
- Weed control using glyphosate allows growers an affordable and economical means of reducing weed pressure in alfalfa
- Some farmers farm in sandy soils and stated that no herbicides were available for acceptable weed control until this technology became available
- A certified crop advisor stated that prior to glyphosate, three different chemicals had to be used to control weeds that persisted in soil for far greater periods and had detrimental effects on alfalfa yields and quality
- The majority of commenters that grow GT alfalfa (and did not submit a form letter as discussed above), and some commenters representing conventional farming interests believe that GT alfalfa is the best option to control weeds in alfalfa stands, stating broadly that less chemical is required than growing conventional varieties
- GT alfalfa farmers and other commenters representing farming interests state that GT alfalfa is a potential solution to the various weed infestations in areas where alfalfa is grown and is preferable to other traditional herbicides as it does not stunt the growth of alfalfa stands
- A commenter from academia suggested that APHIS not only examine the impacts of chemical and non-chemical weed control practices, but also the impact of failing to control weeds by any method

- Another commenter stated that, like soybean, alfalfa already has some glyphosate tolerance to begin with, and as a consequence, glyphosate may not be the best control choice in a worst-case scenario of feral alfalfa in a natural area.
- A commenter suggested that the greatest problem with neighbors is that they moved "to the country" because "it's so beautiful", but they do not have the equipment and do not take time to take care of their weeds and help keep it beautiful. They let the weeds go to seed, then they break off and roll across our fields when it is windy and those weeds seed our alfalfa fields.

4. Glyphosate-Resistant Weeds

Some commenters discussed the historical aspects of herbicide resistance in weeds, stating that with each new chemical, there have always been shifts in weed composition and weeds which acquire resistance, and that this is an issued faced with all herbicides, not just glyphosate.

Some commenters suggested to ways to prevent weed shifts or resistant weeds, including:

- rotating herbicides (some commenters believe that rotating pesticides has become more of a standard practice due to the understanding of resistance development
- stacked herbicide resistance traits will add to the sustainability of herbicide use

Some GT alfalfa farmers stated that farmers recognize the potential of herbicide-resistant weeds, and use each herbicide only when necessary at labeled legal rates to control specific target weeds, and farmers would use the "best practices" approach in raising GT alfalfa to minimize glyphosate-resistance weed development.

A weed scientist believes that there is a low risk of glyphosate-resistant weeds developing in GT alfalfa due to glyphosate use during the year of stand establishment. The comment states that glyphosate does not injure the alfalfa and can be utilized as soon as weeds emerge, reducing weed competition with alfalfa and improves alfalfa stand establishment. The comment continues by stating that following the first harvest, alfalfa takes over weed management if a dense stand is achieved, thus, applying additional herbicide is not necessary until several years later when the alfalfa stand begins to thin. The comment concludes stating that with GT alfalfa the majority of growers will not apply multiple treatments of glyphosate and therefore selection for resistant weeds is of low risk. Other GT alfalfa farmers submitted comments that echoed the idea that GT alfalfa and the use of glyphosate would not result in glyphosate-resistant weeds because of the management practices and biology of alfalfa.

Some conventional and organic alfalfa farmers, along with members of the public and interest groups were concerned about glyphosate use on GT alfalfa leading to the development of glyphosate-resistant weeds. Some of these comments also voiced concern that different and expensive herbicides would eventually be required to control new weeds, and believed that these different and more potent herbicides pose risks to the environment and wildlife.

Some commenters were concerned about some poisonous weeds becoming more prevalent because of the use of glyphosate, including nightshade and field horsetail. A conventional seed grower in Montana believes that there is only a three year window before the weeds begin

building resistance to glyphosate. A conventional alfalfa grower was concerned about what might happen with the alfalfa plants that glyphosate cannot kill, and how burdensome the removal will be to the public.

Interest groups, organic and conventional growers, and members of the public described assessments they wished to see in the EIS, including:

- the effect of widespread use of GT crops;
- the impacts of glyphosate-resistant weeds due to GT alfalfa in combination with the:
  - growing adoption of other GT crops;
  - recent introduction of GT crops that allow for increased use of and expanded application window for glyphosate
  - likely introduction in the near future of GT crops
- rotation between different GT crops;
- the potential for spread of glyphosate-resistant weeds via resistant weed seed present in alfalfa seed, and how this might be exacerbated by introduction of GT alfalfa;
- an assessment that encompasses other weed species that have biotypes with confirmed glyphosate-resistance in other countries; and
- the cumulative impacts on weed control costs of the introduction of GT alfalfa against the backdrop of currently grown GT crops, for growers of alfalfa and other crops.

5. Potential Impacts of GT Alfalfa or Glyphosate on Wildlife

A state farm bureau stated that the NOI question regarding endangered species and critical habitat only considers the use of glyphosate on species or habitat; it does not consider that farmers actually have fewer passes in the field due to the use of GT alfalfa, which can have a beneficial impact on species and their habitat.

An alfalfa farmer states that additionally, there is no evidence that glyphosate will harm any threatened or endangered species or organisms that are beneficial to agriculture.

A commenter states that in the short time that we were allowed to plant GT alfalfa we have, in our pheasant hunting operation, been able to establish an alfalfa stand on parts of our farm that would not have let us otherwise as weeds and grasses would have smothered out the alfalfa plants. Alfalfa is second to none to be used for nesting habitat and is a great source of food for deer and other wildlife.

Organic farmers, conventional farmers, interest groups, and members of the public requested the following information regarding the relationship between GT alfalfa and wildlife discussed in the EIS:

- the potential interaction of increasing levels of glyphosate in the environment on other animals and creatures, such as frogs and other sensitive animals;
- what happens to deer that eat GT alfalfa;
- the impact of insecticides and herbicides on the biodiversity and productivity of aquatic communities;

- what are the effects on insect breeding and on aerial spraying of insects should GT alfalfa be permitted to be used generally, and what are the health effects of increased spraying of toxic substances and poisons; and
- what range of organic chemical impurities and inorganic chemical impurities from the manufacturing process are detectable in glyphosate that may cause or contribute to negative impacts on threatened or endangered species, insects, or wildlife?

6. Pollinator Concerns

Beekeepers, conventional and organic alfalfa growers, members of the public and interest groups were concerned about the relationship between GT alfalfa and pollinators. Issues included:

- management practices for GT alfalfa prohibit bee colonies near GT alfalfa fields, which may result in adverse effect on honey bees, the beekeepers, and honey production;
- link between colony collapse disorder (CCD) and GE crops ;
- effects of GT alfalfa pollen on bees;
- the use of glyphosate will eliminate any pollinator forage habitat in agriculture; and
- effects of GT alfalfa on pollinators and insects was not well studied

One GT alfalfa grower states he raises leafcutter bees for alfalfa seed pollination, and is not afraid to expose the bees to this crop.

One farm growing both conventional and GT alfalfa has had a long term relationship with a local beekeeper and has had bee colonies on the land for many years. The commenter states that we are trying to produce high quality alfalfa, we cut before the plant goes into bloom. The commenter notes that the beekeeper feels that GT alfalfa poses no threat to his bees and the beekeeper has seen no change in his colonies since we have planted the fields of GT alfalfa.

Interest groups, beekeeping interests, conventional alfalfa, and organic alfalfa farmers wanted the following pollinator-related issues assessed in the EIS:

- establish whether there is any reduction in the nutritional value of GE alfalfa as relates to honeybees;
- what is the impact of variation in the nutritional value of pollen on the environment;
- show the economic impact of crowding out honey and pollinator industry for alfalfa seed production;
- test for safety of GE pollen in honey;
- will honey made by bees foraging on GE alfalfa continue to be readily accepted by consumers who are leery of all GE products;
- can honey obtained from GT alfalfa be sold as organic;
- does glyphosate use in GT alfalfa fields have negative impacts on bee populations and colonies;
- what are the effects of widespread use of GT alfalfa on insects which pollinate agricultural crops;
- what range of organic and inorganic chemical impurities are detectable in glyphosate that may cause or contribute to impacts on bee populations and colonies; and
- do we have scientific evidence showing that CCD is not caused from bees foraging on GT Alfalfa.

One scientist commented on the effects of GE crops CCD. The comment states that although the suggestion has been made that GE crops contribute to CCD, the Colony Collapse Disorder Action plan developed by the CCD Steering Committee and presented in June 2007 found that there is no evidence that the use of GE crops has contributed to CCD. The comment states that evidence against GE crops contributing to CCD include the fact that large bee die-offs have also occurred in Europe where GE crops are not widely grown and extensive laboratory and field testing has indicated a lack of acute and sub-lethal effects on bees exposed to GE-pollen.

7. Effects of Glyphosate in Agriculture

Some commenters pointed out the glyphosate is a salt-based herbicide and goes on to state that weeds like salt and it seems counterintuitive to use a salt-based herbicide to control populations of weeds that prefer salts.

Related to glyphosate use, interest groups, conventional and organic growers, members of the public, and organic farming interests wanted the following assessments conducted or questions answered in the EIS:

- What levels of glyphosate can be expected in the harvested alfalfa crop, and what is the animal exposure to glyphosate residuals in GT alfalfa
- The effect on 'sustainable' environment if glyphosate is widely used on GT alfalfa
- How long does glyphosate take to break down
- Assess potential adverse impacts from application of glyphosate to GT alfalfa with various glyphosate application methods
- Include projections of the amount of glyphosate applied to RR alfalfa in the future
- Assess the impacts on threatened or endangered species of glyphosate use associated with GT alfalfa on plants growing in or near alfalfa fields
- With the extensive use and frequent applications of glyphosate, what period of time will be required to dissipate glyphosate from these lower soil profiles, or prevent the leaching of water soluble glyphosate into ground water
- Are there data gaps in ground and surface water monitoring programs to adequately assess the impacts of glyphosate residues? If so how should these data gaps be addressed?
- How many states with glyphosate in agricultural use routinely conduct water testing that includes testing for the herbicide glyphosate and all known glyphosate residues present or have a potential to be present in the ground and surface water
- How frequently is glyphosate contamination and all known impurities like 1,4-dioxane detected in the ground and surface water monitoring programs in the United States
- How many drinking water alerts been issued by states or municipalities due to glyphosate contamination and glyphosate-related contaminants in the ground and surface water conduct testing
- How many public or private drinking water wells in the United States have been contaminated or permanently closed by glyphosate contamination
- Has Monsanto cooperated with local, state or federal agencies in cleaning up drinking water wells contaminated by glyphosate contamination
- What remediation steps were taken and what was the cost to cleanup drinking water wells in the United States contaminated by glyphosate contamination

- Will Monsanto pay any portion of the economic cost of remediation that may have to be made to cleanup drinking water wells in the United States contaminated by glyphosate contamination
- How much has Monsanto paid to date in cleanup costs for cleanup drinking water wells in the United States contaminated by glyphosate contamination? If Monsanto has not paid, where will the cleanup costs come from?
- Has the U.S. Environmental Protection Agency paid for any of the glyphosate contaminated drinking water cleanup costs in the United States for past contamination
- Has Monsanto or any farmers been sued by private individuals or governmental entities for allegations of glyphosate contamination in drinking water
- What is the cost of providing clean drinking water for residents who have had their drinking water contaminated by glyphosate
- Has Monsanto developed or funded a filtration process for remediating glyphosate from contaminated water?
- How much would it cost for a family with contaminated drinking water to filter 100% of their water adequately to remove glyphosate residues
- Will the U.S., state or local governments pay for any costs for a family for 10 years with contaminated drinking water to filter 100% of their water adequately to remove glyphosate residues
- Comprehensively review and consider all possible biological effects of glyphosate exposure
- Conduct a comprehensive literature review of medical and related studies investigating links between glyphosate and non-Hodgkin's lymphoma
- What is the minimum detectability limit that is performed, how many sample are collected, and what analytical chemical methods to test batches for the presence of organic or inorganic chemical impurities including 1,4-dioxane
- What purification and separation technologies are used, and what is the efficiency, to attempt to remove organic chemical impurities or other impurities from glyphosate production batches including 1,4-dioxane
- Will APHIS investigate and review all of this information in the EIS that glyphosate contains detectable concentrations of 1,4-dioxane evidently as impurities in the polyoxyethylene alkylamine inert ingredients?

A retired academic provided his concerns about the use of glyphosate. He believes that glyphosate:

- Increases disease, reduces nutritional quality, and enhances environmental degradation
- Increases the population of *Fusarium* and other soilborne pathogens
- Extends host range of pathogens
- Is released into the soil environment through plant root exudates where it is toxic to many beneficial soil microorganisms
- Persistence in some soils from common "weed burn down" applications is well documented and countries have a recommended delay period on the label before planting a susceptible crop
- Residual levels inhibit root uptake of the essential micronutrient manganese, and greatly restrict translocation of copper, iron, manganese, and zinc

- Resistant genes reduces the uptake or efficiency of Cu, Fe, Mn, and Zn that are essential trace mineral nutrients for plants, animals, and humans

A foreign citizen was concerned that glyphosate tests are done on the active ingredient only and states that the herbicide formulation has been found by some researchers to be more damaging than the active ingredient alone.

An interest group is concerned about the use of 1,4 dioxane as an impurity in surfactants in glyphosate formulations, the use of glyphosate on its effects on human health, animals, and the environment, and supplied references to studies.

An interest group notes that the Environmental Protection Agency (EPA) established a tolerance of 0.5 ppm glyphosate on alfalfa seed to facilitate introduction of GT alfalfa; there were unaware of if glyphosate residues were permitted on alfalfa seed prior to this tolerance decision, and unaware if any tolerance has been established for glyphosate residues on alfalfa hay.

GT alfalfa growers were concerned about the use of other herbicides on alfalfa besides glyphosate, because they felt that glyphosate is safer, both for the plant and for the environment and other herbicides are more expensive and have little effect on weeds. They felt that GT alfalfa will lead to the reduction of more toxic herbicides being used to control weeds in alfalfa. Further, they felt that since glyphosate is so safe to use, harvest restrictions and grazing restriction intervals are all but eliminated.

8. Potential Economic and Social Impacts of GT Alfalfa

Impacts due to the Court-ordered injunction that halted new plantings of GT alfalfa
A regional bank is concerned because as a lending institution commitments are made to producers with the expectation that what they do provides a financial benefit to themselves, contributes to the economy of the region, provides employment, is a sound agricultural practice, and is of course legal. The comment continues: while issues are being explored that may change the decision in time, the fact remains that producers have already invested their capital, borrowed capital and structured their operation around the production of this crop. Because of the long stand life of an alfalfa crop, the negative financial impact of this order on the producer is a reality. In addition, what appears to be ignored is the fact that neither traditional (organic) alfalfa crop producers nor GT alfalfa crop producers benefit from any cross contamination of either crop from a marketing perspective. One can argue the issues surrounding genetic engineering and the environment all day long, but at the end of the day the court has determined with what appears to be a limited amount of information that a business engaged in the legal production of a crop should simply immediately cease to exist.

One alfalfa grower emphasized that farming is a very low margin business. The only way a farmer can stay in business is to be able to grow the best quality and the highest quantity of crops as possible with the most cost effective practices available. The comment states that using GT alfalfa is the only way to grow certifiable, weed-free hay that can be taken into the National Forest without spreading weed seeds as well as alfalfa seeds. Half of the commenter's farm is on hold, waiting for these proceedings to be completed to finish planting with GT alfalfa. The

commenter wishes to not continue our old practices to control the weeds as they do not work effectively on our farm even with spending huge amounts of money on fuel and chemicals and being in the fields 24-7. We believe we should have the right to make a choice as to the kind of alfalfa we plant.

Growers were concerned about the income loss from not being able to plant GT alfalfa seed, including the cost of controlling weeds in conventional seed as compared to GT alfalfa seed, loss of yield, the extra expense in labor of spraying and the cost of running the sprayers, the extra expense in cleaning out the weed seed, and the cost of freight in trucking dirtier seed.

One supply and marketing cooperative found that the regulation of GT alfalfa caused significant losses for alfalfa growers in the Midwest. The comment continues: the release of the first GT varieties drew the immediate attention of the farmer owners of our cooperative. All available GT alfalfa was sold in 2005 and 2006. The level of grower satisfaction surpassed expectations and the cooperative received no complaints about the product. This same commenter referenced the Iowa State University Hay Market News on January 7, 2008: the highest prices were paid for Supreme quality alfalfa hay and as the quality declined the price declined. The commenter noted that nowhere in this hay market report is there a premium for organic or conventional hay nor is there a discount on GT hay.

One alfalfa grower stated that the re-regulation of GT alfalfa have created a real problem for our farm plan for the next four years. The comment continues: as you know, this perennial crop is planted and grown for four - six years before rotation. After the decision to regulate GT alfalfa this summer, we had to go back in time and plant 900 acres of conventional seed for alfalfa hay production which was scheduled for GT alfalfa. In our area we have a real problem with noxious weeds which cannot be transported across state lines in California where our market is located. In the past, we have had trucks rejected at state line due to noxious weeds. GT alfalfa has been the answer to this problem for us, not one rejected load; our quality and production has increased with GT alfalfa.

One commenter felt that the injunction preventing new plantings of GT alfalfa is costing the American farmer millions in lost revenue due the enhanced productivity of this product. In turn the economic impact to the communities in which these farms exist are suffering as well. Other commenters felt similarly, in that the injunction will result in financial harm to growers and seed dealers.

An alfalfa grower feels that this injunction is a crock, nothing more than a fight for a dollar, and guesses this bunch would have us ban tractors and start farming with mules and horses again.

One commenter was concerned that the inability to access GT alfalfa will put us back into the downward spiral of lower quality hay we were in before. The commenter states that in a very short time it will take from us our ability to produce premium grade Race Horse Timothy; it is the only crop that keeps our farms from becoming the subdivisions of another bedroom community to Seattle.

Compensation issues for growers of non-GT alfalfa
Commenters who either grow crops using organic methods or prefer to consume foods that have been grown using organic methods are concerned about who will compensate them for the loss of organic products or the increased cost consumers must bear to continue enjoying organic foods, and who will compensate conventional and organic
producers for their losses and/or increased costs.

Alfalfa seed processors are concerned about their liability if they process alfalfa seed that inadvertently contains the GT trait.

An organic association wanted benchmarks developed that establish distinct mileposts and guidelines for compensation of organic farmers and the manufacturers of organic products should their welfare and livelihood be damaged by GE contamination.

An organic association wants a system developed to contain and halt the spread of such contamination should it occur as well as the establishment of remedial actions to address any contamination.

An alfalfa seed producer wanted to know the economic impact of making FGI responsible for the stewardship of their patented genetics of the GT alfalfa.

One commenter stated that GT alfalfa should only be allowed if a farmer who is not growing GE crops is allowed to sue the manufacturer if the GE crop contaminates his crop by whatever means.

One commenter stated that creator of GT alfalfa should be responsible for all adverse effects caused by adventitious presence. Many organic growers and interest groups feel that the non-GE seed grower should not be responsible for keeping GE pollen out of his/her field. That responsibility should fall upon the owner of the technology contained in said GE pollen.

A law professor states that organic growers who sign contracts promising that their alfalfa will be completely free of all detectable traces of GT-alfalfa have voluntarily contracted to meet product specification standards that are above and beyond those required by NOP standards. The commenter continues by stating that organic growers who voluntarily sign contracts setting forth such product specification have obligated themselves to meet that product specification; they have no legal claim against anyone else if they then fail to satisfy the voluntarily accepted product specifications in their own contracts.

Other economic and social impacts
A sustainable agriculture group believes that when cross contamination does occur, it will result in the loss of organic certification.

A law professor states that so long as organic alfalfa growers do not intentionally use GT-alfalfa and take reasonable measures to avoid use and or contact, these organic growers do not lose organic status for their farmland or their organic alfalfa under NOP standards. NOP regulations and their accompanying comments make clear that organic farmers are not at risk of losing

organic certification for the farm or the product so long as the organic grower complies with the applicable organic grower plan.

One non-GT farmer feels that if a producer within pollen-drift range plants GT alfalfa my rights to grow conventional hay, seed, will be violated.

One commenter felt that it was very important to hear from organic hay producers and conventional hay producers about how the deregulation of this trait might affect their farms.

One commenter believed that organic farmers have the only true concern seen. The commenter believes that the economic impact to these farms can and should be documented, however, the same impact study should be one done on all the farms that produce alfalfa. The fractional acres of organic farms in the United States as a whole would suffer much less economic impact than if this product did not make it into the hands of all farmers. These farms and the towns they preside are not being supported by the additional revenues that will come.

An conventional alfalfa hay and seed grower states that to reduce fuel costs and unnecessary additional harvesting expenses, his stands grow into bloom, which is conducive for conventional alfalfa seed production on his hay ground. The commenter then states that this seed may be sold as common, vernal. Etc., and the source of income is important to growers such as myself.

Interest groups, organic growers, some conventional growers, and organic farming interests were concerned about various economic and social ramifications of GT alfalfa, and requests the following issues be addressed in the EIS:

- How will hay growers keep GE alfalfa separate from conventional alfalfa
- Who will pay for testing conventional hay to make sure it is GE free
- When the GE alfalfa escapes cultivation and become a weed along road sides, and in waste ground will it be possible to remove all contamination in the future? Who will be financially responsible for cleanup if in the future there is a problem?
- Can low-level presence of GT alfalfa can be marketed as “conventional” or “organic”
- What is the cost of testing to satisfy customers who prefer non-GT alfalfa, at whatever no-tolerance or low-tolerance levels desired
- Who has liability or reestablishment of productivity and beneficial micro flora, detoxifying residual glyphosate in the environment and subsequent non-target effects, and removal of the gene from non-target alfalfa
- The costs of implementing effective measures to prevent (not just mitigate) transfer of the GT trait to conventional, organic and feral alfalfa
- Survey domestic and foreign alfalfa purchasers to determine their rank-order preference for organic alfalfa, conventional alfalfa, and GT alfalfa
- Survey prices offered for each type of alfalfa
- Assess the loss of premiums for organic alfalfa resulting from the presence of the GT trait in non-GT alfalfa supplies
- Assess the financial viability of organic alfalfa or GE-free alfalfa cultivation with reduced premiums
- Assess opportunity costs from loss of the option to cultivate GE-free conventional and organic alfalfa occasioned by the introduction of GT alfalfa

- An assessment of the likely shift of organic/GE-free conventional alfalfa seed and forage production to countries whose farmers can guarantee GE-free supplies.
- Assess costs borne by conventional/organic farmers in attempting to avoid transgenic contamination, including but not limited to: purchase or lease of land to create larger buffers separating them from GT alfalfa producers; and any other changes in cultivation practices (e.g. temporal isolation) forced on conventional/organic growers to avoid transgenic contamination
- Formulate and analyze various mechanisms by which GT alfalfa growers and/or companies selling GT alfalfa can be required to compensate organic and conventional alfalfa farmers for loss of markets or loss of income (i.e. premiums) from transgenic contamination of alfalfa supplies for markets that reject such supplies due to presence of GE content
- Formulate and analyze various mechanisms by which GT alfalfa growers and GT alfalfa seed suppliers can be required to compensate organic and conventional growers for their increased expenses associated with GE content testing and attempts to avoid transgenic contamination of their alfalfa
- Assess the long-term consequences of GT alfalfa introduction on the viability of private and any remaining public-sector alfalfa breeding programs in the U.S.
- What are the costs of breeding out an inadvertently-introduced GT alfalfa trait?
- What are the financial consequences of contamination for United States breeders of conventional alfalfa?
- What losses may be expected from a shift of alfalfa breeding programs to other countries where transgenic contamination of experimental alfalfa varieties can be avoided?
- How much is 'low-level' presence of GT alfalfa in non-GT alfalfa?
- What is the negative economic impact to retailers and wholesalers if they lose sales of organic alfalfa sprouts and other organic alfalfa food products because the organic alfalfa food items are contaminated with GT alfalfa ingredients and little or no organic alfalfa is available?
- What is the negative economic impact to retailers and wholesalers if they lose sales of organic alfalfa sprouts and organic alfalfa food products because consumers are concerned about the threat of contamination by GT alfalfa ingredients?
- What is the negative economic impact to organic and conventional alfalfa growers if they lose sales of organic (and conventional) alfalfa sprouts and organic alfalfa food products because the organic (and conventional) alfalfa items are contaminated with GT alfalfa ingredients and no organic alfalfa is available?
- What is the negative economic impact to organic and conventional alfalfa growers if they lose sales of organic (and conventional) alfalfa sprouts and organic alfalfa food products because organic food retailer and wholesalers refuse to buy these food items due to their concerns about the threat of contamination by GT alfalfa ingredients?
- What is the negative economic impact to organic and conventional alfalfa growers if they lose sales of organic (and conventional) alfalfa sprouts and organic alfalfa food products because consumers refuse to buy these food items due to their concerns about the threat of contamination by GT alfalfa ingredients?
- What are the range of economic costs to organic or conventional alfalfa seed growers of having to conduct annual DNA tests of their alfalfa seeds for the presence of GT gene contamination?

- What is the range of economic costs to organic or conventional alfalfa farmers/growers of having to conduct annual DNA tests of their alfalfa seeds and alfalfa crops for the presence of GT gene contamination?
- What extent of alfalfa seed and alfalfa crop DNA testing will be needed to be performed each year by organic and conventional alfalfa farmers to sample their alfalfa seeds and alfalfa crops for the presence of GT gene contamination?
- What is the range of economic costs passed on to consumers who consume products derived from organic or conventional alfalfa if the farmers have to conduct annual DNA tests of their alfalfa seeds and alfalfa crops for the presence of GT gene contamination?
- What is the range of economic costs to organic or conventional food retail and wholesale companies of having to conduct annual DNA tests of their alfalfa seeds and alfalfa crops for the presence of GT gene contamination?
- What is the range of economic costs to organic or conventional alfalfa farmers if they had to label their GT contaminated alfalfa seeds and alfalfa crops when the presence of GT gene contamination is detectable?
- What are the economic costs to food retailers or wholesalers if they had to label their GT contaminated alfalfa seed products and alfalfa food items when the presence of GT gene contamination is detectable?
- What would be the costs borne by a company such as Monsanto to pay for GT testing if their GT alfalfa crop contaminates neighboring non-GT alfalfa crops?
- Examine historical data to evaluate trends in selling prices for conventional and organic alfalfa, in particular premiums offered for organic alfalfa. Based on these data and current trends, APHIS should project the selling price and premiums for organic alfalfa for at least one decade into the future.
- APHIS' analysis should accept the need to preserve the option of farmers to grow and market organic alfalfa free of unintended transgenic content in all alfalfa-growing areas, now and in the future.
- How will GT alfalfa affect the cattle market value?

One commenter believes that the need for establishing a GE Free or conventional production zone is to be able to continue to sell alfalfa seed to the organic seed markets with the lowest possible occurrence of adventitious presence. The commenter states that teed from this production area has been sent for the organic hay market for seed planting and the one thing that is requested by the organic growers and the organic certifier is a letter of verification of production of conventional seed production.

Seed producers, cleaners, and hay producers will all lose if common seed, which is less expensive, becomes contaminated and eventually eliminated.

One commenter believed that organic and non-organic producers have co-operated amiably to mitigate the potential for contamination.

From an alfalfa seed grower: alfalfa growers will have a difficult time competing with corn growers from a profitability standpoint if we are not allowed to utilize the genetic advances already available to corn growers. This schism will be accentuated as new genetically modified

traits become available for corn and future advances in alfalfa are squelched as a result of this action against alfalfa.

An alfalfa grower stated that our main goal is to supply high quality hay to our dairy customers. The commenter continues: of the 27,000 tons we produced in 2007, approximately 20% had enough grass to warrant a reduction in price. These reductions ranged from $10-15 per ton and we lost approximately $50,000 as a result of the deductions for grass. The commenter stated that grass is a prevalent problem in our area and dairymen closely scrutinize the bales and expect a deduction for any grass that is present: none of our GT fields had any grass present and we would expect this to be the case for the entire life of these stands.

An alfalfa producer states that GT alfalfa is essential to stay profitable in the alfalfa business, and to provide a quality product for consumers.

An alfalfa farmer believes that where sandy soils prevail organic farming is an insult; we do not desire to return to the dirty 30's, which is what organics would do. In the commenter's opinion, "organic farming" is only a smart marketing tool, and really is a method to sell sub-par quality products to an uninformed public at a premium price.

A GT alfalfa grower feels that GT alfalfa fields are much cleaner, produced more alfalfa, use less herbicide than the conventional alfalfa fields and less fuel is used in GT alfalfa fields because of the fewer trips across the field for spraying and raking the hay.

A group of academic pointed out that the primary commodity for alfalfa is forage hay and not seed. This group believes that there is no documented certified organic seed in the United States, although there is likely a small proportion grown organically. The commenters state that there is no doubt that the organic market will grow with demand from organic dairies, but it will likely remain the minority of total production, even if it grew 10 fold.

9. Potential Trade Impacts of GT Alfalfa

One commenter believes that because of the potential for disruption to the seed trade environment, GT alfalfa seed production needs government regulation and oversight.

A conventional alfalfa seed farmer, who has grown seed for Argentina, Saudi Arabia, France and Turkey, is cognizant of pollinators and the distance they travel and, because of those factors, does not raise any GT alfalfa seed in our area of over 8,000 acres. The commenter states he is aware of both the sensitivity of some markets of GE traits and the great benefits that genetic engineering has brought to American agriculture. The commenter believes that the Best Management Practices formulated by the National & Alfalfa Forage Alliance (NAFA) can lead to a coexistence between seed grown for organic agriculture, export markets, and GT markets.

A conventional seed grower group believes a GE Free or conventional production zone is needed to export conventional alfalfa, because alfalfa hay growers in the Pacific Northwest who export their hay to foreign countries want the reassurance that the seed that is planted is conventionally

grown so they can assure GE-free hay. This group states that they recognize that foreign governments have accepted GT alfalfa, but not all end-use buyers.

A regional hay grower group supports the advancement of technology and science to keep agriculture viable and productive, however they do not want GT alfalfa released until market acceptability and approval in all markets, assurances of public food safety, and proof that use of GT alfalfa will not contribute to the development of glyphosate resistant weeds rendering glyphosate useless for future use has been assured.

A hay exporter states although the Japanese government has approved the sale of GT alfalfa, Japan's marketplace (importers, agricultural cooperatives and dairymen) does not want to buy GT alfalfa.

An GT alfalfa grower states that his primary crop is Timothy hay, which he exports to Japan, but blue grass is beginning to infest fields. The blue grass infestation then reduces premium grade Race Horse Timothy to lower grade cattle hay. We have tried many types of crop rotations including regular alfalfa, and GT alfalfa is the first crop to show the potential solution to this blue grass problem. The commenter continues: while there seems to be a lot of talk about non-acceptance of GT alfalfa, we were able to export our crop last year to both Korea and Japan; both customers knew it was GT alfalfa and we have Japanese and Korean buyers standing in line to buy this product at a premium price.

Interest groups, some conventional alfalfa growers, some organic alfalfa growers, and some members of the public requested the following information or assessments regarding trade impacts of GT alfalfa included in the EIS:

- What will the effects of widespread contamination with unwanted GT alfalfa be on exports to Europe of organically certified dairy products and meat in situations where the importing country or group of countries does not permit feeding of GT alfalfa for these products
- What are the effects of other products of the widespread use of GT alfalfa
- One commenter stated that in 2007 FGI bought a seed production facility in Alberta, Canada to produce GE free alfalfa seed for sensitive markets. The commenter wants to know why would the company that is in charge of trait stewardship of GT alfalfa, that knows the GPS coordinates of every seed and hay field, and has placed every GE alfalfa seed production contract feel the need to purchase their first seed production facility in another country in order to produce alfalfa seed for sensitive markets?
- Will GT alfalfa eliminate sales of the beef to foreign countries
- A thorough economic review of the GT alfalfa trade impacts on export markets.
- Will APHIS avoid relying too extensively on economic data provided by Monsanto and FGI due to their vested interests in GT alfalfa

10. Mitigation/Coexistence/Farmer Choice Issues

Coexistence possibilities

Two national grower organizations commented on the issue of coexistence between GT, conventional and organic alfalfa. These organization stated concerns must be addressed in a

sensible, reasonable, and practical manner, and detractors of biotechnology overlook the fact that coexistence is not an offshoot of biotech crops. Other comments

- For 10 years, biotech corn and other systems have coexisted with appropriate control measures
- Corn farmers have practiced coexistence for years through the side by side production of commodity corn and specialty corns such as white or food grade, or hybrid seed production
- Each of these non-commodity corns has distinct marketing specifications that require controlling pollen flow
- Although alfalfa has certain unique agronomic characteristics, coexistence is still managing pollen flow. Since the vast majority of alfalfa is harvested before a viable seed is produced, coexistence is not an issue.
- While alfalfa seed production does present some additional challenges, we are confident the seed industry can easily modify production systems to maintain seed purity
- Finally, we emphasize that the National Organic Standards still requires organic producers to demonstrate they are employing buffers or other control measures as part of their process
- Whether it is seed production, feed production or food production, we can and we have all existed together in the safe and continued advancement and expansion of these technologies in other commodities for many years, and we are confident that the alfalfa industry can and will do the same under the same responsible yet practical approaches employed by other commodities or industries utilizing the same technologies.

One commenter is very active in international alfalfa seed markets and believes that traditional markets, such as these, should not be unduly disrupted by the introduction of biotechnology. The commenter believes that over time these sensitivities will decrease, but in the interim the industry wants and needs to provide international customers with the products they call for, which requires developing methods, procedures and enforcement that enable coexistence.

A seed grower comments that he has seen the steps involved in minimizing the potential harm to growers who choose not to grow GT alfalfa. The commenter continues: FGI has been diligent in our Best Management Practices training, and in overseeing our production process, and believes the EIS process will further delineate the steps needed to assure that all concerned parties will be protected. The commenter feels that coexistence strategies should be developed that not only protect those who choose not to grow GT alfalfa, but also to protect my right to access the beneficial GE technologies that have been proven safe and effective in other crops.

A university researcher believes that it is more important to ask: 1) Is the risk of gene flow difference in magnitude or impact than any other common neighbor effects, and 2) Can steps be taken to keep contamination to a low enough level so that it does not impact neighbors' markets. The commenter states that there is a whole series of neighbor effects that could impact neighbors, including pesticide drift, runoff from manures, or other effects from neighbor to neighbor, and organic farmers are not immune either: they might have trouble controlling insects that move into neighbor's fields, causing harm. The commenter feels that coexistence between these two methods are technically feasible and steps have been taken by industry groups to assist in this process. However, for coexistence to work, the commenter believes that there must be a

willingness on the part of the parties to make it work: if parties state that coexistence is impossible, I suspect that indicates a lack of willingness to attempt to make it work.

One commenter believes that those who wish to use this technology should have the option. As a grower of both conventional and GE alfalfa for both hay and seed production, the commenter feels that it is possible for all parties to be able to coexist successfully: if this industry is going to compete in the world market and continue to meet the needs of our consumers then we must learn how to use the technology that is available to us.

One commenter believes that the American farmer is a good steward of the land and will use this technology as a management tool to insure delivery of a quality product to the market. The commenter supports this technology and will defend the right of the American farmer to choose to use this technology. The commenter feels that non users of this technology also have the right not to use this technology: user and non users can coexist providing both sides are good stewards of the inputs they choose or not use.

One commenter states that the economic loss to farmers would be great if GT alfalfa is not made available and it is clear the research and science being conducted by government agencies, private companies and universities show the GT technology as being safe to animals, humans and the environment. As an agronomist, it is the commenter's opinion that the current stewardship practices put in place for GT alfalfa can be effective so that all cropping systems can coexist in harmony .

An alfalfa seed product manager support growers' rights to choose the right product to maximize profitability on their own farms, whether that is GT alfalfa, conventional alfalfa, or organic alfalfa production. The commenter wants others to remember that the majority of producers who use or want to use biotech products have as much of a right to choose what products and technologies they grow as does the small minority of growers who want to grower organic crops and he believes that this point has been overlooked repeatedly in this whole situation.

A commenter states that the technology fees from GT alfalfa are used to finance research and development of agriculture products and crops that will enable the American farmer to be competitive in the future and that the value of the research reaches globally: all alfalfa growers, organic, conventional, and technology, should be allowed to coexist in American agriculture.

One commenter felt that organic and biotech agriculture can coexist and thrive, as they have already done so for many years with no major incidents.

In addition to the potential risks, one commenter believes that the economic and ecological benefits of GT alfalfa should also be addressed. The commenter asks to please remember that the operations potentially negatively are very, very small in number and acreage and therefore, coexistence strategies should be feasible through management measures. For example, the commenter asks if all the farmers east of the Rocky Mountains will be denied the use of the crop because a few operations west of those mountains may be affected, and believes that farmers should have the choice of growing GT alfalfa or non-transgenic alfalfa.

An alfalfa grower commented that growers in the United States should have the freedom to choose the type of forage production system they use whether it be GT, conventional or organic, each of these production systems can coexist with proper management. The commenter believes that proper management is the key to employing any advanced technology whether the result of crop chemicals, biological agents or genetically modified technologies to be able to use the new technologies sustainably.

One alfalfa grower stated that we definitely need the right to choose and there is definitely room for both those who want to grow crops and livestock as of one hundred years ago, and those who want to grow for the needs of the present and into the future. The commenter asks to please allow us that right to choose and when I say us, I mean me, my son, and my grandson, who farm this operation, along with those who choose the organic way.

One farmer wrote to say that there is certainly room to coexist and that should be the name of the game; the side that wants no new biotechnology is dealing with a perception that organic is the only good food produced and that anything else is bad.

Coexistence implementation

Many GT alfalfa growers, conventional growers, and other farming interest suggested various ways to implement coexistence:

- The Crop Improvement Associations in the states can help control or define the areas that the two crops are being grown
- Seed companies and NAFA can work together with the Crop Improvement Associations to help develop criteria for GT and conventional seed, similar to onion seed and carrot seed production.
- An in-depth industry discussion is needed to plan and provide coexistence. A plan should include best practices education for growers, open communication and cooperation regarding what is planted on alfalfa fields, suggestions from the non-GE industry to develop best practices guidelines for their industry, and respect for opposing viewpoints.
- "Best practices" to keep any contamination to feral alfalfa or a neighbor who may be an organic grower to a tolerable minimum. All farmers learn to tolerate their neighbors farming practices.
- Good stewardship, courtesy and communication, and separation of fields.
- Stewardship practices already exist will ensure GT alfalfa, traditional and organic alfalfas coexist successfully.
- GE-free production areas, independently funded research, industry cooperation and legal enforcement by State Dept of Agricultures or Certifying agencies
- Identify critical steps in the development, production, conditioning, and shipment of alfalfa seed and develop a working plan that specifies, in some level of detail, actions to be taken to ensure our ability to produce, condition, and ship GE-free seed.
- A three to five mile GE-free zone to isolate GT alfalfa and conventional production.
- Adoption of usual and ordinary agronomic practices, particularly with regard to the timing of cuttings of alfalfa in the field, to eliminate or reduce to minimal trace levels the presence of GT alfalfa in the fields of organic growers and, vice-versa, the presence of organic alfalfa in the fields of growers of GT alfalfa.

- Several state agricultural departments and university extension services have developed coexistence programs and guidelines that farmers can adopt to eliminate or reduce the presence of GT alfalfa in organic alfalfa and vice-versa.
- Before planting GT alfalfa, a grower went to the State Department of Agriculture and got a list of all certified organic growers, and informed all neighbors within a three mile radius. The growers stated that he received no complaints from neighbors.
- Common sense approach, practicality, and stewardship
- Good communication with neighbors, good seed, and requires an understanding of gene flow and how to maintain seed and hay purity
- A commenter stated that coexistence strategies for alfalfa production systems have been developed and tested by growers and the seed industry with input from seed and hay exporters, growers, processors, seed companies, and public scientists. For example, the science-based information outlined above was published and disseminated at grower (National Alfalfa Seed symposiums) and seed industry (California Seed Association, American Seed trade Association) meetings prior to commercialization of GT alfalfa in 2005. For example, over 3000 publications were disseminated at the meetings over the past 3 years. Specific stakeholder meetings were held and reported on in ID and CA to develop Best Management practices. Recently (October 10th, 2007), a meeting was held by NAFA to specifically address coexistence in alfalfa. At these meetings and currently, best management practices are being refined that will allow farmers to coexist and have a choice in what production system is best for their particular markets.
- Multiple commenters suggested establishing a 'tolerance' or a 'level' that could be found in non-GT or organic alfalfa.
- Prohibit the production of GT alfalfa seed within 15 miles of conventional seed production and banning the production of GT hay within 10 miles, with the stipulation that any GT hay within 15 miles must be harvested before it is pollinated. Any remaining concerns can be dealt with by localized regulation for specific areas, such regulation should be implemented at the state or local level.
- Work with States' Department of Agriculture to formulate a draft rule and establish a control zone for alfalfa production area.
- Coexistence across production systems is process driven as are the NOP and seed certification programs.

Coexistence concerns

One commenter felt that in the absence of both strong collaboration and cooperation between the industry stakeholders or the establishment of mandatory regulations enforceable by a recognized authority, the alfalfa industry will continue to struggle with the coexistence of biotech and conventional alfalfa.

A conventional seed grower recounted the efforts of a group of growers that petitioned a State Department of Agriculture to develop a GE-free production zone under the control of a local growers board, and that the zone was denied due to the fact that GT alfalfa was not considered a "pest" under state statute.

One commenter stated that the organic food industry is a growing sector in the agriculture community and for FGI and Monsanto along with APHIS to be so cavalier in expecting the organic industry to protect themselves from errant gene flow borders on being criminal.

One commenter felt that GT alfalfa would endanger conventional and organic producers by introducing a questionable technology in a crop that is not studied enough to know its impacts.

An academic states that the proposed topics for the EIS includes a number specifically addressing the potential impacts on the organic agricultural sector of the introduction of GT alfalfa and this is primarily directed toward the issue of potential impacts due to low level or adventitious presence of GT alfalfa in organic seeds or hay products. The commenter believes that it must be noted that NOP rules do not establish a threshold for such presence and specifically state that the organic status of such products is not affected by such inadvertent and low-level presence. The commenter states that the inclusion of a ban on use of GE crops in the NOP rules was not mandated by the US Department of Agriculture (USDA) or APHIS, but was rather demanded by the organic community, and therefore this is a self-imposed ban by a subset of agricultural producers with the intent to differentiate products in the marketplace. To the commenter, it seems inappropriate for a study whose mandate is to assess environmental issues to include impacts on voluntary marketing strategies in its scope.

An interest group states that GT alfalfa must not be deregulated absent a convincing demonstration that growers can be assured of their continued option of growing non-GE alfalfa. The group believes that the right to grow non-GE alfalfa is not limited temporally or geographically, and GT alfalfa is not to be deregulated if a reasonably foreseeable impact of the deregulation is the elimination of the option of farmers living in any region of the country to continue growing non-GE alfalfa, in the near or longer term future. The group feels that the right to grow non-GE alfalfa is also not synonymous with the right to grow alfalfa that is contaminated with GE alfalfa at “negligible levels” due to “inadvertent gene flow,” and thus, APHIS should formulate an alternative that analyzes the contamination issue where the standard is zero tolerance for contamination.

Coexistence assessments

Related to coexistence, interest groups, some organic farmers, and some academics requested the following assessment to be included in the EIS:

- What will the effects of widespread contamination of geographical areas with unwanted GT alfalfa be on farmers desiring to transition into certified organic operations that are for the purpose of growing organically certified alfalfa
- What are the environmental effects of making it more difficult for a farmer or rancher to operate as an organically certified produce, that result from widespread GT alfalfa production and contamination
- An academic stated that if, as implied by the court’s ruling and by its inclusion in the NOI, the impact of GT alfalfa on organic producers must be considered in this government action, then one must ask whether the certification of organic farms and farmers should also be subject to the same consideration
- How are the rights of ranchers, farmers and others to use their land affected by the unwanted invasion of the GT alfalfa products to be introduced into the markets

- If it is established as precedent that economic impacts of the introduction of new agricultural products or practices must be considered as environmental impacts, as per the court's ruling in the GT alfalfa case, then it follows that a new organic farmer should be required to assess the potential impact on neighbors of the decision to seek organic certification.
- What are all the environmental effects of driving family farms out of business by making the organic farming alternative more difficult due to permitting use of GT alfalfa, both alone and in the context of extensive use of GT com, canola and other crops
- Can APHIS define what it means by the term "coexistence" of organic/conventional alfalfa as to whether it's a scientific term or an APHIS policy position
- It is incumbent on APHIS to also consider the economic consequences of allowing the self-imposed marketing preferences of one sector of the agricultural landscape to restrict the economic opportunities of other sectors.
- Has APHIS conducted a survey of organic or conventional alfalfa farmers as to their views of the meaning of "coexistence" with GT alfalfa
- What is the difference in the perceptions of "Coexistence" between organic or conventional alfalfa farmers compared to GT alfalfa farmers
- Whether any of the potential negative environmental and economic impacts resulting from the deregulation of GT alfalfa can be mitigated and the likelihood that mitigation measures will be successful – that is, whether "coexistence" is practical or possible.
- If the EIS were to propose specific mitigation procedures that would restrict the opportunities for farmers to grow GT alfalfa due to proximity to organic farms, then the economic impacts of that decision should also be included in the study. Such an analysis might conclude that the NOP should be required to conduct an EIS before certifying additional organic farms if their presence would economically injure nearby conventional farms due to restrictions imposed on their crop choices.

11. Effects of GT Alfalfa on Animal Production Systems

A GT alfalfa farmer growing GT alfalfa for dairy cow production stated that GT alfalfa if free from weeds which defrayed the costs of production due to not having to purchase additional hay for their animals or add protein to supplement their feed as is needed in lower quality hay.

Some commenters felt that GT alfalfa brings improved relative feed value (RFV), more milk to dairies, higher quality beef, and numerous other benefits. One grower attached a recent study that shows that GT alfalfa has no effect on feed intake, milk composition, or milk production in dairy cattle.

GT alfalfa growers commented on the ability of GT alfalfa to keep out noxious weeds that injure, maim, or kill cows and cattle, including cheat grass and nightshade.

One commenter states that he would rather be eating meat from cattle that is eating alfalfa that has been sprayed with glyphosate than all of the other labeled chemicals, is in favor of the labeling of GT alfalfa because we will have a lot better quality feed for the meat that we eat.

Some animal producers feel that animals will refuse to eat GT alfalfa.

Interest groups, some organic and conventional farmers, and some members of the public requested the following information or assessments regarding animal production systems and GT alfalfa included in the EIS:

- What percentage of the pesticide formulation ingredients used on the alfalfa crop show up in the milk of dairy cattle fed this material
- Does the presence of this pesticide alter gene expression in livestock consuming GT alfalfa with the highest application levels of this herbicide and the adjuvants of the formulation
- If there is alteration in gene expression in livestock, can it be transmitted from one generation to the next
- Can the presence of glyphosate in the alfalfa crop alter the numbers of primary follicles in heifers, which would alter their reproductive output
- Should organic livestock agriculture gain the public perception, both domestically and internationally, that it has been contaminated by GE organisms, the public appetite for organic food may be substantially harmed and farmers economically injured
- To what extent will the level of production of organically certified livestock be affected by the use of GT alfalfa and what will the environmental effects of such changes in volume of production be
- An animal feeding trial for multi-generation should be conducted involving both male and female of the species. This should be done outside the influence of Monsanto or FGI.
- What are the effects upon producers and the public of making overall grazing and other use of lands by organically certified farmers and ranchers in circumstances where volunteer and stray GT alfalfa appear in fields which cause additional work or even cause disqualification of a field for organic production
- How will feeding GT alfalfa to beef affect the rating of the beef? Can it be sold as natural?

12. Effects on Food & Feed

Commenters representing organic farming interests, members of the public, and interest groups questioned the safety of GT alfalfa as food or feed. Issues raised and assessment requested for the EIS included:

- Feeding alfalfa to animals treated with glyphosate because glyphosate residues that may be harmful to them
- Use of alfalfa sprouts for human consumption and the use of the CaMV promoter
- What are the effects on children's and others' health nationwide from consumption of meat and, separately, milk where the livestock in question have consumed GT alfalfa including the effects of increased anxiety not knowing what the effects of GT alfalfa are
- What is the period of years likely to be needed for the scientific community to detect higher rates of allergies, cancer and other maladies that result from animal consumption of GT alfalfa and human exposure to GT alfalfa
- What are the effects on children's and others' health nationwide from driving organically certified ranchers and farmers out of business by making it more difficult to produce alfalfa that can be organically certified

- Some commenters were concerned about the effects of GT alfalfa, the nutritional quality of GT alfalfa, or the effects of GE foods in general, on livestock and human health, or were concerned that the effects were not well studied
- Genetic engineering corrupts organisms, and thus results in poisoned food
- GE alfalfa seed must not be sold to be used for alfalfa sprouts
- What is the impact of non-GT alfalfa mixed hay cut at bloom for balanced nutrition-beef cattle, horses, sheep, etc.
- One commenter felt that we need to stop genetically modifying products that go into our food chain because we are what we eat
- What is the effect of feeding GT alfalfa to the mother and calf, hogs, and poultry, and should include alfalfa in its most common forms
- Impact of the glyphosate-resistant gene in alfalfa, by direct comparison with isogenic non-glyphosate resistant lines, grown in various soil types on:
  - Nutrient uptake efficiency (N, P, K, Ca, B, Cu, Fe, Mg, Mn, Mo, Zn)
  - Root exudates impact on the rhizosphere micro flora
  - Nitrogen-fixing Mycorrhizae, pathogens, synergists
  - Nutrient cycling organisms for: Fe, K, Mn, S, etc.
- Impact of glyphosate applied to GT alfalfa compared with non-GT alfalfa on:
  - Yield, nutrient quality, mineral content
  - Rhizosphere organisms: nodulation, nutrient availability
  - Diseases - pathogens, biological control organisms
  - Sustainable production - soil fertility, drought stress, maturity, over-all cost differential with anticipated micronutrient and biological amendments, resistant weed control, etc.
- Impact on subsequent crops in the rotation:
  - Establishment, nutrition
  - Growth and productivity
  - Degradation and persistence of glyphosate and its metabolites from root exudates at root depths of alfalfa
- What are the negative impacts on food or feed value or quality from the use of glyphosate containing organic chemical impurities detectable in batch quantities of herbicide produced such as formaldehyde, N-Nitrosoglyphosate, and insolubles?
- Does the presence of detectable or undetectable glyphosate residues affect the taste of alfalfa when it is processed into food products?
- Does the presence of detectable or undetectable glyphosate residues affect the nutritional quality of alfalfa when it is processed into food products?
- An interest group states that a person has to be ignorant to believe that a smorgasbord of toxic agricultural chemicals in the foods is safe to consume.
- Compositional assessments submitted to USDA and Food and Drug Administration (FDA) by Monsanto are not adequate
- Determine the current impact of weeds on animal production and animal health, and if this new technology decrease animal performance or welfare, or improve it
- One group wants carefully controlled, long-term animal feeding studies, with toxicological endpoints, to assess GT alfalfa for potential adverse effects on animal health

Alfalfa farmers growing GT alfalfa, members of the public, and farming interests commented on the benefits and safety of GT alfalfa. Issues include:

- GT alfalfa produces higher quality alfalfa with greater yields and improved quality that could be marketed to dairy farms for feed
- Glyphosate will kill certain weeds that are harmful if consumed by ruminants, thus increasing the safety of the feed
- GT alfalfa is safer to produce our meat or milk because of the proven safety and effectiveness with years of use of glyphosate in other crops
- Research indicates that GT alfalfa should be safe to use in the United States, and should be registered for use
- No peer reviewed scientific studies have presented any data suggesting or proving any health or safety risks in the use of (feeding) GT alfalfa
- Farmers' goals are to improve the environment and feed for the animals they raise as far as that goes the people they feed as well. GT alfalfa is providing that tool for these producers to so that.
- The GT gene has been in our food chain since the release of GT soybeans. It is very likely that if you eat meat, drink milk, or eat eggs, those animals have been raised with protein sources derived from GT crops. It is a sound, proven technology that should be utilized in alfalfa.

13. Worker Safety

Many GT alfalfa farmers, public agencies, and members of the public believe that One chemical exposure to the application personnel and the growers is greatly reduced by being able to use the safe and reliable chemistry of glyphosate.

One farmer stated that using glyphosate not only minimizes the health risks to our employees, but it also reduces the amount of stronger chemicals that our operation uses. The reduction of chemicals and the types of those chemicals reduces environmental exposure and our costs of production.

An organic association believes it is important that the EIS study the potential health impacts of glyphosate exposure on the users of the chemical, which may include farmers, farm laborers, and the children of the applicators.

14. Alfalfa Agronomic (Farming) Practices

An academic states that alfalfa is grown in almost every state, and is a strategic crop for the United States not only because of its direct commercial value, but also because of its environmental-biological impact in developing soil fertility and structure through its deep tap-root growth habit, fixation of atmospheric nitrogen, and perennial leguminous nature for erosion control. The commenter believes that the value of these environmental functions in crop rotations and sequences may far exceed its commercial value for hay, and any loss of alfalfa production efficiency or quality can have serious consequences for sustainable crop and animal production, with subsequent deleterious impacts on human nutrition, health, and well-being.

One commenter representing academia and another comment from a GT alfalfa farmer stated that GT alfalfa performed similarly to conventional alfalfa, could be managed similarly to conventional alfalfa, and could be controlled similarly to conventional alfalfa.

GT alfalfa farmers described how they use GT alfalfa and glyphosate on their farms:

- We must constantly monitor for noxious weeds. The highway department sprays a couple of times during the summer, may not spray before weeds go to seed. I can spray along the roadway and up to the edges of the alfalfa fields without worrying about the glyphosate killing the edge of the GT alfalfa fields.
- If thistles come up in GT alfalfa, we can take a hand sprayer and hit the thistles, and not kill the alfalfa. That sure beats taking a scythe and cutting that area by hand before the thistles bloom!
- I can grow higher quality hay with very few weeds in it. When the alfalfa does not have competition, it does not thin out as fast. So, I do not have to rotate crops as often. Hay is my main crop, so rotating crops is a detriment and is expensive.
- We can spray the field with glyphosate to kill all the kochia, pigweed, morning glory, thistles, quack grass, and other problem weeds while the alfalfa is small, so that we can get a good, thick stand of alfalfa that will not allow other weeds to compete with it . Then, the alfalfa controls the weeds so we do not have to spray again. Spraying all weeds cannot be done in a conventional field of alfalfa, so the small alfalfa plants must compete with all of the weeds to become established.
- The weed control provided by the applications of other herbicides besides glyphosate is very good for the spectrum of weeds in our area. The main problem we have seen is that the application of these herbicides is very hard on the young conventional alfalfa and it takes over a week for it to recover from the effects of these herbicides. Growth is minimal in the conventional fields during the recovery process and the GT alfalfa does not experience this, since the application of glyphosate does not affect the alfalfa.
- One of the largest problems we have in our alfalfa stands are grasses. Usually by the second or third year, all our fields have some level of grass present along the drain end of the field or in the higher traffic areas. Glyphosate is an excellent grass herbicide and we followed our establishment spray in the tolerant fields with a summer application to control any additional weeds.
- We often see water grass and nuts edge in isolated parts of a field and with the GT alfalfa, we can spot spray these areas very effectively.
- Winter weed control is very important for the longevity of our alfalfa stands, and we are always concerned when applying restricted use chemicals. We have a closed mixing system and other safety measures in place, but not using dangerous chemicals at all is by far the safest practice. We would also like to reduce our use of some other herbicides because of its potential to leach into the groundwater and move in field runoff. The GT varieties allow us to use only glyphosate to control weeds and its chemistry is much safer than that of some of the herbicides we use in our conventional fields.
- We remove our stands by mechanical means (a heavy stubble disc), so we are not concerned about not using glyphosate for stand removal.
- Alfalfa growers try and harvest their crop in the bud stage but due to weather conditions may have to delay harvest until the bloom stage. Even with late harvest the vast

majority of the alfalfa grown in Nebraska never goes to seed which dramatically reduces any chances of pollen flow.

- One commenter was concerned about whether weather plays a role in gene flow because he states that it takes at the very minimum, another thirty days of the most beneficial weather to make viable seed, in our area its closer to forty-five days. If the weather stays inclement, it will never make seed.
- One grower stated that glyphosate was an unreliable tool for alfalfa stand take-out
- A GT seed farmer practices strict sanitation practices in harvesting and handling seed with extensive cleaning of equipment and separation of seed lots between GT alfalfa and conventional. Seed is put in specially marked bins and separately stored, have three combines, and one is used only for GT alfalfa. Feral alfalfa on ditch banks, road sides and adjacent areas, is sprayed out with a non-glyphosate herbicide. We are very aware of our neighbors conventional both hay and seed fields and adhere to isolation distances that are in excess to what is acceptable, and they are monitored by seed certification officials and others.

GT alfalfa growers, researchers, scientists, and farming interests spoke to the benefits of using GT alfalfa in alfalfa agriculture:

- Significantly more hay in the seeding year when direct seeding
- Extra yield of high quality alfalfa in the seeding year alone pays for the cost of the technology and seed
- An alfalfa product manager of a seed company encouraged growers to plant GT alfalfa on their fields with the most severe weed problems to put it to the maximum test possible. He did not find any grower who was disappointed with their weed control using the technology in these situations.
- Primary benefits of GT alfalfa were considered to be higher tonnage, better weed control, and better quality resulting in higher profitability for the grower. GT alfalfa is beneficial because it can increase the longevity of the alfalfa stand.
- A researcher discovered that weeds were more competitive and reduced stand and yield compared to GT technology, and there is more yield reduction to alfalfa from the commonly used herbicides than we had previously known, because now there is an additional control better than an untreated check.
- One alfalfa grower felt that because many alfalfa fields in southern Minnesota are right next to GT soybean and corn fields, farmers could spray glyphosate right next to the alfalfa field without injuring either crop and control the weeds.
- One alfalfa grower felt that GT alfalfa would reduce soil and water erosion, and the benefit to the environment will be greater than the weed control benefit in alfalfa.
- Some growers feel that GT alfalfa seed is just one example of raising more and better food per acre
- One commenter felt that the technology will keep growers in the East growing Alfalfa vs. trucking in alfalfa grown in the West, and GT alfalfa will save our entire system time, fuel and effort

A nationwide trade association representing alfalfa and forage producers in 23 states submitted the Best Practices for growing GT alfalfa.

An alfalfa grower states that with all of the alfalfa plants that are growing wild and plants that are not being harvested in a timely manner are really causing a problem, but only in GT alfalfa seed production. My question is why have all these issues not been brought up before? Growers have always paid a premium for pure seed or a certain variety. Why have we not had any issues in the past with alfalfa plant escapees or one variety of alfalfa getting crossed with another? The seed industry is very careful to isolate and control the potential of cross contamination with various guidelines and certain protocols. The seed industries standards are already tough regarding seed production and the rules that are applied to GT alfalfa are 90 times as tough.

A seed grower stated that his production contract states: "The Company" recognizes that circumstances outside the grower's control may lead to an adventitious presence from an unknown origin within the seed of a genetically modified organism ("GMO") or other. "The Company" considers any such presence up to 1 % to be adventitious. If an adventitious presence exceeds 1%, "The Company" will take possession of the seed and shall pay the grower a price to be negotiated.

One commenter states that the most important factor for hay growers to maintain purity is to begin with certified seed for planting.

One commenter felt that the de-regulation of GT alfalfa will have very little effect on the production of other crops because the primary factor in alfalfa acres is the demand for hay. The commenter believes that the need to feed dairy and beef cattle or an ever growing recreational horse market will determine alfalfa acres, not whether GT alfalfa is de-regulated or not, and that these are the same market influences that have driven corn acres: demand for ethanol, high fructose corn syrup, and animal feed have pushed the increase in corn, not the acceptance of the GT trait.

A cotton association wrote in to discuss the potential similarities between GT alfalfa and GT cotton. They felt that a decrease in herbicide use is found in GT cotton and expects the same for GT alfalfa.

Some conventional and organic alfalfa growers, members of the public, and interest groups commented on concerns or problems with the farming of GT alfalfa:

- Other herbicides besides glyphosate would be used to take out GT alfalfa, some conventional alfalfa growers do not want to lose glyphosate as a tool for stand take-out, and there would be damage caused by drift of these other non-glyphosate herbicides
- If the neighbor sprays glyphosate on his GT alfalfa, and the spray drifts, it will kill my alfalfa
- One group wanted company personnel on hand to assure minimum seed mixtures and felt that seed transported off farm should be tarped to avoid roadside propagation of feral plants
- One group wanted reporting of GT alfalfa plantings to local crop improvement no later than 7 days from date of delivery of parent seed to producer
- For a non-GT alfalfa grower, GT alfalfa is a weed just a damaging as morning glory, Canadian thistle, etc, depending on the buyers demand or seed contract stipulations

Related to agronomic practices in alfalfa farming, interest groups and members of the public requested the following assessments be conducted or information stated in the EIS:

- Volunteer alfalfa in seed production has not been addressed
- What plant back restrictions should be used for GT to conventional alfalfa seed rotations
- Is it possible to plant conventional alfalfa after a GT seed production
- Independent study is required to confirm that isolation distances are adequate
- Potential map of organic alfalfa usage extends across much of the United States and must be considered as an aspect of the EIS
- What about the hay grower or seed grower that has GT alfalfa contamination in his field. How can they eliminate the contamination in his crop?
- What are the environmental effects of prolonging alfalfa fields
- An interest group wants to know the role APHIS will play in surveying organic and conventional farmers on their preferences in regard to farming practices, impacts of GT alfalfa on their farming practices, their current, future, and past farming practices

15. Regional Production Differences

Some conventional alfalfa farmers were concerned because common production practices in South Dakota are to maximize the size of our first and sometimes only cutting of alfalfa; thus alfalfa is midbloom or sometimes full bloom before cutting. For them, the second cutting alfalfa is mostly nonexistent if rainfall is limited, and alfalfa is too short to cut but often blooms for several months then produces seed. Thus, for these commenters, seed crops of common alfalfa is a very good cash crop, often worth more than the hay crop.

One commenter was concerned about the bee restrictions for growing GT alfalfa. He felt that bee production in the northern United States is very dependent on alfalfa for honey production because sites of hives are positioned close to alfalfa fields. I believe GT alfalfa will wipe out the conventional common seed producers.

One beekeeper was concerned because in the Midwest, alfalfa is our major source of honey. When it is too dry in the Midwest to make hay, the commenter believes that farmers still have the option to go for a seed crop, and this has been a great source of additional revenue in an already dry year: we make honey off the blooming alfalfa and they get a seed crop.

One commenter from the Midwest stated that alfalfa grown in this area is grown for feed, and the highest feed value from alfalfa hay is when it is cut in the pre-bud or bud stage. The commenter believes that with this strategy, no viable seed can be produced nor is any pollen available for bees to carry to non-glyphosate fields. His comment continues: if harvest is delayed and the alfalfa blooms, viable seed is still not produced because harvest and drying of the hay prevent development of viable seed. If the weather is so bad that harvest cannot take place, the commenter feels that the conditions also limit the ability of bees to forage.

One commenter felt that GT alfalfa would be a good choice for Tennessee and mid-South alfalfa growers without impacting their neighbors. Most of our alfalfa growers are dairy farmers and use the hay on farm, or sell to their neighbors.

A conventional alfalfa farmer write that although the argument has been made that a "barrier" could be created, this would be impossible with alfalfa in the Imperial Valley because of pollen flow and alfalfa is planted in a patch-work manner where someone could rotate a crop out in a surrounding field and plant GT alfalfa and contaminate a conventional alfalfa field. The commenter believes that if GT alfalfa was to be planted in the Imperial Valley, due to cross-pollination, we would automatically lose 85% of our market because we sell to GE-sensitive markets and this would effective destroy our market for our conventional alfalfa seed.

16. Agri-business Concerns

Some commenters question the long term security of the nation's food supply in light of Monsanto's quest for monopolizing control of seed through the patents of hybrid, genetically engineered & pesticide dependent products and the purchase of existing vegetable seed company's nationwide. Some commenters were also concerned that alfalfa seed was only held by FGI and/or Monsanto.

Some commenters were concerned that USDA is only deregulating GT alfalfa because it is a product of big agribusiness, specifically Monsanto.

One commenter was concerned about the legal system of patents on artificially manipulated plant genetics that allows holders of such patents to seek damages against farmers who harvest seed that may have been contaminated by plants on which there is a patent. Further, the commenter believes that actions have been taken by holders of such patents and farmers have been significantly damaged economically.

One commenter believes Monsanto has been issued many fines for the work they do and so in my opinion it is risky to allow this profiteer to let this product be used in a wide area so quickly.

One commenter is concerned that the governments of world are shoving genetically engineered food down our throats with no labeling or vote on that we even wish to be eating, and that the government has helped Monsanto by letting them get away with false tests that where done by Monsanto own employees.

One commenter's concern is that if we continue to regulate and over regulate everything, it will not be long and American agriculture will be done with; the fact of the matter is that without progression (GE crops, better chemicals, and the best technology available), it will not be long and we will not be able to compete on the world market far less be a leader.

An interest group was concerned about the value of studies provided by Monsanto and wanted to know the funding source of all authors on publications and felt that the public would be better served with this information. One commenter believes that Monsanto can hire an army of people to manufacture crop safety data, as well as post comments.

An interest group felt that APHIS possesses a governmental zeal trumping science and consumer interests in supporting GE crops such as GT alfalfa despite serious questions about Monsanto's own glyphosate studies and whether GT alfalfa is needed at all. The commenter believes that

there is the inherent bias in Monsanto's research studies, that they are flawed by design, and flawed by analysis, therefore, questions arise over how much of Monsanto's glyphosate research has actually been subjected to external peer-review and published in journals.

One comment wanted the EIS to show the economic impact on seed and feed costs if all alfalfa were controlled by GE seed monopoly, and this commenter also felt that property rights are impacts on growers of non-GT alfalfa.

One commenter feels that it is unreasonable that the government would allow introduction of a situation that puts significant power in the hands of a large corporation to materially harm large numbers of small businessmen (farmers) in situation where these small businessmen have no malicious intent.

17. Continuing the Use of Biotechnology

Some commenters felt that as world demand for food increases and available land and resources decrease, higher yields per acre must account for this deficit. Advances in technology, such as GT alfalfa, must be integrated into agriculture in order to move towards sustainability. The commenters feel that the bottom line is that this technology is safer for the environment, the grower, and the consumer, and it is also can help increase production on the current acres farmed. One commenter even felt that the American farmer wants the ability to use this great technology in their quest to continue to grow high quality alfalfa to feed their herds and feed the world.

Some growers are concerned that the removal of GE crops would not allow the country to feed itself and cut down the use of foreign oil.

One commenter only wanted genetic-engineering to be used for disease resistance and flavor enhancement.

One commenter felt that the whole situation with GT alfalfa is similar to bovine somatotropin (BST); we have a safe technology and a few pin heads screw up the whole works. The commenter feels that if GT alfalfa is not approved for use, we can blame of our government for failing to use common sense.

An academic stated that herbicide-tolerant crops produced by other methods (e.g., mutation) did not require an EIS prior to commercialization, yet the potential for development of weeds resistant to those herbicides is greater than that for glyphosate. The commenter asks why should those questions be included in an EIS only required of crops developed using recombinant DNA methods, while the same environmental issues arise with crops having similar traits developed by other methods? The commenter stated that the underlying principle of the GE regulation in the United States is claimed to be based on the product, not on the process, and by including these questions about development of herbicide-resistant weeds only for GE crops and not for those developed by other means, APHIS is not being guided by its stated principles.

A seed grower stated that throughout the history of modern agriculture there has been resistance to transformative technologies, such as steel plows, sprinkler irrigation, commercial fertilizer, tractors, and reduced tillage practices, and asks how we could feed the world if new technology was not available to expand productivity.

An alfalfa grower believes that the American consumer wants quality food that is affordable and safe, and the American agricultural producer wants to supply the food to meet these criteria and needs to make a profit. To meet the increasing demand for food and fiber in the United States and abroad, the commenter believes that the American producer needs all of the tools available to produce an economical, safe, quality product at a reasonable profit and GT alfalfa is one of these tools. Further, the commenter believes that if all American producers were to switch to "organic" farming methods and abandon the new technology that has been made available this past 100 years we could not even feed the United States, let alone the rest of the world.

One commenter stated their contention that growers in the United States should have the ability to choose GT alfalfa varieties if they are to remain competitive in the world today and still be able to efficiently meet the demands for quality hay products.

Many farmers commented that if the soybean and corn plants can be modified with no problems feeding it to animals, why not alfalfa.

Some commenters felt strongly that farmers are held a captive minority ("environmentalists" and "so-called do-gooders") that tell the farming community what to raise. These commenters felt that the regulations and court orders make is harder to make a living.

An alfalfa producer believes that we need GT alfalfa as one of the tools to help supply high quality forages to an ever increasing market, there is a shortage of quality alfalfa hay, and GT alfalfa will enable us to get maximum production the seeding year and encourage producers to keep alfalfa as part of a diversified crop production system.

One commenter believes that there is lots of room in this world if we just learn to be tolerant and except new ideas.

18. Comments on the EIS Process

APHIS received requests for extension to the Notice of Intent public comment period, and numerous scientific publications demonstrating the potential for gene flow between alfalfa fields, pollinator behavior, food and feed issues related to GT alfalfa, weed management issues in GT alfalfa, glyphosate safety studies, and studies related to various environmental impacts.

Some commenters stated that the questions posed in the NOI were adequately developed by APHIS.

One commenter felt that the EIS should address a fuller range of topics than is required in the court order, and discussion should be open to findings and reports completed after the EA was completed in 2004. One aspect requiring fuller comment, according to the commenter, is an

apparent bias toward unsupported opinions rather than references to relevant empirical studies, therefore, is imperative that the new EIS should be produced by a fresh group of APHIS staff members who had not been involved in the original EA, those hew members should be committed towards full and unbiased reporting based on empirical evidence.

A farmer using organic methods to grow alfalfa felt that the proposed scope of Environmental Impact Statement was excessively narrow.

A farmer using organic methods to grow alfalfa asked what alternatives for regulation exist other than those set forth in the Notice (whether or not such alternatives require legislation or revised regulations of the USDA)? What is the balance of pros and cons of the USDA authorizing the use of the GE products in question.

One commenter wondered why the comment site did not show some of the comments and regulations website seems inadequate and negligent.

One commenter wanted better public announcement of dockets open for public comment.

One commenter want to know that a comment comes from the heart and from a protective instinct for Americans citizens, and not from money and greed desire, thus the commenter asks that APHIS require that a commenter identify whether he has any financial interest in what he is commenting on.

One commenter feels that considerations should be trait-based rather than process-based and that the EIS should address scientifically valid risks, not perceived or precautionary risks.

A farmer growing organic alfalfa asked what role should scientific uncertainty and numerous issues dealing with genetic modification (health issues, production issues, marketing issues, pest and weed issues, and others) have upon assessing environmental impact of the decisions in question that are the subject of the EIS.

An interest group stated that APHIS needs to ensure that legitimate external peer-review is conducted of the scoping process so the EIS is good science and not as inadequate as the Environmental Assessment was on GT Alfalfa.

A law professor stated that the National Environmental Policy Act (NEPA), and EISs under NEPA, are not meant to provide an analysis of creating a protected or protectionist market for any economic group, including for organic farmers, and NEPA does not and should not guarantee that organic farmers can satisfy any particular market demand. The commenter feels that if there is a market demand for 100 percent free organic alfalfa or alfalfa seeds, it is the responsibility of organic growers and their marketing agents to bear the costs and the burdens of meeting that market demand.

A farm bureau stated that while marketing and export concerns are extremely important, and NEPA requirements must be met, it is our view that these issues are best addressed primarily by the market place.

A commenter believes that GT alfalfa may have the potential to increase the acreage of alfalfa grown in the United States, and therefore, the possible benefits of expanded alfalfa acreage due to GT alfalfa should be assessed.

19. General Concerns or Other Potential Impacts Not Mentioned

A beekeeping group urge not only that genetically engineered (GE) Roundup Ready® alfalfa not be deregulated, but also that existing plantings of GE alfalfa be destroyed.

The president of a seed grower association states that he had the opportunity to raise organic alfalfa for seed, but has declined because the negative weed and insect impacts that would have occurred without the use of herbicides and pesticides, and only being able to raise just a few acres because of the hand labor required. The commenter believes that this is not something a real farmer can afford to do.

One commenter felt that GT alfalfa would endanger conventional and organic producers by introducing a very questionable technology in a crop that is surely not studied well enough to determine its impacts. Other commenters were concerned about diminished biodiversity.

A GT alfalfa grower stated that currently all of my alfalfa seed production is GT and he follows all of the "best practices" guidelines set forth by the USDA and FGI. The commenter also stated that in the past 3 years of dealing with this GT crop I have not had one complaint from any neighbor, farmer, rancher, or consumer in my area.

An organic alfalfa grower asked if GT alfalfa is a product for which there is no legitimate use.

A grower believes that most environmental concerns about GT alfalfa are without adequate merit, there are many millions of acres of GT corn and soybeans grown in America every year, and this has not lead to any environmental catastrophe, although that was predicted by many of the same groups who oppose GT alfalfa. The commenter believes that, GT crops have become an integral part of farming practices that reduce the tillage and environmentally harsh and persistent herbicides, and GT alfalfa will be no different.

One commenter felt that a key aspect of the deregulation decision is to compare current practices (organic, conventional), with practices which are enabled by GT technology, and to understand the relative advantages and disadvantages of current conventional methods with the GT approach in terms of environmental and market impacts. The commenter feels that the risk is not only from the new technology, (which are in some cases unknown or speculative), but the risks of current (chemical and non-chemical) weed control methodology must be taken into account, as well as the (not unsubstantial) risks of failing to control weeds by any method.

One commenter was concerned that a genetically modified crop seed be eaten by a bird; if that bird got ill, and subsequently infected poultry, and then spread to humans, if that is what caused avian influenza.

One commenter stated that growers of GT alfalfa found no negative impacts to surrounding fields or animals for growing and feeding GT alfalfa.

A university scientist submitted his testimony given during the court case that ultimately ended with the decision to complete this EIS. His testimony covered gene flow, stewardship, and coexistence strategies.

An organic farmer wants to know:

- What are the environmental effects of introducing into the general environment GT alfalfa which, once introduced, will never be eliminated from the environment.
- What are the environmental effects of damage to the public perception of organically certified products where testing is perceived to be inadequate to detect GT alfalfa as to many products.
- How are all environmental impacts of the various possible decisions affected by the impacts upon production of organically available grain and other production (other than alfalfa) due to past approvals by the government to use GE products with consequent effect on the production of those crops organically.
- What will be the effects on the ability of people of limited means, as well as the public in general, to purchase organically certified products after production of organically certified alfalfa is made more difficult (and expensive) by invasion of unwanted GT alfalfa.

A public interest group requested the following assessments be included in the EIS:

- What is the negative impact to consumers whose preference is to purchase organic alfalfa sprouts and organic alfalfa food products because they seek more certified organic nutritional foods in their diet and seek to avoid eating genetically engineered alfalfa products and will have to avoid all alfalfa products in the future if they become contaminated with GT alfalfa ingredients and no organic alfalfa is available.
- If certified organic alfalfa nutritional food items are contaminated, what will be the economic impacts to the organic food sector and to consumers who want the certified organic alfalfa nutritional food items.

One non-GT alfalfa grower wanted the EIS to consider these environmental impacts (from 0% contamination to 1 % contamination):

- Will this percent be okay to be marketed if between 0 and l%?
- Due to no fault of my own, if this adventitious presence goes to 10%, is this the point at which FGI sues me for patent infringement, even if they are at fault for the contamination?
- Who pays the tech fee on this? Will I have to pay the full 10% of the tech fee or will FGI pay at the rate at which I pay for the original testing?
- Will these questions have different answers if the percentage grows to 20%?

A conventional seed farmer believes that our government has an obligation to preserve the small niche markets that we have been encouraged to develop over the 27 years that I have been involved in the alfalfa seed business, and we need to respect and preserve the market that the "organic" folks have also worked hard to develop.

An exporter stated that Monsanto has yet to join with the Washington State hay exporters in an educational effort in Japan, to help develop Japanese-language media materials for distribution to Japan's forage industry, and to accompany us to Japan to make face-to-face presentations, answer questions in detail and generally allay the fears and concerns the Japanese forage industry has. The commenter feels that Monsanto is ignoring the concerns of the Washington State hay industry and intends to proceed with their sales plan, whereas we believe Japan's reaction to Monsanto's sale of GT alfalfa seed in Washington State could be extreme, including chances of a boycott or other negative reaction. The commenter feels that the consequences of such a reaction will fall primarily on the shoulders of the Washington State hay industry and on the state's economy, not Monsanto, and Monsanto either does not appreciate, or is not concerned about, the heightened level of Japanese consumer awareness of, and phobia for, GT products, particularly with regard to milk and dairy products and the perceived danger to their children's diets.

One grower considered surface and ground water pollution, potential worker safety issues, and that alfalfa field is in the riparian zone of a river when selecting alfalfa seed. The commenter stated that he is practicing sustainable agriculture, and the use GT technology fit well to my soft/integrated pest management program.

An interest group wants APHIS to conduct a comprehensive study of the extent genetically GE alfalfa has already contaminated organic and conventional alfalfa seed, because such testing would allow the alfalfa seed and forage industries to identify contamination, understand the scope of segregation problems, and educate their customers accordingly.

On commenter asked if there is no evidence of harm after all these years of use how the USDA can possibly recognize something that does not exist.

B. Comment-Response Document Draft EIS

Introduction

In December 2009, APHIS made the DEIS available for public comment. The DEIS was available for an extended 75-day comment period, which closed on March 3, 2010. Approximately 244,000 comments were received. This section responds to all of the substantive[1] comments provided on the DEIS. APHIS' responses to comments identify where changes occurred in the DEIS, clarify or correct information in the DEIS, direct readers to information in the DEIS, and/or answer substantive questions. APHIS prepared the comment responses in accordance with the Council on Environmental Quality (CEQ) regulations that implement the National Environmental Policy Act (NEPA) (40 CFR Parts 1500 to 1508).

Methodology

The methodology described herein enabled APHIS to efficiently consider all public comments it received on the DEIS and to respond to the substantive issues raised in the comments. APHIS used a systematic approach to capture, track, analyze, and respond to comments on the DEIS. First, APHIS read all of the comment documents. Based on their content, substantive comments were then sorted into specific subject areas. These subject areas are referred to as issue areas throughout this Comment-Response Document. In many cases, an individual comment was separated into multiple parts and placed into their respective issue areas. The docket folder, which contains all of the full-text public comments, is available at www.regulations.gov. By searching for the docket ID (APHIS-2007-0044) and selecting document type (public submissions), public comments for this EIS can be located.

After comments were grouped into their appropriate issue area, each issue area was assigned to a subject matter expert per their respective expertise. Subject matter experts drafted and reviewed each response to ensure technical and scientific accuracy, clarity, and consistency. Each response was also reviewed to ensure that the response adequately addressed the comment. If the meaning of a comment was not clear, APHIS made a reasonable attempt to interpret the comment and respond based on that interpretation. APHIS did not modify any comment excerpt text. In many cases, more than one commenter submitted identical or similar comments. In order to eliminate repetitive responses, APHIS instead directs readers to see a response to comment located in the primary issue area.

Substantive comments and recommended articles and other references by the public were considered for incorporation into the FEIS. In addition, APHIS reviewed technical attachments (i.e. reports, articles) for consideration in the FEIS. When a comment resulted in a revision (addition, deletion, or correction) to the DEIS text, the response states that APHIS made the change and directs the reader to the location of the edited text in the FEIS.

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[1] Substantive comments are those that suggest the analysis is incomplete or incorrect in a specific way. Generally they challenge the accuracy of information presented, challenge the adequacy, methodology or assumptions of the environmental or social analysis (with supporting rationale), present new information relevant to the analysis, or present reasonable alternatives (including mitigation) other than those presented in the document. Such substantive comments may lead to changes or revisions in the analysis or in one or more of the alternatives.

Organization of the Comment-Response Document

Throughout this section, each comment response consists of three parts: 1) the comment excerpt text, 2) the assigned comment identification number, and 3) APHIS' response. This section is organized by issue area in which subsequent comment responses exist. APHIS sorted individual comments and grouped them into the following issue areas, as shown in Table 5-1 below. Issue 12.0, 12.1, and 12.2 are organized differently because APHIS summarized multiple comments that were general in nature, but raised unique issues that warranted a summary in the EIS.

Table 5-1: Issue Areas for Response to comments on the DEIS

1.0	Alternatives
2.0	Regulatory process
2.1	EIS methods
2.1.1	Assumptions
2.2	Precedent setting
2.3	Confidential business information (CBI)
2.4	Docket
3.0	Plant Genetics and Gene Flow
3.1	Gene Flow Due to Pollen Transfer and Pollination
3.2	Gene Flow Due to Secondary Seedlings
3.3	Seed Purity
3.4	Gene Flow to Other Alfalfa (non-seed) Crops and Wild Relatives
3.5	Weediness Potential of Alfalfa
3.6	Increased Glyphosate Resistance of Weeds
3.7	Unintended differences in GT alfalfa (yield)
3.8	J101 and J163 transformation event details
4.0	Biological Impacts
4.1	Impacts to T and E Species
4.1.1	Impacts to T and E Species from GT alfalfa J101 and J163 Gene Product
4.1.2	Impacts to T and E Species from Herbicide Application
4.2	Glyphosate and Other Herbicide Use and Comparative Toxicity
4.3	Impacts on Plants
4.4	Impacts on Animals
5.0	Socioeconomic Impacts
5.1	Conventional Alfalfa Hay Farming
5.2	Impacts on Domestic Organic Alfalfa Markets
5.3	Impacts on Dairy and Beef Markets
5.4	Impacts on Trade

5.6	Social Impacts
5.7	Irreversible Commitment of Resources
5.8	Farmer costs (input costs)
5.9	Honey industry
6.0	Human Health and Safety Impacts
6.1	Introduction of Gene Product into Foods
6.2	Impact of Introduction of Gene Product into Animal Feed
6.3	Glyphosate Exposure and Other Herbicide Use
6.5	Impacts from Changes in Production Practices to Human Health and Safety
7.0	Land Use and Production Practices
7.1	Alfalfa Production and Farming Practices
7.2	Weeds in Alfalfa (including weed control)
7.3	Crop Rotation in Alfalfa
7.4	Regional Differences in Production Practices
7.5	Seed Production Practices
8.0	Physical Environment
8.1	Impacts on Soils
8.2	Impacts on Climate and Air Quality
8.3	Impacts on Water and Water Use
9.0	Mitigation Measures
9.1	Stewardship programs and Best Practices
9.2	Barriers
10.0	Cumulative Impacts
11.0	Specific Comments that refer to Appendices
11.1	G – weeds in crops
11.2	H – weeds in non-agricultural settings
11.3	I – gene flow
11.4	J – cultivation practices
11.5	K – farming economics
11.6	L – human health
11.7	M – field workers
11.8	N – chemical impacts on wildlife
11.9	O – colony collapse disorder
11.10	Q – alfalfa in food and feed (unintended presence, seed purity)
11.11	R – trade
11.12	S – organic (market)
11.13	T – downstream markets
11.14	U – alfalfa traits (Monsanto data)
11.15	V – marketing and seed purity
11.16	W – plant pest RA
12.0	General (not included in another index topic)
12.1	For deregulation alternative

12.2	Against deregulation alternative
13.0	Genetic engineering technology – general

1.0 Issue 1 – Alternatives

Comment Excerpt Text:
I*Tell USDA to Protect Organic Farmers and All Farmers Who Wish to Choose to Grow Non-GE Crops:

Although USDA says it supports “coexistence” of all types of agriculture, USDA refuses to even consider any future for alfalfa that would include protections from contamination for organic and conventional farmers and exporters.

- USDA can approve GE crops in whole or in part. Partial approval could include use restrictions, geographic limitations or planting isolation distances. Yet, in the court-ordered analysis, USDA analyzed only two options: 1) Full approval, allowing GE alfalfa to be grown and sold without restriction like any other crop; and 2) No action, meaning GE alfalfa could only be grown under USDA permit, as at present. USDA’s “all or nothing” approach leaves un-analyzed any potential options to protect farmers. This is contrary to law and logic. USDA’s basic mission is “protecting American agriculture.” Yet, USDA refused to even consider any options that might protect organic and conventional agriculture from contamination and the resulting loss of markets and ability to sow the crop of their choice. (Comment Number: APHIS-2007-0044-0948-3)

Response: See the response to comment APHIS-2007-0044-11741-4 for issue 1.0.

Comment Excerpt Text:
USDA's basic mission is "protecting American agriculture." Yet in the draft EIS (APHIS-2007-0044) USDA refused to even consider any options that might protect organic and conventional agriculture from contamination and the resulting loss of markets and ability to sow the crop of their choice. USDA analyzed only two options in the EIS: 1) Full approval, allowing GE alfalfa to be grown and sold without restriction like any other crop; and 2) No action, meaning GE alfalfa could only be grown under USDA permit, as at present. USDA's "all or nothing" approach leaves un-analyzed any potential options to protect farmers. This is contrary to law and logic. USDA should protect all farmers, not just those growing Monsanto's patented crops. (Comment Number: APHIS-2007-0044-10002-1)

Response: See the response to comment APHIS-2007-0044-11741-4 for issue 1.0.

Comment Excerpt Text:
Consideration of Alternatives
APHIS has not identified or analyzed an adequate range of alternatives in the DEIS, looking only at “No Action” and complete deregulation. By claiming a lack of jurisdiction, APHIS has left only two
options, the status quo and total deregulation (the commercial use of GT alfalfa throughout the nation

with no oversight). However, as discussed above, APHIS has broader power to regulate the commercial
use of plant pests and noxious weeds. While NEDC first and foremost supports the No Action alternative due to the risks of GT alfalfa, the possible mitigation of these risks through various alternatives should be explored alongside the preferred alternative. APHIS has the power, for example,
to grant permits for limited field trials of regulated organisms. Given its broad authority to regulate the
spread of potentially harmful plants, APHIS should not deregulate potentially harmful GE crops without
enforceable mitigation measures.
The purpose identified in the DEIS is to protect American agriculture and more specifically, to provide regulatory oversight to new genetically engineered organisms that have the "potential to pose a
plant pest risk."[Footnote 18: DEIS at 1] The myriad potential harms associated with GT alfalfa evidence its potential to pose a plant pest risk. As a result, APHIS must consider other alternatives to complete deregulation. For
example, the alternatives APHIS dismissed without adequate consideration involving isolation distances,
geographic restrictions and testing requirements may limit potential contamination of conventional and
organic alfalfa crops and thus should be analyzed in greater detail.[Footnote 19: DEIS at 14-15.]
Again, NEDC does not support the deregulation of GT alfalfa. Any deregulation resulting in the limited commercial deployment of GT alfalfa must be accompanied by enforceable mitigation measures to deal with issues of contamination
and other concerns. APHIS will fail to fulfill the mandate of NEPA without a more detailed discussion
of these possible alternatives. (Comment Number: APHIS-2007-0044-11741-4)

Response: Based on public comments on the DEIS, an additional alternative has been added to the FEIS that was not considered in detail in the DEIS. Alternative 3, isolation/ geographic restriction combines isolation distances between conventional and GT alfalfa seed fields and GT alfalfa hay fields and conventional seed fields with geographic restrictions on growing GT alfalfa in some locations. This alternative is intended to more fully examine the potential impacts on non-GE farmers. Imposing a testing requirement was not analyzed in detail. Full descriptions of this added alternative and alternatives rejected from further consideration are included in chapter 2 of the FEIS. In addition, chapter 4 of the FEIS has been updated with this additional alternative. In regard to APHIS' regulatory authority, see the response to comment APHIS-2007-0044-8397-5 for issue 2.0.

Comment Excerpt Text:
The judge who ordered this EIS clearly stated that USDA needed to analyze real world alfalfa farming, and not base its analysis on ideal world conditions. However, in this EIS, USDA did not follow that direction.
In the EIS, USDA refused to even consider any options that might protect conventional and

organic agriculture from contamination. Partial approval could include geographic limitations or planting isolation distances. Because USDA refused any protections for farmers that do not want to plant GM Alfalfa, they are refusing to protect me and only protecting Monsantos contracted farmers who plant its patented crops. (Comment Number: APHIS-2007-0044-6811-2)

Response: See the response to comment APHIS-2007-0044-11741-4 for issue 1.0.

Comment Excerpt Text:
The Draft EIS also provides an in-depth analysis of the potential for increased glyphosate use as a result of the deregulation of RRA and the related potential for the development of weeds resistant to glyphosate. This analysis fully complies with the requirements of NEPA. See infra Section III. (Comment Number: APHIS-2007-0044-7620-53)

Response: APHIS acknowledges the comment..

Comment Excerpt Text:
There were only two options considered by APHIS with regard to these two lines of genetically-modified alfalfa. One option was to deregulate (grant non-regulated status) to these varieties, and the other was to maintain the status of GT (glyphosate-tolerant) alfalfa Lines J101 and J163 as regulated articles. The decision by APHIS to completely deregulate these alfalfa varieties without any limitations or protections for farmers, and without any protections to guard against contamination of non-GM, or GM-sensitive, markets, could potentially have far-reaching environmental, economic and legal consequences. (Comment Number: APHIS-2007-0044-8978-2)

Response: See the response to comment APHIS-2007-0044-11741-4 for issue 1.0.

Comment Excerpt Text:
First, we would like to state that we agree with APHIS' decision that the only viable alternative is to
deregulate Glyphosate-Tolerant Alfalfa Events J101 and J163, based on well-documented scientific and socio-economic considerations. We also believe the alternatives proposed by APHIS are adequate for consideration for the EIS and that the scope of the notice of intent adequately covers the relevant issues.
APHIS correctly rejects alternatives based on science and lack of authority to regulate certain options. We would like to further point out that rejected alternatives 2-4 would not guarantee 100% purity in any situation due to the dynamic biological environment that exists in agriculture. Markets in agriculture have continued to thrive with non-zero practical thresholds. The level of purity and quality of alfalfa hay and seed is market-driven and growers (not APHIS) choose which market to pursue, such that the quality of product is a self-imposed decision that growers must meet using knowledge of specific production practices and a wealth of experience and scientific information. Consistent with APHIS regulations, safe products that have gone through

a risk assessment are not isolated from conventional commodity products in the US. (Comment Number: APHIS-2007-0044-9304-1)

Response:
The DEIS presented a range of alternatives within the jurisdictions of APHIS to implement. An additional alternatives is considered in detail in the FEIS that was not considered in detail in the DEIS. Based on public comment APHIS incorporated this alternative into the detailed analysis of the FEIS to more fully evaluate the impacts to the human environment from imposing geographic restrictions and isolation distances. Additionally, see the response to comment APHIS-2007-0044-11741-4 for issue 1.0.

Comment Excerpt Text:
APHIS' Alternatives Analysis Is Inadequate.

The DEIS' Alternatives Section is legally deficient. Federal courts have consistently held that "[i]n addition to the proposed agency action, every EIS must '[r]igorously explore and objectively evaluate all reasonable alternatives' to that action." [Footnote 21 Center for Biological Diversity v. U.S. Dept. of Interior, 1071 (9th Cir. 2009) (citing 40 C.F.R. § 1502.14(a)).] The analysis of alternatives to the proposed action is "'the heart of the environmental impact statement.'" [Footnote 22 Or. Natural Desert Ass'n v. Bureau of Land Mgmt., 531 F.3d 1114, 1121 (9th Cir.2008) (quoting 40 C.F.R. § 1502.14).] "The existence of reasonable but unexamined alternatives renders an EIS inadequate." [Footnote 23 Friends of Southeast's Future v. Morrison, 153 F.3d 1059, 1065 (9th Cir.1998).]

The consideration of alternatives furthers NEPA's goal by guaranteeing that agency decisionmakers "[have] before [them] and take [ ] into proper account all possible approaches to a particular project (including total abandonment of the project) which would alter the environmental impact and the cost-benefit balance." [Footnote 24 Calvert Cliffs' Coordinating Committee, Inc. v. United States Atomic Energy Commission, 449 F.2d 1109, 1114 (D.C. Cir.1971).] An alternatives analysis must foster both informed decisionmaking and informed public participation. [Footnote 25 Westlands Water District v. U.S. Dept. of Interior, 376 F.3d 853, 872 (9th Cir. 2004).]

NEPA's requirement that alternatives be studied, developed, and described both guides the substance of environmental decisionmaking and provides evidence that the mandated decisionmaking process has actually taken place. [Footnote 26 Id.] Informed and meaningful consideration of alternatives is thus an integral part of the statutory scheme. [Footnote 27 See Bob Marshall Alliance v. Hodel, 852 F.2d 1223, 1228 (9th Cir. 1988).]

APHIS acknowledges that it has authority to "approve the petition in whole or in part." (DEIS at 11). Yet, despite the significant risks involved in deregulating GT alfalfa, APHIS claims that no partial deregulation needs to be analyzed in this case, that no analysis of any other alternative need be included. According to APHIS only two alternatives need be considered in the DEIS: no-action and unconditional deregulation.

First of all, the Court certainly believed, in complying with its order APHIS would analyze partial deregulation alternatives such as isolation distances or geographic restrictions. Indeed, APHIS previously conceded that "one option that APHIS has is to approve Monsanto's 'petition with a geographic limitation stipulating that the Roundup Ready could only be grown without APHIS authorization in certain geographic areas.'" [Footnote 28 Geertson Seed, 2007 WL 518624 at *6.] APHIS does not adequately explain why its position has changed in the DEIS.

APHIS has a brief discussion of "considered but rejected" alternatives list. The paucity of discussion on these rejected alternatives is insufficient to comply with NEPA. In order to comply with NEPA, APHIS must "[r]igorously explore and objectively evaluate all reasonable alternatives." [Footnote 29 40 C.F.R. § 1502.14(a).] Such cursory (1 ½ pages) rejection is not "rigorous" analysis. The DEIS flatly rejects all partial deregulation reasonable alternatives, such as isolation distances or geographic restrictions in a few sentences analysis, relying on the exact same pro forma language. See DEIS, pp. 14-15.

The no action alternative, i.e., prohibiting deregulation: "APHIS determined this alternative is not appropriate in that GT alfalfa [] have been determined in APHIS' Plant Pest Risk Assessment not to be plant pests (USDA-APHIS, 2009)."

Isolation distances: "Because GT alfalfa is unlikely to pose plant pest risk (USDA-APHIS, 2009), APHIS will have no regulatory authority over GT alfalfa and will be unable to require regulatory restrictions or management practices for these GE alfalfa varieties once it is granted nonregulated status."

Geographic restrictions: "State-level or county-level restrictions on GT alfalfa, as well as the establishment of GE-free alfalfa production zones, were rejected because GT alfalfa is unlikely to pose a plant pest risk. (USDA-APHIS, 2009).

Testing: "[B]ecause GT alfalfa is unlikely to pose a plant pest (USDA-APHIS, 2009), APHIS will have no regulatory authority over GT alfalfa, and will be unable to impose regulatory restrictions on these GE alfalfa varieties."

Such out of hand rejection of these alternatives does not comply with NEPA. Agencies cannot define the project so narrowly that it foreclosed a reasonable consideration of alternatives;" they "cannot define its purpose and need so as to winnow down the alternatives until only the desired one survives." [Footnote 30 Klamath-Siskiyou Wildlands Center v. U.S. Forest Service, 373 F. Supp. 2d 1069 (E.D. Cal. 2004).] "NEPA's legislative history reflects Congress's concern that agencies might attempt to avoid any compliance with NEPA by narrowly construing other statutory directives to create a conflict with NEPA. Section 102(2) of NEPA therefore requires government agencies to comply 'to the fullest extent possible.' [Footnote 31 Center for Biological Diversity v. National Highway Traffic Safety Admin, 538 F.3d 1172, 1213 -1214 (9th Cir. 2008).]

Further, the structure of the alternatives analysis gets to the crux of APHIS's misconception of NEPA, impermissible frame of this DEIS, and mischaracterization of its authority under the

Plant Protection Act. APHIS claims it need not analyze any partial deregulation alternatives such as isolation distances or geographic restrictions, or even meaningful consider the no-action alternative, not because other alternatives like isolation distances would not work or because such measures are not be needed, but because the agency has (erroneously) determined that GT alfalfa does not pose a plant pest risk in a separate document. Based on this faulty reasoning, APHIS rejects reasonable alternatives such as isolation distances, geographic restrictions and testing requirements without any discussion of the potential benefits of these alternatives. (DEIS at 14-15).

First, beyond its plant pest determination, APHIS has broad authority to protect and further U.S. agriculture and therefore violated NEPA by failing to perform an adequate alternatives analysis. Second, again, APHIS has the analysis process precisely backwards: the EA should inform the agency's decision-making process, not the other way around (i.e., have the agency's forgone conclusion limit and prejudge the NEPA analysis). The policy behind NEPA is "to ensure that an agency has at its disposal all relevant information about environmental impacts before the agency embarks on the project." [Footnote 32 Salmon River Concerned Citizens v. Robertson, 32 F.3d 1346, 1356 (9th Cir.1994).]

APHIS also claims it can only approve a petition "in part" if there is a plant pest risk associated with some but not all lines requested in the petition. (DEIS at 12). There is no basis in the statute or regulations for this extremely limited interpretation.

The agency also argues it could consider a deregulation with geographic restrictions, if there is a "geographic variation" in risk, but then removed from consideration the concept of approving partial deregulation with geographic restrictions because the DEIS states that there are no geographical variations in risk.

This reasoning is arbitrary and capricious and not take the hard look NEPA requires. There are significant geographical variations in risks. As APHIS points out, alfalfa hay production occurs across the country, "in almost all the States, with farming conditions varying considerably depending on climate rainfall, soil fertility, weed and disease prevalence, whether it is seeded in the fall or the spring…" (DEIS at 34). In contrast, "[u]nlike alfalfa hay production, alfalfa seed production is largely concentrated both geographically and in number of producers." (DEIS at 43). In fact, 60% of seed production occurs in California, Washington, and Idaho. Id.

There are of course a variety of differences between hay and seed production. The presence of weeds can have a greater impact on the costs in alfalfa seed production than alfalfa forage production because the separation of weeds seeds from alfalfa after harvest is costly. (DEIS at 44). Transgenic contamination can occur in different ways in seed and hay fields. While hay fields can and often do go to seed and pollination does occur, farmers purposefully stock bees in seed fields for pollination. (DEIS at 94).

Additionally, the type of managed bees used for pollination depending on geographic location. Leafcutter bees are used primarily in the Pacific Northwest while honey bees are typically used in the irrigated valleys of the Desert Southwest. The honey bee is known to travel six miles or more, while the leafcutter bee travels far less. (DEIS at 95). Different wild pollinators are located

in different regions. Different weather patterns affect the timing of harvest and the ability to harvest forage hay before bloom in different parts of the country.

In short, the environmental risks differ for cultivation of hay and seed, and differ between different regions of the country. Reasonable alternatives may exist for mitigating these risks, such as isolation distances and geographic restrictions, which APHIS arbitrarily and capriciously refused to even consider.

Further, APHIS claims it has no authority to mandate isolation distances and so it does not have to analyze an alternative with isolation distances, but the 2008 Farm Bill, Section 10204(b)(7), requires the Secretary to take actions that enhance "the use of the latest scientific techniques for isolation and confinement distances." Farm Bill Section 10204(c)(1)(C) requires the Secretary to consider establishing "standards for isolation and containment distances." Congress clearly understands APHIS's existing oversight to include the power to establish isolation distances, else the agency could not comply with this particular directive in the Farm Bill.

The unconditional deregulation of GT alfalfa poses significant risks to the quality of the human environment. For example, the significant likelihood of gene flow from GT alfalfa to non-GT alfalfa poses risks to the livelihood of organic and conventional farmers as well as the environment. The potential for APHIS to reduce these significant impacts by adopting one or more of these "rejected" alternatives must be fully analyzed as an alternative. Finalizing the current draft without fully analyzing reasonable alternatives would be arbitrary and capricious agency action. (Comment Number: APHIS-2007-0044-9936-6)

Response: APHIS uses its plant pest risk assessment to help identify reasonable alternatives. The plant pest risk assessment along with the NEPA process informs the decision maker. In regard to alternatives, see the response to comment APHIS-2007-0044-11741-4 for issue 1.0. See chapter 2 of the FEIS, where APHIS added an alternative that analyzes the impacts of imposing isolation distances and geographic restrictions on GT alfalfa (Alternative 3). The commenter is also referred to the Environmental Consequences section (chapter 4) of the FEIS, which has been supplemented to expand on the technical issues raised for requesting an expanded range of alternatives, including geographical differences in hay and seed production. APHIS notes that the 2008 Farm Bill, Section 10204(b)(7) specifically refers to regulated field articles. If APHIS grants nonregulated status to GT alfalfa this section of the 2008 Farm Bill would not apply because GT alfalfa would not be a regulated article.

2.0 Issue 2 – Regulatory process

Comment Excerpt Text:
Beginning in 2006, the Center for Food Safety (CFS) took legal action against the U.S. Department of Agricultures (USDA) illegal approval of Monsantos genetically engineered (GE) Roundup Ready alfalfa. The federal courts agreed and banned GE alfalfa until the USDA fully analyzed the impacts of the plant on the environment, farmers, and the public in an environmental impacts statement (EIS).
USDA released its draft EIS on December 14, 2009. A 60-day comment period is now open until February 16, 2010. CFS has begun analyzing the EIS and it is clear that the USDA has not taken the concerns of non-GE alfalfa farmers, or organic dairy farmers seriously, for example, having dismissed the fact that contamination will threaten export markets and domestic organic markets. You can review the EIS here and supplemental documents here.
This is the first time the USDA has prepared an EIS for any GE crop and therefore will have broad implications for all transgenic crops, and its failure to address the environmental and related economic impacts of GE alfalfa will have far-reaching consequences. CFS is spearheading a campaign to make sure all affected parties know and are involved in the public process and have the opportunity to comment.
This is a call to action to all who have concerns about the environmental and economic consequences of uncontrolled nation-wide growth of GE alfalfa, to all who believe in the publics right to choose to eat non-GE food and the farmers right to sow the crop of his or her choice, and to those who care about the impacts of pesticides and invasive weeds on biodiversity and endangered species.
Farmers, dairy producers, scientists, public interest organizations, and all concerned citizenry must make sure their voices are heard in this important process. At this stage, the most critical thing anyone can do is provide public comments indicating their concerns with GE Roundup Ready Alfalfa.
In particular, the EIS dismisses the significance that GE alfalfa will broadly contaminate non-GE alfalfa. Opinions, studies (published or unpublished), anecdotal stories, and testing data about how contamination will occur and /or demonstrating that contamination has in fact occurred are critical.
The EIS also dismisses the significant adverse economic effects that GE contamination will have on non-GE conventional alfalfa seed or hay growers (e.g., export markets), or dairy production that rely on non-GE and organic alfalfa hay for forage. Studies (published or unpublished), anecdotal stories, and economic analysis showing harm through contamination is essential, especially markets that are GE sensitive or reject GE outright. (Comment Number: APHIS-2007-0044-0397-3)

Response: All substantive public comments provided on the DEIS during the comment period are responded to in the FEIS. Substantive concerns raised by commenters have been considered and reviewed by APHIS.

The DEIS discusses the impact of GT alfalfa deregulation on export markets in appendix R. For more detail on this issue, see response to comment APHIS-2007-0044-0511-1 for issue 5.8. Impacts on domestic markets, including conventional, organic and downstream markets, are

discussed in appendices S and T of the DEIS. For more information on this issue, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
While I have no personal understanding of the long and short term effects of GM alfalfa, I am incensed by regulations that continually gloss of the public's right to know when GM products have been introduced into the community and food sources. It is my fundamental right to CHOOSE whether I want to consume, handle, or even live near GM products.
Until enough evidence, from unbiased research, is available, it is in the government's own best "cover-your-ass" interest to mandate clear labeling of GM products or ingredients all the way to the final retail products. (Comment Number: APHIS-2007-0044-0416-1)

Response: APHIS acknowledges the comment. APHIS does not have the authority to regulate labeling of genetically modified products. As discussed in section I of the DEIS, the U.S. Food and Drug Administration (FDA) is responsible for ensuring the safety and proper labeling of all plant-derived foods and feeds, including those developed through genetic engineering such as glyphosate-tolerant alfalfa.

Comment Excerpt Text:
I strongly urge the strict regulation of genetically modified plants and at the very least, the testing of their environmental impact as well as their impact on human beings. I am distressed that government agencies invariably rule to protect business interests ahead of the public that they are intended to protect. Additionally, we must be allowed to know what plants are genetically modified so that we can make informed choices. We have that right at least. (Comment Number: APHIS-2007-0044-0418-2)

Response: "Protecting American agriculture" is the basic charge of USDA-APHIS. By ensuring plant and animal health, APHIS contributes to public health. If a GE organism has the potential to pose a plant pest risk, it is subject to APHIS oversight. This EIS identifies and analyzes environmental impacts, which includes impacts on humans, associated with APHIS' determination on whether to grant nonregulated status to GE alfalfa lines J101 and J163. For more information regarding health effects of GT alfalfa on humans, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0 and the response to comment APHIS-2007-0044-11034-2 for issue 6.1.
APHIS acknowledges the comment regarding the public's right to know what plants are genetically modified. Regarding labeling, see the response to comment APHIS-2007-0044-0416-1 for issue 2.0.

Comment Excerpt Text:
- Roundup has been associated with increased rates of several cancers in pesticide applicators (e.g. non-Hodgkin's & multiple myeloma),[ix] and is highly toxic to frogs at field-relevant concentrations.[x] The Environmental Protection Agency (EPA) is currently re-assessing the safety of glyphosate, the active ingredient in Roundup, for the first time in over 15 years. USDA

should wait for this new EPA assessment before it considers approving GE alfalfa. (Comment Number: APHIS-2007-0044-0948-6)

Response: Regarding health effects, see the response to comment APHIS-2007-0044-0278-1 and APHIS-2007-0044-2243-1 for issue 6.0. Note that EPA periodically reviews pesticides for registration, but APHIS's decision on the petition does not affect EPA's decision on the re-registration. EPA will determine, however, if any changes should be made to the label with respect to glyphosate use on alfalfa and other crops, and APHIS is in routine contact with EPA as to the availability of any updates on their human health and environmental risk assessments of glyphosate.

Comment Excerpt Text:
Until proper studies have been conducted as to the longterm cytotoxicity, carcinogenicity as well as immunological alterations, it is impossible to even consider the deregulation of transgenetic alfalfa. Longterm studies regarding the pollen contamination as well the death of bees from agribacterium when infected with Morgellons-like symptomology is also necessary as such modification of genes in plants has also modified the genes in other plants, insects, animals and humans.
Empirical and objective peer-reviewed studies with NO financial ties to the biotech industry also need to be done. No study is worth anything unless it has been published in a high impact point, peer-reviewed journal. Unless the studies you are looking at have been in there, then they are completely worthless and the scientific model has been usurped by corporate greed with the cost to be born on our children's health and future wellbeing.
Genetic modification is an extremely dangerous game that no one should be playing. The science nor do the people support the justification of deregulating genetically modified alfalfa.
(Comment Number: APHIS-2007-0044-10562-1)

Response: Adequate information is provided in the EIS in order for APHIS to make the determination on whether to deregulate GE alfalfa lines J101 and J163. The best available information and peer-reviewed science has been incorporated into the EIS. Where information gaps existed, and this information was important for a reasoned choice among options, that information was gathered as part of the deregulation process. Where information is still incomplete, APHIS has made statements that such information is incomplete or unavailable, provided summaries of existing credible scientific evidence relevant to evaluating the effects, and evaluated the impacts based on theoretical approaches or research methods generally accepted in the scientific community. Appendix O of the DEIS and FEIS includes an assessment of the effects of GT alfalfa on bees and concludes that GT alfalfa will not adversely affect bees..

For more information regarding health effects of GT alfalfa on humans, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0 and the response to comment APHIS-2007-0044-11034-2 for issue 6.1.

Comment Excerpt Text:

ASTA strongly supports choice for both our members in developing, producing and marketing seeds and their customers in selecting seeds that best meet their needs. In order to provide farmers with a wide choice of high quality seed, seed producers have established agronomic methods such as isolation distances, removal of feral plants and/or noxious weeds, and temporal isolation, some of which are discussed in the DEIS. With the common goal of safely utilizing the new advances in plant breeding, ASTA supports the U.S Government's science-based approach to regulation as part of the Coordinated Framework for Regulation of Biotechnology. [Footnote 2: See generally 51 Fed. Reg. 23,302.] The oversight of APHIS and the other federal agencies to ensure the safety of agricultural biotechnology products for the environment, as well as for consumers, has allowed the benefits of these new seed varieties to reach farmers and the public at large. ASTA refers APHIS to the overall comments submitted to the Agency by the Biotechnology Industry Organization (BIO) on this DEIS. (Comment Number: APHIS-2007-0044-10725-1)

Response: APHIS acknowledges the comment and referred to the comments submitted by BIO (issue 3) for this DEIS.

Comment Excerpt Text:
Marketing Standards Address Economic, Not Environmental Issues The draft EIS does not include an extensive discussion of an alternative under which no crosspollination would be allowed. Some members of the public advocated for this approach in the comments to the APHIS scoping document, and some commenters to the draft EIS have expressed concern about the absence of such an approach. Under some situations, limited in terms of time, geography and acreage, the absence of movement of genetic material may potentially be assured. As a practical matter, when operating in a farmer's field or any other biological system, it is not realistic to discuss such an option and no legal or scientific basis supports such a "zero tolerance" standard. [Footnote 24: Indeed, acting under the auspices of the Office of Science and Technology Policy (OSTP), APHIS, FDA and EPA have each adopted a policy that recognizes the likelihood that commercial products may contain the low-level presence of genetic material from products that have not yet completed the regulatory review process. 67 Fed. Reg. 50578 (Aug. 2, 2002) (OSTP); 72 Fed. Reg. 14649 (Mar. 29,2007) (APHIS); 71 Fed. Reg. 35688 (June 21, 2006) (FDA); 72 Fed. Reg. 25303 (May 4, 2007) (EPA). See also Guideline for the Conduct of Food Safety Assessment of Foods Derived from Recombinant-DNA Plants, Annex 3: Food Safety Assessment in Situations of Low-level Presence of Recombinant-DNA Plant Material in Food, CAC/GL 45-2003, Codex Alimentarius Commission, http://www.codexalimentarius.net/download/standards/10021/CXG 045e.pdf. (Codex was created in 1963 by FAO and WHO to develop food standards, guidelines and related texts such as codes of practice under the Joint FAO/WHO Food Standards Programme. The main purposes of this Programme are protecting health of the consumers and ensuring fair trade practices in the food trade, and promoting coordination of all food standards work undertaken by international governmental and non-governmental organizations. http://www.codexalimentarius.net/web/index_en.jsp).] This is true regardless of whether the plants being grown are conventional, organic or GE. Instead, calls for a "zero tolerance" appear to be based on a lack of trust in government safety assessments, disapproval of private rights to the intellectual property associated with new seed traits, or simple unhappiness over a newly-recognized but age-old lack of control over the genetic content of food. While a

discussion of marketing standards and consumer preferences may have its place in an EIS under certain circumstances, the inclusion of a fully developed alternative to address these issues would appear to be inconsistent with the policy objectives of APHIS' Part 340 program and the proposed determination of non-regulated status for an herbicide-tolerant crop that triggers this NEPA review. (Comment Number: APHIS-2007-0044-10866-4)

Response: APHIS acknowledges the comment An additional alternative, which combines two alternatives considered in the DEIS but not in detail, was added as an alternative to study in detail in the FEIS. This alternative was added to address the specific issues and potential effects raised in the public comments. The reader is referred to the alternatives and environmental consequences sections of the FEIS for specific discussions of the alternatives and their potential impacts. For further detail regarding the alternative, see the response to comment APHIS-2007-0044-7620-53 for issue 1.0.

Comment Excerpt Text:
Although not directly at issue here, it should also be noted that GT alfalfa and all other herbicidetolerant plants deregulated by APHIS have successfully cleared food and feed safety review with the FDA. FDA recognizes the uniformity and ubiquity of genetic material (nucleic acids) and the fact that genetic material does not raise a safety concern as a component offood. [Footnote 28: FDA, Statement of Policy: Foods Derived From New Plant Varieties, 57 Fed. Reg. 22984, 22990 (May 29,1992) (declaring genetic material to be safe).] Under FDA policy, the safety ofGE crops is established through a showing that the GE crop is as safe for food and animal feed as conventionally bred crops. This showing was made for the GE alfalfa at issue here. FDA policy also does not require labeling of any food derived from GE plants or other new plant varieties unless material differences exist regarding nutrition, allergenicity, or basic use ofthe food or feed. From a food safety standpoint, GT alfalfa is indistinguishable from conventional alfalfa. Food products produced from GE crops are universally consumed today and have been on the market for over a decade, with no instances of harm to human health or the environment in any crop that has completed the deregulation process. The environmental impact of any gene flow from those crops to any others has been negligible. It is unlikely that many people in the United States today can accurately claim that their diets are completely free from food produced from GE crops. (Comment Number: APHIS-2007-0044-10866-6)

Response: APHIS acknowledges the comment. APHIS is aware of the FDA policies for genetically engineered crops that are used for human consumption. The knowledge of past deregulations has, in part, served to inform the analysis contained in this final environmental impact statement.

Comment Excerpt Text:
Regulation of Pesticides
Congress saw the need for a separate statute regulating herbicides and other pesticides when it passed the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) in 1947. Through subsequent major revisions to FIFRA in 1972, 1975, 1978 and 1988, and the passage of the Food Quality Protection Act in 1996, Congress has provided for an increasingly comprehensive

pesticide regulatory system that is protective of health, safety and the environment. EPA is the federal agency charged with the responsibility for regulating pesticides. Under FIFRA, every herbicide and other pesticide sold or distributed in the United States must be granted a registration. The regulations and policies that implement FIFRA are revised and updated as necessary to address new needs and the latest science and technologies. EPA's responsibilities include ensuring the correct use instructions are available to growers through the evaluation of supporting health, safety and environmental data and approval of the herbicide label. A pesticide product can only be used legally according to the directions for use on the label.

Herbicide Safety

Nearly 900 scientists and program officials in EPA's Office of Pesticide Programs ensure that products are properly registered and comply with federal law. These expelis are responsible for ensuring that pesticides cause no unreasonable adverse effects on the environment and human health. EPA's initial registration and subsequent reregistration and registration review processes include the evaluation of potential health effects on humans and environmental effects on wildlife and other non-target organisms - birds, amphibians, mammals, beneficial insects, including bees, and plants. These processes include scientific, legal, and administrative elements through which EPA examines the ingredients of the pesticide; the particular site or crop on which it is to be used; the amount, frequency, method and timing of application, and other conditions of its use; and storage and disposal practices. Under FIFRA's strict provisions, the process of bringing pesticides to market by securing an EPA registration is complex and demanding, based on strong scientific principles and undertaken according to stringent government review and regulation. EPA requires over 100 separate scientific safety tests to ensure that a product, when used properly, does not present an unreasonable risk to health or the environment, as required by law. [Footnote 3l: http://www.epa.gov/pesticides/regulating/index.htm#eval.] On average, only one in 139,000 chemicals makes it from the chemist's laboratory to the farmer's field; pesticide development, testing and EPA approval takes 8 to 10 years and costs manufacturers between $152-184 million for each product. [Footnote 32: http://www.pestfacts.org/use/responsibleuse.htm.] The data required by EPA are used to evaluate whether a pesticide has the potential to cause adverse effects on humans, wildlife, fish, and plants (including endangered species and other "non-target" organisms - organisms that the pesticide is not intended to act against). The registration applicant must also supply data addressing the pesticide's potential impact on surface water or ground water (which might result from leaching or runoff, for example). Potential human health and safety risks range from short-term toxicity to long-term effects such as cancer and reproductive system disorders. A pesticide's registration is not the only opportunity EPA has to evaluate that product's safety.

For example, EPA recently completed a program to review older pesticides (those initially registered before November 1984) ensure that they meet current scientific and regulatory standards. This process, called reregistration, considers the human health and ecological effects of pesticides and results in any actions necessary to reduce risks that are of concern. Glyphosate and many other herbicides satisfactorily completed the EPA's reregistration process. EPA concluded its reregistration evaluation of glyphosate in 1993. At that time, the Agency produced a 291-page Reregistration Eligibility Decision document (RED) on glyphosate, setting forth the data on which it made a decision to reregister all then-existing uses of the pesticide, based on the pesticide having met the no unreasonable adverse effects standard found in FIFRA. Where pesticides may be used on food or feed crops, EPA also sets tolerances (maximum pesticide

residue levels) for the amount of the pesticide that can legally remain in or on foods. EPA undertakes this analysis under the authority of the Federal Food, Drug, and Cosmetic Act (FFDCA). Under the FFDCA, EPA must find that such tolerances will be safe, meaning that there is a reasonable certainty that no harm will result from aggregate exposure to the pesticide chemical residue. This finding must be made and the appropriate tolerance established before a pesticide can be registered for use on the particular food or feed crop in question. Several factors must be addressed each time that a tolerance is established or modified, including a tolerance to allow the use of an herbicide over-the-top of an herbicide-tolerant crop. Those factors include:
• the aggregate, non-occupational exposure from the pesticide (exposure through diet, from using pesticides in and around the home, and from drinking water);
• the cumulative effects from exposure to different pesticides that produce similar effects in the human body;
• whether there is increased susceptibility to infants and children, or other sensitive subpopulations, from exposure to the pesticide; and
• whether the pesticide produces an effect in humans similar to an effect produced by a naturally-occurring estrogen or produces other endocrine-disruption effects. [Footnote 33: Based on determinations of safety made under the FFDCA, EPA has granted food and feed safety tolerances
allowing for the post-emergence use of glyphosate and other herbicides on every commercialized herbicide-tolerant
crop. See generally 40 C.F.R. pt. 180.] EPA's registration, reregistration and tolerance decisions for glyphosate and other pesticides provide a formal and authoritative record of federal agency action that should be adopted by APHIS and incorporated by reference as a matter of course in NEPA assessments prepared for any actions proposed under Part 340 that involve a pesticide. [Footnote 34: See 40 C.F.R. § 1502.21.] (Comment Number: APHIS-2007-0044-10866-8)

Response: APHIS acknowledges the comment and the description of the regulatory process, including the EPA authorities, procedures, and regulations relative to their responsibilities under FIFRA and relative to approval of GE plants that contain pesticide-resistant characteristics. APHIS does rely on the body of science used by EPA in their approval process. However, APHIS must also conduct an independent evaluation of the information and analysis provided by other agencies and is responsible for its accuracy.

Comment Excerpt Text:
Based on the foreseeable and significant likelihood of harm to protected species and their habitat as discussed above, APHIS should at a minimum re-analyze the these impacts using sound science. This assessment should also include consultation with expert sister agencies. Finally, unless harm to protected species can in some way be avoided, APHIS should deny the petition to deregulate GT alfalfa. (Comment Number: APHIS-2007-0044-10966-14)

Response: Regarding potential risks to threatened and endangered species, see the response to comment APHIS-2007-0044-9936-27 for issue 4.1.

Comment Excerpt Text:

Monsanto in court prosecuted farmers for "stealing their proprietary crop". The farmers were a victim of the cross pollination process of nature, not thieves. By Monsanto taking this action against the farmers proves crops will not stay pure.
"A landmark piece of legislation protecting California's farmers from liability was signed by Governor Schwarzenegger on Sept. 27, 2008. The bill, AB 541 (Huffman, D-Marin/Sonoma), was sponsored by a coalition of agriculture organizations and food businesses, and it is the first bill passed by the California legislature that brings much-needed regulation to genetically engineered (GE) crops. AB 541 indemnifies California farmers who have not been able to prevent the inevitable - the drift of GE pollen or seed onto their land and the subsequent contamination of non-GE crops.. Look at California before you OK Roundup-tolerant Alfalfa
We do not want our Organic Way of Life diminished or altered.
See: http://www.cbsnews.com/stories/2008/04/26/eveningnews/main4048288.shtml for more of Monsanto's tactics
(Comment Number: APHIS-2007-0044-11053-1)

Response: APHIS acknowledges the comment. Regarding risks of gene flow see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). Regarding the liability for unintended presence of genetically engineered content in non-GE fields, see the response to comment APHIS-2007-0044-6376-1 in issue 5.1.

Comment Excerpt Text:
Another troubling aspect of the draft EIS is the USDA's complete failure to acknowledge the need for companies responsible for GE contamination to be held liable for their actions and for mandatory enforcement actions to be taken against liable parties. This indefensible position is absolutely unacceptable, and so is the stated assumption that liability for GE contamination should be borne solely by organic and non-GE conventional farmers. In short, it puts the future viability of the entire organic industry at risk. (Comment Number: APHIS-2007-0044-11689-1)

Response: APHIS acknowledges the comment. Regarding risks of gene flow, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). Regarding the future viability of organic markets, see the response to comment APHIS-2007-0044-9882-1 (paragraph 1 of the response) for issue 5.0. Regarding the liability for unintended presence of genetically engineered content in non-GE fields, see the response to comment APHIS-2007-0044-6376-1 in issue 5.1.

Comment Excerpt Text:
ABPC is a coalition representing farmers, food processors and manufacturers, merchandisers and biotechnology providers that support the continued availability and marketability of products derived from agricultural biotechnology. ABPC has been a resource to administration officials over the past ten years. We provide a forum for policymakers to discuss agriculture biotechnology issues and exchange information with the food chain groups. ABPC also strives to reach consensus positions on important biotechnology policy issues.
The first fourteen years of commercially available crops derived from modern biotechnology have delivered substantial economic and environmental benefits. For these reasons, global

adoption of these crops has accelerated rapidly in the past several years. Currently, the United States leads the world in the development of these technologies which has been made possible by the science-based regulatory framework adopted by the U.S. government. As a result of APHIS's stringent regulatory review, consumers can be confident in the safety of new crops while innovative companies continue to make investments and create value for farmers and jobs for the American people.
In the case of GT alfalfa, this product has successfully completed the review process at APHIS and the Food and Drug Administration (FDA), and the use of glysophate for effective weed control on alfalfa has been approved by the Environmental Protection Agency (EPA). Per the DEIS, ABPC acknowledges that GT alfalfa, like other widely used crops with the same trait, can provide important benefits to U.S. producers. Other crops genetically engineered for tolerance to glyphosate have been used safely on millions of acres for over a decade.
In keeping with the Council on Environmental Quality guidelines, the final EIS should incorporate the reviews conducted by FDA and EPA by reference.[Footnote 1: "Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act" 40 C.F.R. Part 1502.2 (Nov. 1978)] (Comment Number: APHIS-2007-0044-11753-1)

Response: APHIS does incorporate the information and analyses performed by the EPA and FDA relative to their authorities in the EIS. However, following the Council on Environmental Quality (CEQ) regulations (40 CFR Part 1506.5), APHIS must also do an independent evaluation of the information and analysis provided by other agencies and is responsible for its accuracy.

Comment Excerpt Text:
Consumers have established an implied zero tolerance for GE material in organic products, since the polls mentioned above show confidence in organic products as clear alternatives to GE ingredients. The organic industry risks losing credibility altogether should its consumer base become aware that GE material is making its way into organic products. This puts organic operations and this valuable market at risk. Additionally, the NOP federal regulations are at risk, as there is no "acceptable" use of an excluded method, such as the use of genetically engineered inputs. Excluded means excluded – organic seed cannot have GE traits and be used by an organic farmer. APHIS needs to respect the federal rule, and recognize that the companies releasing GE crops must have a clear and sound method for preventing contamination of organic seed systems. Until that is the case GE crops should be prohibited. It is unreasonable to place the economic burden of protection along this entire chain of production on the potential victims of contamination. (Comment Number: APHIS-2007-0044-12044-5)

Response: Regarding GE gene flow of organic alfalfa production, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0 APHIS-2007-0044-11689-2 for issue 5.62007-0044-11689-2 for issue 5.6 address excluded methods. In addition, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1, (paragraph 1 of the response) which addresses gene flow.

Comment Excerpt Text:

Farmers and ranchers who desire quantity vs. quality can plant RR hay fields next to my seed fields of conventional varieties and leave them until full bloom or later before cutting can contaminate my fields. Who will be liable for the loss of genetically pure seed? Comment Number: APHIS-2007-0044-12219-3

Response:
Monsanto requires a commitment from Roundup Ready alfalfa hay growers to harvest at or before 10 percent bloom. Conventional alfalfa seed growers are required to follow minimum production standards if seeds are to be certified for varietal purity. However, in the event that low level presence of genetically engineered material is present in conventional seed fields above the levels accepted by targeted seed markets, see response to comment APHIS-2007-0044-6376-1 for issue 5.1

Comment Excerpt Text:
Most ofthe data in the E.I.S. was provided by the company that owns the patent rights. Was the data verified by a third party? (Comment Number: APHIS-2007-0044-12219-5)

Response: APHIS uses data provided by the applicant, peer reviewed scientific studies, and expert opinion to inform its decisions. As part of the petition process the applicant is required to collect and supply to APHIS certain information. APHIS evaluates that information, along with all of the available published data on that topic for analyses. The data used to perform the analyses in this EIS use data from all of these sources. In addition, see the first paragraph of the response to comment APHIS-2007-0044-10866-3 for issue 2.1.

Comment Excerpt Text:
As for my second concern, it is not appropriate that APillS prefer one alternative over another, as such
preference is the prerogative of the public and not any agency meant to serve the public in an impartial
manner. Furthermore, it is not the prerogative of any civil service agency to render a preliminary conclusion of any sort on a matter which is still in open public contention, as APillS repeatedly states it
has so done in the EIS in question.. The USDA-APillS has grossly overstepped its responsibility in this
regard. (Comment Number: APHIS-2007-0044-12345-2)

Response: Per the Council on Environmental Quality (CEQ) regulations (40 CFR § 1502.14), agencies shall, "identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement…" Therefore, it was acceptable for APHIS to identify a preferred alternative in the DEIS.

In response to public comments, the comment period was extended to 75 days. APHIS reviewed all comments and incorporated substantive public comments into the FEIS, as deemed relevant. The NEPA process will allow for an informed record of decision to be made.

Comment Excerpt Text:
Over eight hundred scientists from 84 countriescall for ban on patenting Life-forms.
Open Letter from World Scientists to All Governments Concerning Genetically Modified Organisms (GMOs)
• The scientists are extremely concerned about the hazards of GMOs to biodiversity, food safety, human and animal health, and demand a moratorium on environmental releases in accordance with the precautionary principle. (Comment Number: APHIS-2007-0044-1295-2)

Response: APHIS acknowledges the comment. Regarding health effects from GT alfalfa on humans and other animals, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0 and the response to comment APHIS-2007-0044-11034-2 for issue 6.1. The protection of biodiversity is now addressed in this EIS in sections IV.C.1 and IV.C.2. See response to comment APHIS-2007-0044-0868-1 for issue 4.1.

Comment Excerpt Text:
Please do not allow genetically altered alfalfa to be called "organic" - that term should stand as a beacon of purity to consumers. Applying such label to a plant that is genetically altered to be able to withstand herbicide seems particularly heinous. As a disabled Veteran who suffers from diabetes, thyroid problems and a host of other issues attributed to the herbicide "agent orange" I need to know that when I buy "organic" that the fruit, vegetable or grain I am going to consume will be pure and will not add to the physical problems my government has already saddled me with. (Comment Number: APHIS-2007-0044-1518-1)

Response: APHIS acknowledges the comment regarding labeling. In regard to the National Organic Program, see the response to comment APHIS-2007-0044-10866-5 for issue 3.3.

Comment Excerpt Text:
The Organic Standard requires that livestock feed for animals used for meat, dairy and eggs is 100 percent organic. Organic alfalfa, the main source of feed for the organic dairy industry, cannot be contaminated with GEOs. (Comment Number: APHIS-2007-0044-2301-1)

Response: The DEIS analyzes the impact on organic markets under the scenario of decreased demand for organic products due to GT alfalfa deregulation, as described in appendix S of the DEIS. For more information on this and the National Organic Program, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to the National Organic Program and what is allowed in organic food, see the response to comment APHIS-2007-0044-10866-5 for issue 3.3. In regard to the adventitious presence of non-GE or organic alfalfa with GT alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:

9. Please consider these comments constituting significant impact on a number of market sectors, and in light of consumer right to choose. The company that produces RR Alfalfa seed is under investigation by the Justice Department for Antitrust violations, and continues to raise seed prices, (2008-09: corn – 30% increase, soybeans – 25%, 2010: soybeans 42%), which has significant financial implications for farmers who choose to grow GE crops. The health impacts of RoundUp – both the active and inert ingredients of this pesticide, and the significant increase in blanket applications of RoundUp compared to traditional spot applications of pesticide on Non-GE crops, on human and environmental health (see the dead zone in the Gulf of Mexico as an example of the significant impact of widespread increase in pesticide usage) - as well as the implications of RoundUp resistant super weeds, constitute significant damage to our nation's long-term agricultural future. (Comment Number: APHIS-2007-0044-2421-6)

Response: Regarding your comment on impacts on markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to health effects of GT alfalfa on humans, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0. In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for issue 3.6.

Comment Excerpt Text:
Being a consientious consumer is becoming more difficult everyday. Instead of labels that say what a product is or has in it, food producers have to label what it is not "Non-GMO, No pesticides, No hormones". If these things are unwanted, then they should be easier to point out. Please do not continue to jeopardize our food system by deregulating genetically engineered crops such as Glyphosate-tolerate alfalfa. Without regulation mechanisms, there will be even less ability to monitor these new crops in case of problems. The security and health of our food system has already been undermined by poor regulatory decisions. Please do your part to protect us and our food system and our choice to not eat genetically engineered derived foods. (Comment Number: APHIS-2007-0044-3225-1)

Response: Regarding labeling, see the response to comment APHIS-2007-0044-0416-1 for issue 2.0. For more information regarding health effects of GT alfalfa on humans, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0 and the response to comment APHIS-2007-0044-11034-2 for issue 6.1.

Comment Excerpt Text:
I am totally against Genectically Modified food sources. I do what I can to avoid purchasing, or supporting, any products that have been genectically modified. I also believe that there should be required labeling on any food that has been genectically modified, or has been grown from a seed that has been modified. (Comment Number: APHIS-2007-0044-3280-1)

Response: APHIS acknowledges the comment. Regarding labeling, see the response to comment APHIS-2007-0044-0416-1 for issue 2.0.

Comment Excerpt Text:
GE contaminated foods must be labeled as such. The fact that this information could be withheld from consumers is appalling and another indication that our government no longer stands for the protection of its people but instead exists to further the interest of corrupt politicians and the corporations and money they represent. (Comment Number: APHIS-2007-0044-3392-1)

Response: APHIS acknowledges the comment. Regarding labeling, see the response to comment APHIS-2007-0044-0416-1 for issue 2.0.

Comment Excerpt Text:
Then the last version of why we need RR alfalfa was: As a multi generation family farmer (a young lady from SE Minnesota wearing a seed company coat who was over heard to say she also attended the session in Kearney, Ne. the day before) I should have the right to plant whatever I want. OK, I agree. So let's see the person who has the right to plant the RR crop as well as the company who owns the patent rights to the RR crop, be held responsible for the damages resulting from the contamination of the neighbors crop. They can also be liable to livestock operations who buy this GMO grain and feed it to their livestock. When the animals get sick and need veterinary attention or worse die because of the toxins caused by the GMO crops, these losses will be paid for by both the biotech seed company and the farmer who wanted to have the right to plant the GMO crop. This multi generation family farmer and the company holding the patent on the GMO crop can also pay the organic farmer and the non-GMO crop farmer for the loss of income when they can not sell their organic or non-GMO crop as non-GMO or organic because of GMO contamination.
Then we need address who pays for the damage to the soil from the use of glyphosate and RR crops.
Will farmers using these RR farming practices be held responsible for the damage caused by flooding because the soil can not hold the amount of water that it used to before RR crops? (Comment Number: APHIS-2007-0044-3395-4)

Response: In regard to the gene flow of non-GE or organic alfalfa with GT alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). For more information regarding health effects of GT alfalfa on humans and other animals, see the second response to comment APHIS-2007-0044-0278-1 for issue 6.0 and the response to comment APHIS-2007-0044-11034-2 for issue 6.1. In regard to the flooding concern, the DEIS did not conclude that there would be an increase in flooding due to the deregulation of GT Alfalfa. Regarding liability in case of economic losses caused by presence of genetically engineered material, see response to comment APHIS-2007-0044-6376-1 for issue 5.1

Comment Excerpt Text:
As a resident of an agricultural area and a community which cares significantly about where their food comes from, farming practices and pesticide residual in the foods we eat, we care alot about the lack of an Environmental Impact Statement on genetically engineered alfalfa from Monsanto corp.

It is quite surprising that as a regulatory agency you would consider such an action, unless there is no actual regulation happening at all.
I do not like the idea of modifying plants in order to make them resilient to pesticides. This practice on corn has led our country down a bad path, I am opposed to furthering this practice. And I feel strongly that you at the very minimum conduct and EIS by an impartial third party. (Comment Number: APHIS-2007-0044-3959-1)

Response: See the first paragraph of the response to comment APHIS-2007-0044-10866-3 for issue 2.1.

Comment Excerpt Text:
I care about all of the foods that I consume - not to the point of making everything pure or organic, but certainly to the point where I would like to read on a label with clear and concise language what I'm consuming. Genetically engineered or altered foods should be sold with a label indicating that the foods contain GE products. Until then, I don't believe that any GE foods should be allowed, including GE alfalfa, even though I realize we already consume these foods. That being said, it is a buyer-beware market out there. I feel that the consumer ultimately has the responsibility of choosing foods right for them based on the information given.
As a consumer, I am prepared to take that responsibility. I would like the choice to buy or not buy foods based on the label. The label should represent what is in the package or product in a language that is clear to the general public. Period. (Comment Number: APHIS-2007-0044-3969-2)

Response: APHIS acknowledges the comment. In regard to labeling, see the response to comment APHIS-2007-0044-0416-1 for issue 2.0.

Comment Excerpt Text:
I strongly object to granting Roundup Ready alfalfa nonregulated status. In fact, I believe it should be prohibited. Given the USDA's surprisingly limited scope of regulation in the case of this "product" and of GMOs in general, I understand prohibition exceeds what the USDA considers to be it's authority. But the USDA should use what power it does have to curb this GMO to the utmost limit of its mandate.
Roundup Ready anything is a mistake. Please keep this product out of our grass. (Comment Number: APHIS-2007-0044-5226-1)

Response: See the response to comment APHIS-2007-0044-8397-5 for issue 2.0.

Comment Excerpt Text:
I hereby request that you don't allow Monsanto non-regulated status.
2. Please extend the deadline for public comments by 30 days.
3. Immediately Release the Plant Pest Determination for Comment
(Comment Number: APHIS-2007-0044-6207-2)

Response: APHIS acknowledges the comment. Regarding the second comment, the initial 60-day comment period was 15 days greater than the 45-day comment period required by the Council on Environmental Quality (40 CFR § 1506.10). However, in response to public comments, the comment period was extended an additional 15 days. This extended 75-day comment period did provide ample time for substantive comments. Regarding the third comment, the Plant Pest Risk Assessment for Glyphosate-Tolerant Alfalfa Events J101 and J163 was included as appendix W in the DEIS, which was available for public comment.

Comment Excerpt Text:
As a US citizen and organic consumer I am very much concerned with the issue of GE alfalfa contamination. As well, I am appalled that while "the USDA admits that an economic analysis shows GE alfalfa will hurt the organic industry and small farmers" they fail to come to terms with the impact or address the issue of protection. I've about had it with the way the USDA panders to "agri-business" and insist that the time is now for the Agency to immediately require any and all agricultural products with ANY GE content be CLEARLY labeled for the consumer, AND that severe penalties and prohibitions be enacted that hold GE growers responsible for ANY cross-contamination to non-GE crops.
For Gods sake, a little less pandering to Monsanto and company....and a hell of a lot more care, concern, and protection for the the organic grower and....US consumers if you please !!
(Comment Number: APHIS-2007-0044-6210-1)

Response: APHIS acknowledges the comment. For information regarding the impact on organic markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the impact of deregulation to small farms, see the response to comment APHIS-2007-0044-4913-7 for issue 5.1. Regarding labeling, see the response to comment APHIS-2007-0044-0416-1 for issue 2.0.

Comment Excerpt Text:
2.That the APHIS's preference for the deregulation alternative is highly inappropriate.
In regard to the first issue, I should first like to make clear that I have read the indemnifying statements contained in the EIS to the effect that APHIS is not responsible for pesticide regulation, and that APHIS is in compliance with CEQ requirements. (Comment Number: APHIS-2007-0044-6240-1)

Response: See the response to comment APHIS-2007-0044-11741-4 for issue 1.0. In regard to APHIS' responsibilities, see the response to comment APHIS-2007-0044-8397-5 for issue 2.0. With regard to choosing a preferred alternative see APHIS-2007-0044-12345-2

Comment Excerpt Text:
As for my second concern, it is not appropriate that APHIS prefer one alternative over another, as such preference is the prerogative of the public and not any agency meant to serve the public in an impartial manner. Furthermore, it is not the prerogative of any civil service agency to render a preliminary conclusion of any sort on a matter which is still in open public contention,

as APHIS repeatedly states it has so done in the EIS in question.. The USDA-APHIS has grossly overstepped its responsibility in this regard. (Comment Number: APHIS-2007-0044-6240-4)

Response: See the response to comment APHIS-2007-0044-11741-4 for issue 1.0. . With regard to choosing a preferred alternative see APHIS-2007-0044-12345-2

Comment Excerpt Text: In accordance with our responsibilities under Section 309 afthe Clean Air Act and the National Environmental Policy Act (NEPA), the Environmental Protection Agency (EPA) has reviewed the U.S. Department of Agriculture, Animal Plant Health Inspection Service's (APHIS) draft environmental impact statement for "'GlyphosQre-TolerantAlfalfa EvenlS (GT) JIOJ and J163: Requestfor Nonregulated Statlls," APHIS prepared this draft environmental impact statement (EIS) to comply with an order from the U.S, District Court for the Northern District of Califamia to prepare an EIS before deciding whether to grant nonregulated status to genetically engineered (OE) alfalfa lines JIOI and JI03. Two alternatives were examined: Alternative (I), No Action, to maintain the status ofOT alfalfa lines JIOI and JI03 as regulated articles under 7 CFR Part 340; and Alternative (2), to deregulate OE alfalfa lines JIOl and JI03 as regulated articles under 7 CFR Part 340. The draft EIS identified Alternative 2 as the preferred alternative. EPA has no objection with an APHIS determination to deregulate GE alfalfa lines J10I and Jl03. Therefore, in accordance with EPA's procedures, we have rated the draft ElS as a Lack of Objections (LO) which indicates that we have no concerns regarding an APHIS determination to deregulate GE alfalfa lines JIOI and J103, (Comment Number: APHIS-2007-0044-6298-1)

Response: APHIS appreciates the review and rating provided by the EPA as part of their statutory authorities under Section 309 of the Clean Air Act.

Comment Excerpt Text:
In their statement encouraging producers to comment on Roundup Ready Alfalfa, APHIS states that "this decision will impact the use of genetically engineered crops in general for alfalfa in the future (not just RR alfalfa) and perhaps other crops as well." We take this to mean that APHIS itself views its EIS and potential results as a "test" or "pilot" study for the future of all GMOs, (Comment Number: APHIS-2007-0044-6353-1)

Response: At this time, APHIS is only considering the petition to deregulate GT Alfalfa lines J101 and J163. In the future, any other petitions to deregulate other GE organisms will be appropriately analyzed as a separate action with consideration given to any potential adverse cumulative effects. For more information regarding APHIS' responsibilities, see the response to comment APHIS-2007-0044-8397-5 for issue 2.0.

Comment Excerpt Text:
6) The USDA hotline intended for use by farmers to identify proximity of their acreage to GE fields has not been successful for at least two Nevada individuals, who attempted to use it. In one

case, the information was inadequate and faulty; in another case, a Nevada organic farmer, growing alfalfa for row crops, was denied access of any information. In general we question why this hotline substantially limits access, and in fact, does not fall under the Freedom of Information. In any case, we found it difficult to use and unsuccessful in results. (Comment Number: APHIS-2007-0044-6353-13)

Response: This comment has been noted, and APHIS apologizes for any problems encountered with the USDA hotline.

Comment Excerpt Text:
We respectfully request the establishment of a Public/Private/Industry Task-Force to further study genetically engineered or genetically modified organism ("GE" or "GMO") crops being grown in Nevada; and to research the potential health and environmental impact to our State. This task force would report back to the Governor, the Nevada legislature, and Nevada consumers (of agricultural products of the soil, livestock, and animal feed) about their findings, and make recommendations for proposed future regulation or restrictions on the growing of GE crops in Nevada. (Comment Number: APHIS-2007-0044-6353-16)

Response: APHIS acknowledges the comment._However, the comment suggestion is outside of APHIS' regulatory purview. APHIS is responsible for regulating the introduction of genetically engineered (GE) organisms that are known to, or could, pose a plant pest risk. Per the National Environmental Policy Act (NEPA), it is the responsibility of the federal agency undertaking the proposed action to analyze the proposed action; thus, it is the responsibility of APHIS to analyze the potential environmental consequences of deregulating GT alfalfa as detailed in the EIS.

Comment Excerpt Text:
I further think that any marketing of this crap ought to have a label stating that it is genetically mutated and allow people- like me, the free choice to avoid this kind of crap. (Comment Number: APHIS-2007-0044-6412-2)

Response: APHIS acknowledges the comment. Regarding labeling, see the response to comment APHIS-2007-0044-0416-1 for issue 2.0.

Comment Excerpt Text:
I am a consumer of organic foods and I care deeply that deeply that regulations should exist to protect organic food from contamination by genetically engineered (GE) substances such as GE alfalfa, GE corn and GE soybeans as well as animal products from animals where their feed might be contaminated by such substances. (Comment Number: APHIS-2007-0044-6542-1)

Response: In regard to the adventitious presence of non-GE or organic alfalfa with GT alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In addition, APHIS evaluated an additional alternative in the FEIS that include geographic restrictions and isolation distances for the use of GT alfalfa. For more information

about the alternatives, see the response to comment APHIS-2007-0044-11741-4 for issue 1.0and Chapter 2 of the EIS.

Comment Excerpt Text:
I am submitting this comment because I am an organic consumer, and I care about what is allowed to be called organic. Genetic engineering is a controversial agricultural practice that is harmful to organic farmers and dangerous for our planet. I choose to not eat genetically engineered (GE) food because I have doubts about its safety for myself and my belief that it is harmful to our planet. Foods that contain GE ingredients should be labeled as such, and should not be termed "organic." (Comment Number: APHIS-2007-0044-6575-1)

Response: APHIS acknowledges the comment. Regarding health effects of GT alfalfa, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0 and comment APHIS-2007-0044-11034-2 for issue 6.1. Regarding the labeling comment, see the response to comment APHIS-2007-0044-0416-1 for issue 2.0.

Comment Excerpt Text:
I am always concerned about the quality of food I put into my body. Recently I learned that the USDA declares there is no evidence that organic consumers care about GE contamination. I am speaking specifically about an environmental impact statement on genetically engineered (GE) alfalfa, that declares there is no evidence that organic consumers care about GE contamination. Alfalfa isn't a crop that people eat directly, but if you eat yogurt, cheese, milk, ice cream or beef, you are affected by how alfalfa is grown.
I am writing to tell you that I DO care about this. I don't want GE foods to be allowed into foods labeled organic. (Comment Number: APHIS-2007-0044-6592-1)

Response: APHIS acknowledges the comment. All substantive public comments provided on the DEIS during the comment period are responded to in this appendix of the FEIS. Substantive concerns from the public as noted in their comments have been considered and reviewed. Regarding the labeling comment, see the response to comment APHIS-2007-0044-0416-1 for issue 2.0. In regard to consumer care, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Please do not approve any more GE modified seeds, especially those that are Round-up ready. And please develop strict standards for the use of these products so they do not contaminate the growing fields of organic farmers. (Comment Number: APHIS-2007-0044-6617-1)

Response: APHIS acknowledges the comment. The additional alternative analyzed in detail in the FEIS includes goals for implementing standards in order to potentially minimize adventitious presence of GT alfalfa with organic alfalfa.

Comment Excerpt Text:
As a consumer who buys primary organic food, it is important to me to be able to determine whether the food I buy is itself from genetically modified foods, or contains ingredients from genetically modified food. Ultimately this will come down to a choice, increased cost for non-GM, or spending less money. It should be left up to the consumer to decide this, not a government agency, and not a Company that has a financial interest in disguising whether or not the food has been genetically modified. It is not relevant whether or not studies show there is no difference in GM food or non-GM food, it is still a choice I want to have. (Comment Number: APHIS-2007-0044-6638-1)

Response: APHIS acknowledges the comment. For information regarding APHIS' responsibilities, see the response to comment APHIS-2007-0044-8397-5 for issue 2.0. For information about labeling, see the response to comment APHIS-2007-0044-0416-1 for issue 2.0.

Comment Excerpt Text:
As I consumer, I do not want to buy meat or dairy products from GE-alfalfa fed cattle. There has not been sufficient evidence that this is safe. The GE-alfalfa could contaminate other fields and living produce that we consume. Also, smaller local farmers will suffer from these changes. Please reconsider, we have a right to know what exactly is in our food! (Comment Number: APHIS-2007-0044-6736-2)

Response: In regard to the adventitious presence of GT alfalfa with non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). Regarding the impact of deregulation to small farms, see the response to comment APHIS-2007-0044-4913-7 for issue 5.1.

Comment Excerpt Text:
3.The EIS implies that there is no damage if organic crops are contaminated by GMOs because the crops can still be sold as organic. The reasoning is that the certification of organic products are certifications and if you don't test the product it is still organic even if it is contaminated by GMOs. How disingenuous! (the kindest word I could think of). Consumers want GMO free products. I want GMO-free products! (Comment Number: APHIS-2007-0044-6761-2)

Response: For information regarding the impact on organic markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the impact of unintended adventitious presence on organic certification, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
As a consumer of organic produce and other products I am concerned about GE contamination and believe that the organic designation means that produce and other products are supposed to be free of such contamination. (Comment Number: APHIS-2007-0044-6780-1)

Response: For information regarding the impact on organic markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the impact of unintended adventitious presence on organic certification, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
I also demand that the government scrutinize the current trend of purchasing seed producers and suppliers by huge agricultural companies. It's enough to make a reasonable person paranoid! Once Monsanto buys all the independent seed companies, are they going to insert their patented gene into all those seeds, thus preventing all growers everywhere from saving seed? and from being able to grow non-GE crops? I am not alone and there are more people like me becoming more aware every day. We care (Comment Number: APHIS-2007-0044-7029-1)

Response: APHIS acknowledges the comment; however, the comment is outside the regulatory purview of APHIS. For information regarding APHIS' responsibilities, see the response to comment APHIS-2007-0044-8397-5 for issue 2.0.

Comment Excerpt Text:
I strongly oppose genetically modified food. I avoid eating it as much as I can. Clear labels must be placed on all food containing Genetically modified ingredients. NO new genetically modified food products whould be allowed to grow in the United States.
Just as clean air and clean water belongs to all the citizens, unadulterated food must be widely available. (Comment Number: APHIS-2007-0044-7035-1)

Response: APHIS acknowledges the comment. Regarding labeling, see the response to comment APHIS-2007-0044-0416-1 for issue 2.0.

Comment Excerpt Text:
I often eat organic food and very much care about GMO. Our bodies are not evolved to process foods like these and they are not healthy for us. If they have to exist, consumers should certainly be able to make a clear educated choice, with labeled products. Anything which is GMO should not be able to call itself organic. (Comment Number: APHIS-2007-0044-7061-1)

Response: APHIS acknowledges the comment. In regard to the comment about health concerns, see the response to comment APHIS-2007-0044-11034-2 for issue 6.1. In regard to labeling, see the response to comment APHIS-2007-0044-0416-1 for issue 2.0.

Comment Excerpt Text:
No further approvals of GM seed should be made until all food products, seeds and by-products are required to be labeled as such. Consumers deserve the right to choose. (Comment Number: APHIS-2007-0044-7078-1)

Response: See the response for comment APHIS-2007-0044-0416-1 for issue 2.0.

Comment Excerpt Text:
Abundant information is appearing to show that we have been misled regarding the toxic effects of GE food crops. These crops present a significant health risk that cannot be ignored or avoided if they are introduced. In addition there are misrepresentations as to the increased crop yields which it turns out have not been resulting. This skirting of judicial findings is a dangerous one and should not be adopted. The FDA's own scientists warned of the dangers of GE crops but were ignored by superiors who were former employees of Monsanto. (Comment Number: APHIS-2007-0044-7139-1)

Response: In regard to comments about health concerns, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0 and the response to comment APHIS-2007-0044-11034-2 for issue 6.1.

Comment Excerpt Text:
Please do not approve the use of this product without strong protections for organic alfalfa producers and significant labeling of products produced with it (including meat, dairy, and other products that may be produced by animals eating the alfalfa). I am an organic consumer, and I care about GE contamination. It is critically important to avoid with alfalfa what has happened with corn -- As a consumer, I have to suspect any product with non-organic corn has genetically engineered ingredients, and organic farmers have no protections from neighbors engineered materials getting into their fields. As a consumer, I avoid dairy products with growth hormone, and if this goes through with no labeling, I'll have an even more difficult time selecting wholesome food for my family. (Comment Number: APHIS-2007-0044-7179-1)

Response: APHIS acknowledges the comment. See the response to comment APHIS-2007-0044-9882-1 for issue 5.0, which describes the impact of deregulation on the non-GT and organic markets. In regard to information about the new alternative analyzed in the FEIS, see the response to comment APHIS-2007-0044-11741-4 for issue 1.0. In regard to labeling, see the response to comment APHIS-2007-0044-0416-1 for issue 2.0.

Comment Excerpt Text:
Limitation of consumers' freedom of choice. On page S-15, the following statements are made:
· Consumer preferences for organic over GE foods are influenced in part by ethical and environmental factors that are likely unrelated to unintended presence of feed crops with GE material;
· In surveys, U.S. consumers often suggest a preference for non-GE foods;
· U.S. consumers show relatively little knowledge of their own consumption of GE products;
· Product labels in the United States typically do not indicate presence or lack of GE material;

The last point is not true; certified organic foods contain no GMOs and consumers are aware of this – this is why they pay a premium for them. Foods are also labeled, if possible, "made without GM ingredients."
Organic meats are raised without GM feed, and this is publicized. Polls consistently show that consumers would prefer to have all GM foods labeled as such. It is true that foods that do contain GMOs are never labeled as such because consumers will perceive them as inferior.
Consumers have expressed a clear preference for non-GM foods. However, they often remain ignorant of exactly which foods contain GMOs because processors either decline to label, or do not know (or want to know) if their raw materials are contaminated with GMOs. The Draft EIS concludes that consumers are ignorant of what is in their food, and they will not know about GMO contamination because there is no labeling, so the issue of GMO contamination is moot. No Spray Zone strongly rejects any such assertion. If contamination of organic alfalfa occurs, our members, and certainly many consumers, will be very upset. We should not be creating a situation where more feedstock contamination will destroy the ability of organic farmers to certify their livestock and consumers are unsure of what they are purchasing. (Comment Number: APHIS-2007-0044-7408-3)

Response: APHIS acknowledges the comment. In regard to labeling, see the response to comment APHIS-2007-0044-0416-1 for issue 2.0. For information regarding the impact on organic markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the impact of unintended adventitious presence on organic certification, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
- The Draft EIS includes a thorough plant pest risk assessment of RRA and a comprehensive evaluation of the potential environmental impacts associated with the full deregulation of RRA. Based on its analyses, APHIS can reasonably conclude that RRA should be fully deregulated. See infra Section I.

- Monsanto and FGI agree with APHIS that "all methods of agricultural production (conventional, organic, or the use of genetically engineered varieties) can provide benefits to the environment, consumers, and farm income, and they can and should 'coexist.'" Draft EIS at xiii. Indeed, ample evidence demonstrates that RRA will provide substantial benefits to growers. [Footnote 2: For instance, RRA is expected to (i) offer growers a wide-spectrum weed control option that will enhance stand establishment and increase alfalfa forage and seed purity; (ii) increase flexibility to treat weeds on an as-needed basis; (iii) allow alfalfa production on marginal land with severe weed infestations; and (iv) provide growers with a weed control system that has a reduced risk profile for the environment. See Monsanto, Petition for Determination of Nonregulated Status: Roundup Ready Alfalfa (Medicago sativa L.) Events J101 and J163, at 20-21 (April 16, 2004) [hereinafter, "RRA Petition"], available at http://www.aphis.usda.gov/brs/aphisdocs/04_11001p.pdf; see also Draft EIS at 55-56 (discussing risks facing conventional alfalfa growers, including unpredicted stand failure from weed competition and herbicide application, which can be ameliorated with a product that is resistant to glyphosate); id. at 125 (discussing survey of GT alfalfa farmers, who reported benefits to using GT alfalfa, including "possible increase in yields (due to lesser stunting caused by other

herbicides), eliminating the use of other, more toxic herbicides, and a reduction in herbicide costs"); id. at Ap. V-35 to -37 (purpose and need for a Roundup Ready weed-control system in alfalfa).] See infra Section II. (Comment Number: APHIS-2007-0044-7620-1)

Response: APHIS acknowledges the comment. The Plant Pest Risk Assessment is included as appendix W of the DEIS.

Comment Excerpt Text:
2. APHIS appropriately references EPA's pesticide risk assessment process.

The process EPA uses for evaluating the potential health and environmental effects of glyphosate and every other registered pesticide, under either FIFRA or the FFDCA, is called risk assessment. See, e.g., Draft EIS at 91-92 (explaining EPA's risk assessment process). For human health, this includes a review of data that address potential exposure through consumption of food and drinking water as well as occupational and bystander exposure that might result from glyphosate use. For environmental risk assessment, EPA evaluates the potential effects of glyphosate use on: soil, surface water, groundwater, wildlife, and other non-target organisms such as birds, amphibians, mammals, soil microorganisms and beneficial insects, including bees. This review covers plants as well as animals, and includes endangered and threatened species.

The regulations and policies that implement FIFRA and the FFDCA are revised and updated as necessary to address new needs and the latest science and technologies. [Footnote 14: For example, EPA's risk assessment process includes the most current methodologies and techniques developed in compliance with the Food Quality Protection Act of 1996, Pub. L. No. 104-170, 110 Stat. 1489 (1996).] In 2009, EPA began a periodic registration review of glyphosate, mandated under FIFRA for all pesticides, to ensure that the product continues to perform its intended function without unreasonable adverse effects on human health or the environment. The registration review process is done transparently and the public has opportunities to comment at various stages. See Registration Review; Glyphosate Docket Opened for Review and Comment, 74 Fed. Reg. 36,217 (July 22, 2009).

The portions of the Draft EIS dealing with the safety of glyphosate could benefit from additional information regarding the risk assessments previously performed by EPA as part of the agency's comprehensive regulation of glyphosate. To that end, attached as Comment Appendix 4 is a detailed summary of the EPA's registration, reregistration, and tolerance-setting processes as related to glyphosate, along with technical corrections to information in the Draft EIS. (Comment Number: APHIS-2007-0044-7620-15)

Response: APHIS acknowledges the comment. The human health risk assessments (Appendices L and M of the EIS) have been updated based on data, corrections, and clarifications provided by this commenter, as appropriate.

Comment Excerpt Text:

The national organic standards in both the U.S. and Canada prohibit the use of genetically engineered organisms. This is a central tenet of organics. For example, animals used for certified organic meat, milk, eggs, and other animal products need 100 percent organic feed. Alfalfa is used widely for livestock feed, including for dairy cows. (Comment Number: APHIS-2007-0044-8159-2)

Response: In regard to the National Organic Program and what is allowed in organic food, see the response to comment APHIS-2007-0044-10866-5 for issue 3.3.

Comment Excerpt Text:
Prohibition of GE is a fundamental tenet of the Organic Standard. In fact, the proposed allowance of GE seeds and methods in the first organic rule in 1977 was one of the main reasons why 275,000 people like me submitted comments on the Rule — the largest outpouring of public participation in the history of U.S. administrative procedure. Consumers like me care deeply about organic integrity, and GE threatens the integrity of organic. Polls show that more than 75% of consumers believe that when they purchase organic food they believe that the food they are buying does not contain GE-derived ingredients or contaminants. (Comment Number: APHIS-2007-0044-8397-2)

Response: In regard to the National Organic Program and what is allowed in organic food, see the response to comment APHIS-2007-0044-10866-5 for issue 3.3.

Comment Excerpt Text:
USDA must remember that it is supposed to be an advocate for all U.S. agriculture, not just an enabler of a few wealthy agribusiness conglomerates.
In the EIS, USDA refused to even consider any options that might protect organic and conventional agriculture from contamination and the resulting loss of markets and farmers' ability to sow the crop of their choice. To continue down this path would be to abandon the interests of all alfalfa farmers and livestock producers who (for whatever personal, political, or financial reason) do not want to grow or feed their livestock Monsanto's patented crops. (Comment Number: APHIS-2007-0044-8397-5)

Response: APHIS acknowledges the comment. Based on public comment APHIS has analyzed a third alternative in the EIS that analyzes isolation distances and geographic restrictions on the production of GT alfalfa. This alternative, identified in the FEIS as one of the co-preferred alternatives, uses these measures to help facilitate coexistence of GT alfalfa and alfalfa grown for GE sensitive markets.
Regarding information about the additional alternative analyzed in detail in the FEIS, see the response to comment APHIS-2007-0044-11741-4 for issue 1.0.

Comment Excerpt Text:
The safety of Monsanto's Roundup herbicide is being questioned worldwide. France's supreme court recently upheld 2007 and 2008 criminal convictions against Monsanto for lying about the

safety of Roundup. (French environmental groups had brought the case way back in 2001 on the basis that glyphosate, Roundup's main ingredient, is classed as "dangerous for the environment" by the European Union.) (Comment Number: APHIS-2007-0044-8492-5)

Response: APHIS acknowledges the comment; however, our analysis of relevant information supports a different conclusion. For more information regarding health effects, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
Following the decision in the 9th Circuit that precipitated this DEIS, we would also ask for additional clarity to the process of deregulation. While realizing that a case pending before the U.S. Supreme Court will, in part, clarify the steps necessary for complete and final deregulation, we would ask that this process be clear to all parties, and that the occurrence in this particular case, non-regulation, followed by removal of such non-regulation status be avoided, where the process is under the control of APHIS.
In conclusion, we would like to reiterate that we support choice for all alfalfa producers, whether they choose to use organic, conventional, or GT alfalfa production methods. (Comment Number: APHIS-2007-0044-8508-6)

Response: For information about the process of deregulation, see the response to comment APHIS-2007-0044-8397-5 for issue 2.0.

Comment Excerpt Text:
GMOs are approved without adequate safety studies
In 1992, the Food and Drug Administration claimed they had no information showing that GM foods were substantially different from conventionally grown foods. Therefore absolutely no safety studies were required.
But secret internal memos made public by a lawsuit show that the actual consensus among FDA scientists was that GMOs can create unpredictable, hard-to-detect side effects, including allergies, toxins, new diseases, and nutritional problems. They urged long-term safety studies.
Sadly, the FDA official in charge of policy ignored the warnings. He was Michael Taylor, Monsantos former attorney and later their vice president.
Because of him, the same biotech companies who have been found guilty of hiding toxic effects of their chemical products are now in charge of determining whether their GM foods are safe. A close look at their so-called GMO safety studies shows how they rig research to avoid problems. Theyve got bad science down to a science.
Tragically, Michael Taylor, who may be responsible for more food-related illness and death in human history, is now back at the FDA as the US Food Safety Czar. (Comment Number: APHIS-2007-0044-9298-11)

Response: Regarding the concern that GM organisms can cause health effects, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0 and the response to comment APHIS-2007-0044-11034-2 for issue 6.1.

Comment Excerpt Text:
The National Organic Program (NOP), an agency of the federal government, has established organic agricultural standards which exclude the process of genetic engineering. USDA-APHIS, another government agency, is seeking to approve a crop that, with absolute certainty, would lead to future contamination and loss of markets for organic alfalfa seed and alfalfa producers. (See historical examples below.) We consider this a serious conflict of interest.
Alfalfa seed growers have no recourse nor are there federal protocols in place in the event that Roundup Ready Alfalfa genes enter their crops. They are left to solely bear the economic and agronomic costs of detecting and eradicating this genetic material, and will, as has been shown in all other approvals of GE crops, over time lose not only the genetic integrity of their seed, often acquired after years of careful breeding, but the integrity of their products trusted by their customers and the source of their livelihood. (Comment Number: APHIS-2007-0044-9896-2)

Response: In regard to the National Organic Program, see second paragraph of the response to comment APHIS-2007-0044-11689-2 for issue 5.6. The analysis done in the DEIS indicates that losses to organic markets are possible, although not certain: see response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the role of APHIS in regulating genetically engineered crops, see response to comment APHIS-2007-0044-9936-4 for issue 2.1.1. Regarding the liability for unintended presence of genetically engineered content in non-GE fields, see response to comment APHIS-2007-0044-6376-1 in issue 5.1.

Comment Excerpt Text:
The Organic Seed Growers and Trade Association (OSGATA) represents the interests of organic seed growers and organic seed companies in fifteen states and is actively working to develop and protect the organic seed trade industry nationwide. After much discussion and research, we have concluded that USDA-APHIS failed to conduct a rigorous analysis of the potential and significant impacts of Roundup Ready alfalfa in their recently released draft Environmental Impact Statement (EIS). As growers of organic seed, the very basis of organic agriculture, it is imperative to the health and economic viability and growth of this vital industry that all seed grown under organic conditions and labeled as organic is indeed organic. USDA policies reflected in the draft alfalfa EIS threaten our growing organic industry, our family farms, consumer confidence, and the economic viability of these feed and food industries and export markets. We implore USDA/APHIS to review and rethink current policies and move to support and protect all farmers growing conventional (non-GE)and organic crops and their customers in the USA and abroad from unwanted GE contamination (Comment Number: APHIS-2007-0044-9896-7)

Response: In regard to the concern that APHIS has not conducted a rigorous analysis, see the response to comment APHIS-2007-0044-9936-35 for issue 2.0. In regard to labeling, see the response to comment APHIS-2007-0044-0416-1 for issue 2.0. In regard to the adventitious presence of GT alfalfa with non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to economic impacts caused by deregulation, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Moreover, "one of Congress's express goals in adopting NEPA was to attain 'the widest range of beneficial uses of the environment without degradation, risk to health and safety, or other undesireable and unintended consequences.'" [Footnote 56 Id. (emphasis in original) (quoting 42 U.S.C. § 4331(b)(3)).] Accordingly, "[a] federal action that eliminates a farmer's choice to grow non-genetically engineered crops, of a consumer's choice to eat non-genetically engineered food, is an undesirable consequence: another NEPA goal is to 'maintain, whenever possible, an environment which supports diversity and variety of individual choice.'" [Footnote 57 Id. (quoting 42 U.S.C. § 4331(b)(4)).]

APHIS' claim that there will be no impacts on organic farmers or organic consumers because the presence of a detectable GE residue does not constitute a violation of the National Organic Standards, are equally arbitrary and capricious. (DEIS at 60). During the implementation of the Organic Food Production Act, the Department of Agriculture indicated that the presence of GE contaminants would render a product unmarketable as organic. The Department explained:

[C]onsumers have made clear their opposition to the use of [GE] techniques in organic food production. This rule is a marketing standard, not a safety standard. Since use of genetic engineering in the production of organic food runs counter to consumer expectations, [GE foods] will not be permitted to carry the organic label. [Footnote 58 65 Fed. Reg. 13534-35 (Mar. 13, 2000) (emphasis added). Like in this record where over 200,000 members of the public expressed concern that release of GE alfalfa will contaminate organic alfalfa, during the rule-making for organic 275,000 members of the public expressed concern that GE be prohibited in organic production.)]

Thus, as the Geertson court found:

[E]ven APHIS is uncertain whether farmers can still label their products organic under the federal government's organic standards. Second, many farmers and consumers have higher standards than what the federal government currently permits; to these farmers and consumers organic means not genetically engineered, even if the farmer did not intend for his crop to be so engineered. . . . Third, and most importantly, APHIS's comment simply ignores that these farmers do not want to grow . . . genetically engineered alfalfa, regardless of how such alfalfa can be marketed. [Footnote 59 2007 WL 518624 at *7.] (Comment Number: APHIS-2007-0044-9936-13)

Response: APHIS analyzes the effects of GT alfalfa on organic growers in section IV. D of the FEIS. A discussion of organic markets is also included in appendix T, additionally see response to comment APHIS-2007-0044-11689-2 for issue 5.6 and response to comment APHIS-2007-0044-10866-5 for issue 3.3.

Comment Excerpt Text:

Under the Plant Protection Act, decisions affecting regulated products "shall be based on sound science." [Footnote 101 7 U.S.C. § 7701(4).] Sound science includes objective findings, which take into account all relevant and available data, does not disregard superior data and is based on accepted scientific method, which includes peer review and methodology that is widely used and can be replicated. Instead, the DEIS is largely based on Monsanto and FGI's own studies, which are largely not peer reviewed or objective.

"Sound science" would counsel that APHIS should properly inform its PPA decision, with its NEPA analysis, which was not done here. See supra. Further, even if the agency had informed the PPA decision with its NEPA assessment, the DEIS is chock full of unsound sciences – biology, botany, agronomy, genetics, and economics – to name a few; the result of which allows APHIS to conclude, at least preliminarily, that the deregulation will have no significant impacts. Again, as discussed supra the DEIS currently is predicated upon arbitrary and capricious assumptions about: contamination harms to farmers, exporters and dairies; intertwined economic risk to various sectors and geographic regions of the U.S. agricultural economy. (Comment Number: APHIS-2007-0044-9936-34)

Response: APHIS used sound science to inform its regulatory decision regarding plant pest risk of GE alfalfa. APHIS also used sound-science in developing the analyses that make up the DEIS. The National Research Council developed a document that also refers to sciences and studies used in this EIS, and also comes to many of the same overarching conclusions about using GE crops in agriculture (NRC 2010). The EIS does contain assumptions for analyses – as highlighted in the NRC report, substantive data are lacking in areas such as societal effects and economic impacts of GE crops (NRC 2010). However, NEPA requires the use of the best available science, and allows for assumptions given that they are disclosed and supported.

APHIS recognizes the importance of peer-reviewed research publications in its analyses, but APHIS also considers relevant information from sources that do not go through a peer-reviewed process. In plant breeding of new crop varieties, much of the research is never published in peer-reviewed journals, yet it is entirely valid in evaluating the characteristics of the plants being developed.

In addition to the information provided by the petitioner, APHIS considered other relevant information sufficient to make the determination on whether to deregulate the alfalfa lines J101 and J103. The best available information, including peer- reviewed science, was reviewed and incorporated into APHIS' analysis. Some of this information was provided in the petition, but considerable information was derived from other sources, including peer-reviewed scientific publications.
APHIS does not agree with a commenter's contentions that biology, botany, agronomy, genetics, and economics are "unsound sciences". In the DEIS, APHIS acknowledged the complex and multi-disciplinary nature of analyzing and managing potential economic negative impacts of unwanted traits in hay, GEsensitive, organic or other conventional hay. APHIS suggested that producers may consider using effective mitigation and avoidance practices which are based on sound science and successful co-existence models adopted in previous GE crop market channels and in use for specialty market alfalfa hays such as organic, certified weedfree or forage quality tested hay lots [see USDA-AMS Livestock and Seed Program

(http://www.ams.usda.gov/lsmnpubs/hsum.htm) Web site for examples of by-feature hay lot identification strategies].

Comment Excerpt Text:
On March 9, 2009, President Obama issued a Memorandum entitled "Scientific Integrity" mandating that "[s]cience and the scientific process must inform and guide decisions of my Administration," with the "highest level of integrity in all aspects of the executive branch's involvement with scientific and technological issues." [Footnote 102 Barack Obama, Memo for the Heads of Departments and Agencies, March 9, 2009, at http://www.whitehouse.gov/the_press_office/Memorandum-for-the-Heads-of-Executive-Departments-and-Agencies-3-9-09/.] President Obama established several core principles that indicate what constitutes scientific integrity, including:

- Having "appropriate rules and procedures to ensure the integrity of the scientific process within the agency,"

- Subjecting scientific or technological information "to well-established scientific processes, including peer review,"

- "Appropriately and accurately reflect[ing] that information in complying with and applying relevant statutory standards,"

- Making "available to the public the scientific or technological findings or conclusions considered or relied on in policy decisions,"

- Putting "in place procedures to identify and address instances in which the scientific process or the integrity of scientific and technological information may be compromised," and

- Adopting additional procedures, such as whistle blower protections, in order to "ensure the integrity of scientific and technological information and processes on which the agency relies." [Footnote 103 Id.] (Comment Number: APHIS-2007-0044-9936-35)

Response: APHIS is responsible for ensuring that data and relevant studies included and analyzed in the DEIS are reasonable. Relevant studies analyzed for the DEIS are based on accurate data. Per the Council on Environmental Quality (CEQ) Regulations for Implementing NEPA (40 CFR § 1502.23), agencies shall insure the professional integrity, including scientific integrity, of the analyses in Environmental Impact Statements. In addition, CEQ regulations (40 CFR § 1500.1), states that "accurate scientific analysis" is essential to implementing NEPA. CEQ regulations do not specifically mandate the need for agencies to utilize peer-reviewed scientific studies or the best possible science available. However, the information must be of high quality, and it must be an accurate scientific analysis. APHIS ensures that the scientific analysis, as provided in the DEIS and updated in the FEIS, is accurate and is based on high-quality information.

Comment Excerpt Text:
APHIS has frequently violated the tenants of sound science in its decision-making documents on GE crops in numerous ways, such as excessive reliance on applicants' analysis and data; frequent citation of dubious, industry-sponsored white papers with little or no scientific merit or review; and egregious factual errors biasing decisions in favor of applicants among other unscientific practices. Here, APHIS has seemingly willfully violated basic tenets of sound science. APHIS has willfully ignored high-quality data and information crucial to the DEIS, data and information well-known to it, some of it generated by its sister agencies, the Agricultural Research Service, and the National Agricultural Statistics Service. Instead, APHIS has relied extensively on outdated information, misinformation from industry sources, and speculation. For more detailed analysis on this point, see separately submitted CFS comments.

In contrast, sound science requires APHIS to: undertake its own independent and holistic analysis of the impacts of GE crops; base its decision-making on peer-reviewed scientific literature whenever possible; critically examine applicant claims and analysis rather than uncritically accept them; and call on independent experts from outside the agency for external peer review. In addition, unduly narrow assessments – for example, not assessing impacts from pesticides used in conjunction with herbicide-tolerant GE crops – cannot be considered sound science.

In addition to physical science, sound assessments must also apply the social sciences, for instance, to analyze the economic impacts of transgenic contamination of non-GE crops. The purpose of the PPA is summarized in its first finding: "the detection, control, eradication, suppression, prevention, or retardation of the spread of plant pests or noxious weeds is necessary for the protection of the agriculture, environment, and economy of the United States." 7 U.S.C. § 7701(1) (emphasis added). The ultimate goal – contained in the second half of the first finding – is the protection of US agriculture and economy. Id. Disregarding significant adverse economic impacts on the agricultural economy, as discussed supra, further violates the PPA. (Comment Number: APHIS-2007-0044-9936-36)

Response: APHIS is responsible for ensuring that data and relevant studies included and analyzed in the DEIS are accurate Relevant studies analyzed for the DEIS are based on accurate data.
Per the National Environmental Policy Act (NEPA), it is the responsibility of the federal agency undertaking the proposed action to analyze the proposed action, alternatives to the proposed action, and their impact on the human environment. Thus, APHIS has conducted its own independent analysis, as provided in the DEIS. Experts were consulted during the NEPA process. All expert input was reviewed and analyzed by APHIS. All substantive expertise and analysis is reflected in the DEIS.

In regard to the PPA comment, see the response to comment APHIS-2007-0044-8397-5 for issue 2.0.

Comment Excerpt Text:

Finally, APHIS's statutory authority aside, as noted above it has discretion whether to grant a petition under its plant pest regulatory authority, and may exercise that discretion to grant a petition "in whole," "in part," or not at all. [Footnote 113 7 C.F.R. § 340.6(3)(i).]And partial deregulation could include isolation distances, geographic restrictions, or testing as noted infra. APHIS's decision to refuse to consider such options was not based on sound science. (Comment Number: APHIS-2007-0044-9936-39)

Response: APHIS has included in the detailed analysis of the FEIS an additional alternative. This alternative could take the form of partial deregulation or Federal/Industry partnerships. This alternative, described in detail in section II.B. of the FEIS, includes isolation distances and geographic restrictions. An alternative that required testing was rejected from detailed consideration because it is outside of the scope of this EIS, see the discussion in section II.C. for more detail.

Comment Excerpt Text:
While traditional cross-breeding poses such risks, that potential risk is readily managed without federal regulatory oversight. Developers safely monitor and control variations in trait expression within a plant population as a part of the conventional breeding process, screening out and discarding any undesired traits. Similarly, the economic impacts of new biotech crops can be managed through self-regulatory oversight implemented primarily at the level of seed industry stewardship (in close consultation with the relevant grower association).
As a result, any NEPA analysis of the significance of any potential impacts of a GE plant on the quality of the human environment, should take into account the relevant stewardship standards and identity preservation tools. USDA is not empowered to regulate mere economic impacts to non-GMO or organic soybean growers, and the mere presence or absence of a particular gene in another crop with some intended marketing purpose (e.g., organic, non-GMO or export-bound) should not, in and of itself, determine the Agency's NEPA assessment. APHIS can and should, however, take notice of comments that illustrate industry and state or local stewardship initiatives, like those discussed below at Section B. (Comment Number: APHIS-2007-0044-9968-9)

Response: APHIS is aware of the industry stewardship practices and how they can and have been applied. Where applicable, these standards have been considered in assessing the potential environmental impacts of the proposed action. However, APHIS recognizes that the potential economic and social effects of the proposed action and alternatives should be fully evaluated to enable an informed decision. As a result, an additional alternative has been added for detailed study in the FEIS that will highlight the economic and social consequences associated with gene flow, for which many commenters expressed concerns.

2.1 Issue 2.1 – EIS methods

Comment Excerpt Text:
Any EIS that dismisses the significance of widespread contamination from GE crops can be neither accurate nor thorough in my opinion. If it was not the case, Monsanto would not have filed suit for patent infringement on farmers who had never used their seed. No court injunction

against failure to guarantee ability of non-GE growers to maintain their crops would exist. No lawsuits against the failure to ensure protection for organic growers from GM crops would have been filed. But these examples are all readily available to even the most cursory of searches. Why do we have an EIS process if it does not state the case? Whose job is it to examine and expose these issues?
But to say there is no evidence organic consumers even care about GE contamination, and especially when the USDA has never before conducted an EIS into this matter, if not fraught with cronyism is nevertheless at the height of irresponsibility. Just the opposite is perhaps more true. There is no evidence of significant opposition from consumers to USDA certified organic products in disproportionate supply to GMO products, EXCEPT FROM BIOTECH PROFITEERS intent on deceiving the people. I defy even the USDA to produce a large segment of consumers going out of their way to find products that are certified and labeled as Genetically Engineered so they may purchase them exclusively.
Therefore I conclude failure by the USDA to protect organic agriculture against testing, planting or harvesting of any GE crop in this case is a distortion of the truth, grossly unfair and in violation of the right of freedom of choice for consumers, as well as a severe threat to the environment. (Comment Number: APHIS-2007-0044-0901-1)

Response: The DEIS analyzed the risk of adventitious presence (AP) from GT alfalfa to non-GT alfalfa. In regard to the AP of GT alfalfa with non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

See the response to comment APHIS-2007-0044-11689-2 for issue 5.6, which discusses how the analysis in the DEIS supports the conclusion that consumers (and producers) of organic products care about the presence of GE material in organic products.

Comment Excerpt Text:
The central flaw of the draft EIS is its failure to analyze the real life impact of the deregulation of genetically modified alfalfa. It failed to address the contamination of non-GM alfalfa which will inevitably be followed by unfettered deregulation. It also failed to recognize the impact on non-GM alfalfa hay and seed growers, organic meat and livestock producers; producers of beef, lamb, and other meat and livestock marketed with source-verification claims related to feed, dairy producers, and conventional and organic honey producers. (Comment Number: APHIS-2007-0044-10318-1)

Response: In regard to the adventitious presence of GT alfalfa with non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to the potential impact on non-GE and organic markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
For NEPA purposes, the mere application of genetic
engineering or the mere presence or absence of a particular gene should not, in and of itself, be relevant to the Agency's NEPA assessment of a PPA decision regarding an individual plant or

other organism. The Agency can and should be able to draw certain conclusions regarding the safety of the breeding technique of genetic engineering based on the broad scientific consensus regarding the relative safety of this breeding technique compared to conventional breeding, which has an excellent safety record. While specific phenotypical effects can and should be analyzed on a case-by-case basis, this EIS is also the appropriate document in which to draw the line under a number of questions that some have raised regarding the technology as a whole. Among the most important of these issues is the environmental irrelevance of the movement of a specific gene from one plant to another absent any phenotypic change.
The Agency should also acknowledge that its PPA review includes an assessment ofthe stability of the introduced trait. Such analysis provides the scientific basis that allows the Agency to conclude that, based on the multi-generational stability of the introduced genetic material and the subsequent confirmation of the stability of the introduced trait, the PPA assessment conducted on one (or several) generations is applicable to all derived progeny. The process of breeding and selection of commercial varieties derived from the initial genetically engineered lines confirms the overall agronomic properties of the derived progeny, including an assessment that the introduced trait is in fact performing as expected. Thus, the breeding and selection process itself serves as an additional mechanism to ensure that the assessment made by APHIS on a particular introduced trait is relevant to the subsequent progeny.
There are other reasonable conclusions that the Agency should reach related to the application of genetic engineering in and of itself including that: (a) gene flow from transgenic to nontransgenic ~lants is no more likely than between other plants simply because the plant is
transgenic; [Footnote 21: See, e.g., discussion in APHIS DEIS for proposed amendments to Part 340 at 73-74
(http://www.regulations.gov/search/Regs/home.html#documentDetail?R=090000648026695b).]
(b) transgenic plants are no more likely as a group to persist in the environment
than conventionally bred plants; [Footnote 22: See, e.g., id. at 76-79.] (c) no evidence suggests that horizontal gene transfer poses
any significant potential risk for the transfer of traits from genetically engineered plants simply because the plant is produced through biotechnology. [Footnote 23: See, e.g., id. at 83-86]
(Comment Number: APHIS-2007-0044-10866-3)

Response: Per the National Environmental Policy Act (NEPA), it is the responsibility of the federal agency undertaking the proposed action to analyze the proposed action, alternatives to the proposed action, and their impact on the human environment. The Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508) defined required environmental documents such as the EIS to be developed by the agency undertaking the action. Thus, it is within APHIS's purview to develop this EIS that analyzes the potential environmental consequences of a proposal to grant nonregulated status to GT alfalfa lines J101 and J163.

APHIS acknowledges the commenters statements on the plant pest risk assessment. Appendix W contains the plant pest risk assessment.

Comment Excerpt Text: There do exist consumers who desire food with an absolute absence of genetic material from GE crops, despite the fact that this material can neither be seen, smelled, touched, nor tasted, and despite the fact that it has been found to be safe for humans and the environment by hundreds of scientists and dozens of regulatory authorities around the world.

"Zero tolerance" food and consumer markets have been established for these consumers, based on this preference. These markets may suffer if consumers had a better understanding that "zero tolerance" cannot be guaranteed. This market impact is not so closely related to the physical impacts caused by deregulation that it should be the subject of NEPA review. The physical impacts of the use of an herbicide-tolerant crop relate to the fact that a particular herbicide can now be safely sprayed on it; other pesticides will be used less often on the crop and the herbicide to which the crop is tolerant will be used more. The fact that the crop contains genetic material that makes the use of an alternate herbicide possible is irrelevant to the physical environment in all other respects. There are no phenotypical or safety differences between the GE products on the market today and their conventional counterparts. For this reason, the vast majority of markets in the United States and an expanding number of overseas markets are indifferent to the presence of genetic material from deregulated GE plants that may be present in crops or food at any level. The mere presence of this genetic material does not have a direct social or economic impact. This is not to deny that social or economic impacts exist. However, these impacts are grounded in personal presumptions and preferences about these products and, in some cases, the companies that produce them, that are unrelated to the physical presence of specific genetic material. These impacts are so attenuated from the direct physical impact of the genetic transfer as to be beyond the scope of NEPA analysis. The simple dislike ofthe products of genetic engineering as a personal preference does not give rise to a potential environmental impact that is appropriate for NEPA review. The preference that some have for crops produced without GE technology may arise from perceived unrealized risks to human health or the environment. Such risks are, by definition, wholly speculative and unrealized in the physical world. The fact that a market exists to cater to a fear of those risks or to matters of personal choice, and some perceive this action to threaten that market, do not bring those risks or personal preferences within the realm of the physical environment NEPA was intended to address. [Footnote 29: 40 C.F.R. § 1500.2(b) (directing federal agencies "to emphasize real environmental issues and alternatives" in implementing NEPA).] A "zero tolerance" guarantee is neither logical, reasonable nor consistent with the purpose and scope of this decision-making. As stated in the draft EIS, the mission of the decision maker here, APHIS, "is to protect America's agriculture and environment using a dynamic and science-based regulatory framework that allows for the safe development and use of genetically engineered organisms.,, [Footnote 30: DEIS at 2.] It is impossible to use GE crops in any meaningful way in commodity agriculture while guaranteeing the "zero tolerance" called for by some. The enormous costs and dislocations that would be involved in segregating fields, equipment, transportation, storage and packaging in an attempt, potentially futile, to guarantee a "zero tolerance" standard are unwarranted in light of the absence of meaningful differences between these and other commodity crops, including in terms of potential health, safety or environmental impacts. Satisfaction of the preference of a minority of consumers and the producers who service them cannot justify the costs that "zero tolerance" would impose on the vast majority of producers and consumers who are satisfied with safe, wholesome, affordable food. Accordingly, while the DEIS discussed gene flow and relevant mitigation measures in detail, it is appropriate that APHIS did not include a fully developed "zero tolerance" alternative. Even if such an alternative were to be included, it would not merit adoption for the reasons discussed above. (Comment Number: APHIS-2007-0044-10866-7)

Response: The commenter states that there are consumers who prefer food with an absolute absence of genetic material from GE crops ("Zero tolerance"). But the commenter believes that

a "zero tolerance" guarantee is neither logical, reasonable, nor consistent with U.S. agricultural practices since it is impossible to use GE crops in any meaningful way in commodity agriculture while guaranteeing "zero tolerance." The commenter cites to the fact that there are enormous costs and dislocations that would be involved in segregating fields, equipment, transportation, storage and packaging in potentially futile attempt to guarantee a "zero tolerance" standard and, moreover, that such a goal is unwarranted in light of the absence of meaningful differences between these and other commodity crops, including in terms of potential health, safety or environmental impacts - there are no phenotypical or safety differences between the GE products on the market today and their conventional counterparts.

The commenter then claims that the rejection of the products of genetic engineering based on personal preference does not give rise to a potential environmental impact that is appropriate for NEPA review. The preference that some have for crops produced without GE technology may arise from perceived unrealized risks to human health or the environment and that such risks are, by definition, wholly speculative and unrealized in the physical world. The commenter believes that the fact that a market exists to cater to a fear of those risks or to matters of personal choice, and some perceive this action to threaten that market, do not bring those risks or personal preferences within the realm of the physical impacts NEPA was intended to address. Accordingly, the commenter believes that it is appropriate that APHIS did not include a fully developed "zero tolerance" alternative.

Also, there have been commenters who have argued in favor of a zero tolerance for GE alfalfa in non-GE alfalfa including organic alfalfa. Zero tolerance may mean different things to different people and those who use the term often don't define it. Consumers may cite zero tolerance as a reason to buy organic products believing, true or not, that organic products do not contain any amount of GE ingredients. APHIS assumes that growers of non-GE crops who advocate zero tolerance want assurances that GE materials will not be detected in their crops. APHIS has proposed an alternative that proposes geographic restrictions and isolation distances to designed to achieve with reasonable certainty non detectable levels of GT alfalfa offtypes in nonGT varieties, which technically is not a zero tolerance..
Even under a condition of full deregulation with no Part 340 regulatory oversight, there are nevertheless private industry provisions which are expected to limit gene flow and intermingling. In seed production, there are mandatory, contract-based stewardship programs developed by the National Alfalfa and Forage Alliance, Forage Genetics International and Monsanto to address concerns regarding gene flow. With respect to hay production, any farmer who purchases GT alfalfa seed for producing hay is required to sign a Monsanto Technology/Stewardship Agreement (MTA). We have no reason to believe that these practices, which are in the interest of the industry, would cease. Together these technology/stewardship programs would be expected to highly limit gene flow, but still not achieve a zero tolerance standard.
If regulatory restrictions were imposed on commercial production as is suggested under alternative three, a zero threshold standard could not be guaranteed for commercial production and would not be an aspect of that alternative. Restrictions such as those imposed by AOSCA on seed production still recognize the possibility of occasional detections and thus do not require nor impose a zero tolerance, but instead target to achieve less than 1% off types for Certified alfalfa seed. More stringent controls are possible, but at some point become unfeasible because of practical constraints. That is why APHIS has developed a "low level presence" policy.

APHIS discusses in the EIS that there are GE sensitive markets (IV.H.2. Measures to Minimize AP of Genetically Engineered Content in Conventional and Organic Alfalfa for GE Sensitive Markets. These markets may require testing of products to determine if there is detectable GE material in the nonGE product. APHIS discusses methods that can be used to meet those market demands, including industry led stewardship programs. These are discussed in detail in Appendix V. Section IV H also discusses mitigation of gene flow between GT alfalfa and conventional alfalfa. APHIS has analyzed an addition alternative in the FEIS that also provides for a stewardship program that would facilitate growing conventional alfalfa for GE sensitive markets. It should be noted that all stewardship programs are designed with a particular target threshold. For example the FGI-BMP set the target threshold at below 0.5% GT alfalfa seed in conventional alfalfa seed. Other stewardship programs are designed to have thresholds of less than 0.01%. No stewardship program can guarantee that there will never be GT alfalfa present in conventional alfalfa. They instead provide for a reasonable certainty that a given lot will be below a certain threshold. In regard to the NEPA scope comment, see the first paragraph of the response to comment APHIS-2007-0044-10866-3 for issue 2.1. In regard to the National Organic Program, see the response to comment APHIS-2007-0044-10866-5 for issue 3.3. In regard to alternatives, see the response to comment APHIS-2007-0044-11741-4 for issue 1.0.

Comment Excerpt Text:
THE DEIS IS INADEQUATE IN SEVERAL RESPECTS, AND IS IN VIOLATION OF THE NATIONAL ENVIRONMENTAL POLICY ACT. The National Environmental Policy Act (NEPA)[Footnote 10: 42 U.S.C. §§ 4321 et seq.] is the "basic national charter for protection of the environment."[Footnote 11: 40 C.F.R. § 1500.1.] NEPA requires all federal agencies to prepare an Environmental Impact Statement (EIS) before undertaking "major Federal actions significantly affecting the quality of the human environment."[Footnote 12: 42 U.S.C. § 4332(C).] NEPA obligates federal agencies to "study, develop, and describe alternatives to the recommended course of action."[Footnote 13: 42 U.S.C. § 4332(2)(E); 40 C.F.R. § 1502.14.] NEPA requires sufficient attention to each alternative, with enough information to "permit a reasoned choice" of alternatives.[Footnote 14: NRDC v. Morton, 458 F.2d 827 (DC Cir. 1972)] Under NEPA, the agency must consider the "effects" of the action, which include direct, indirect, or cumulative "ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health" effects.[Footnote 15: 40 C.F.R. § 1508.8] Concerning cumulative impacts, agencies must consider "the incremental impact of the action when added to other past, present and reasonably foreseeable future actions," as well as "individually minor but collectively significant actions taking place over a period of time."[Footnote 16: 40 C.F.R. § 1508.7.] NEPA requires APHIS to consider a reasonable range of alternatives and to take a "hard look"[Footnote 17: Kleppe v. Sierra Club, 427 U.S. 390, 410 (1976).] at the environmental consequences of deregulation of GT alfalfa, including and the cumulative impacts of past and future deregulation of GE crops. The DEIS fails on each count and thus fails to comply with NEPA. (Comment Number: APHIS-2007-0044-11741-3)
Response: This EIS complies with the NEPA statute and the implementing regulations by the Council on Environmental Quality (40 CFR §§ 1500-1508). The analysis from the DEIS has been revised and updated where appropriate in the FEIS to more clearly disclose the environmental impacts. In addition an alternative has been added to the FEIS to ensure the

incremental impacts, including cumulative impacts, from various options are understood for a reasoned choice among the options.

Comment Excerpt Text:
ABPC supports the inclusion of a discussion regarding the ability of biotechnology-derived alfalfa to be successfully grown along with conventional and organic crops without the imposition of federally-mandated restrictions in the final EIS. In assessing the biology of alfalfa and its production in modern agriculture, the DEIS confirms that long-standing agricultural practices, both for alfalfa seed and hay production, make the option of deregulating GT alfalfa without geographic or other restrictions a sound regulatory decision.
ABPC members understand that the published DEIS was a result of a court decision but do not believe a full EIS is warranted for most new products. The overwhelming consensus of scientific opinion indicates that the fact a plant has been genetically engineered does not, in itself, change the environmental impact of the plant. The EIS should also explain that, for purposes of the National Environmental Policy Act, the mere fact that a plant is genetically-engineered, such as GE alfalfa, does not increase the likelihood of pollen flow, gene transfer, environmental persistence or adverse environmental effects. (Comment Number: APHIS-2007-0044-11753-3)

Response: APHIS is aware of the concerns raised and believes that the DEIS makes clear the likelihood of cross-pollination and gene flow is no different in GT alfalfa and conventional alfalfa. The FEIS discusses both voluntary industry led stewardship programs and an additional alternative that includes a mandatory stewardship program.

Comment Excerpt Text:
RE: Comments on Docket No. APHIS 2007-0044; Regulatory Analysis and Development
Thank you for this opportunity to comment on what is something of a historic moment – the first draft EIS on the potential introduction of a major genetically engineered crop, Roundup Ready Alfalfa.
As a scholar with expertise in the area of sustainable agriculture and food systems, I have closely followed the administrative and judicial decisions regarding Roundup-Ready Alfalfa. I also write as a long-time supporter of organic farmers and ranchers, and as a consumer of organic foods. In my home state of Montana, the organic industry has been one of the bright spots for our rural communities because of the opportunities it provides our producers.
As you are no doubt aware, then-Secretary of Agriculture Dan Glickman announced in 2000, for a second time, the agency's release of a proposed rule to put into place organic standards for the nation. Unlike the first draft that the USDA issued in 1997, this one did not allow for the use of genetic engineering in organic production. The agency's official release was clear on this point: "in no case will the use of irradiation, sewer sludge, or genetic engineering be permitted in the production of any organic foods or ingredients." The USDA was rightly responding to massive consumer outcry against the initial 1997 proposal to include GMOs in organic production. Given the USDA's clear reversal of that proposal in the final rules for the national organic program implemented in 2002, most consumers assume there is a zero tolerance for transgenic material in organic products.
Yet, organic agriculture and the use of genetically engineered crops cannot practically remain "separate" or "co-exist." While a growing number of US farmers have planted field crops with

genetically engineered traits, the acreage under organic production has also expanded rapidly in recent decades. However, the organic industry – and the consumers it serves – is increasingly challenged by the fact that genetically engineered traits do not stay contained and can inadvertently contaminate other seeds and plants. The draft EIS acknowledges that contamination may happen and includes references to studies that demonstrate how honey and alkali bees can cross pollinate plants at distances from 4 – 6 miles, even when these GE crops are planted according to Monsanto's planting guidelines. The movement of transgenic materials beyond their intended destinations is a near-certainty, leading to genetic contamination of organic and other farming systems.

The draft EIS on RR Alfalfa only analyzes two options for protection of organic and conventional farmers: (1) full approval without restriction, as if GE crops are no different than any other crop and (2) no action, meaning GE alfalfa could only be grown under USDA permit. Thus, the EIS does not adequately review all the use restrictions that might be available, such as geographic limitations or planting isolation distances. Given the rapid growth of organic agriculture and food product sales, it is the USDAs responsibility to protect this industry. Because foods produced with GE crops are not labeled in the market place, consumers often choose organic thinking it is GE free.

For the reasons stated above, I strongly urge the USDA to much more fully consider all options that might protect organic farmers/ranchers and consumers, including an outright rejection of Roundup Ready Alfalfa. Such an analysis needs to carefully explore how the potential loss of markets will affect non-GE farmers, farmers' right to sow the crops of their choice, and consumers' right to purchase non-GE foods. The public's trust in the organic label is greatly compromised by the potential for genetic contamination. Quite simply, it is unfair for one industry to destroy the ability of another industry to thrive.

Another key issue that needs to be addressed much more fully in the EIS is how the adoption of Roundup Ready Alfalfa (and other similar herbicide-tolerant crops) would increase pesticide use. The Environmental Protection Agency (EPA) is re-assessing the active ingredient glyphosate for the first time in 15 years and is exploring its known and potential human health and ecological risks. That analysis should be incorporated into the final EIS and be fully considered before allowing Roundup Ready Alfalfa to be approved. Further, because EPA is only looking at the active ingredient, USDA should require that Monsanto produce an assessment on the full formulation of Roundup, including its so-called "inert" ingredients and its metabolites.

Even though it is a perennial crop, most alfalfa today is grown without the use of herbicides. The economic and agronomic need for Roundup Ready Alfalfa has not been clearly demonstrated. Exactly what problem will society solve with the introduction of this new technology and at what risk? It is likely that it will benefit the company producing the product and those farmers who want to adopt it (at least until resistance forces use of an alternative chemical). But the purpose of an EIS is to completely explore the environmental, social, and economic implications of major federal actions and to carefully weigh the alternatives that exist. Is this new variety necessary? Does the agency have to take this federal action? The draft EIS is unconvincing on this point.

In sum:

• Organic consumers care deeply about GE contamination. Statements made by USDA representatives have led organic consumers to consider the organic label as a de-facto zero tolerance for GE contamination. Yet, genetic contamination is highly likely.

• USDA should protect all farmers – including those who do not want to grow GE crops. The draft EIS fails to fully consider all the options for doing so nor does it give a full analysis of the

alternatives to this seed variety. This is the agency's responsibility; it is not sufficient to leave it up to Monsanto's seed contracts.
• The EIS needs to fully explore the environmental and human health risks associated with the increased use of Roundup that would result if the variety is approved. The potential for increased weed resistance to Roundup must also be explored in greater detail. The risks associated with Roundup must be assessed both for the active ingredient and the full formulation of the product.
• The economic and agronomic need for this new variety has not been fully demonstrated.
• Based on my own review of USDA data on and studies of the the organic industry, you know well the vitality of this sector, which has been the fastest growing sector within the food industry for nearly two decades. Please do your best to ensure that it survives and thrives into the future. Organic farmers/ranchers, their rural communities, and consumers depend on it.
Thank you for the opportunity to comment on the draft EIS. While I realize that the agency produced the draft EIS in response to a lawsuit, I hope that the proposed introduction of all future GE crops will be similarly reviewed. This should be standard practice.
Please keep me informed about future opportunities for public comment and about your decisions regarding this important matter. (Comment Number: APHIS-2007-0044-11794-2)

Response: See the response to comment APHIS-2007-0044-11741-4 for issue 1.0, which discusses the additional alternative that has been added to the FEIS. This alternative analyzes the use of geographic restrictions and isolation distances to segregate conventional and GT alfalfa seed production. With regard to "zero tolerance" the EIS discusses stewardship programs and how these can be used to produce seed for GE sensitive markets. Sections III C and IV D also discuss consumer preferences, organic markets and the effects of GT alfalfa on theses. Appendix T analyzes the impacts of GT alfalfa production on downstream organic products. With regard to "de facto zero tolerance" and the organic label, see response to comment APHIS-2007-0044-10866-5 for Issue 3.3 and APHIS-2007-0044-11689-2 for issue 5.6
The DEIS analyzed potential adverse health effects, as discussed in detail within the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0. In regard to the comment that APHIS should require that Monsanto produce an assessment on the full formulation of Roundup, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0 for details on APHIS' responsibilities as an agency. In regard to the economic need for GT alfalfa, see the response to comment APHIS-2007-0044-0511-1 for issue 5.8.

Per NEPA, it is the responsibility of the federal agency undertaking the proposed action to analyze the proposed action, alternatives to the proposed action, and their impact on the human environment. For more details on this issue, see the first paragraph of the response to comment APHIS-2007-0044-10866-3 for issue 2.1.

Comment Excerpt Text:
In keeping with the Council on Environmental Quality guidelines, the final EIS should incorporate the reviews
conducted by FDA and EPA by reference.[Footnote 1: "Regulations for Implementing the Procedural Provisions of the National Environmental Policy
Act" 40 C.F.R. Part 1502.2 (Nov. 1978) (Comment Number: APHIS-2007-0044-12101-1)

Response: APHIS does incorporate the information and analyses performed by the EPA and FDA relative to their authorities, in DEIS. However, APHIS must also do an independent evaluation of the information and analysis provided by other agencies and is responsible for its accuracy.

Comment Excerpt Text:
I would like to stress that this action if approved cannot be undone. If scientific evidence at a later date finds that genetically modified food has adverse impact, GT alfalfa will be impossible to remove. Biotech and chemical products that were not stringently tested and therefore arbitrarily assume to be safe have been shown time and time again to be toxic, including DDT, PCBs and CFCs, which still persist in the environment decades after their banning. The APHIS determination of "not a plant pest" does include the risk to animals or humans and is therefore not an acceptable conclusion to base the entire EIS on. The EIS states that infants should eat fruit, and every person who eats vegetables are at risk of adverse effects from acute glyphosate exposure.
There are many other concerns noted but not adequately addressed by the EIS, including the cycle of increasing glyphosate use and impact on trade, but above all, the potential harm to human health and the potential for unregulated, uncontrollable spread of GT alfalfa. Therefore, the EIS is insufficient and the deregulation of GT alfalfa should be denied or delayed, pending additional studies. (Comment Number: APHIS-2007-0044-12502-01-2)

Response: For information regarding about CEQ requirements on scientific integrity in NEPA analyses, see the response to comment APHIS-2007-0044-9936-35 for issue 2.0. In regard to adverse health effects, the DEIS did analyze potential adverse health effects, as discussed in detail within the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0. The DEIS did analyze the impact on organic markets under the scenario of decreased demand for organic products due to GT alfalfa deregulation. This analysis is presented in appendix S of the DEIS. APHIS affirms that the analysis provided in the DEIS, and the revisions incorporated in the FEIS are sufficient per the CEQ regulations for complying with NEPA.

Comment Excerpt Text:
The study APHIS has done for GE alfalfa in this Docket is inadequate. It certainly does not measure up to the risk assessment procedures suggested in the Protocol or the several relevant Codex guidelines and procedures. For example, the concerns of non-GE alfalfa farmers (whether regular or organic growers), organic dairies, and consumers are not seriously analyzed.
There have been about 200 incidents of GE crops contaminated non-GE produce, resulting in hundreds of millions (if not billions) of dollars in damages; contamination is a real risk and one of very significant magnitude. The court in the original lawsuit found that contamination by GE alfalfa has already occurred. Thus, the EIS cannot dismiss it as insignificant or rest on Monsantos assurances that its practices render contamination unlikely. And, by the way, Monsanto’s documented history of lying to governmental bodies and distorting evidence in submissions reduces its credibility to nil.

APHIS must surely be aware that the US government's definition of "organic" (by the Department of Agriculture) contains no threshold for the presence of GE contamination. WashBAC was among the 275,000 commentators vigorously objecting to the original version of the rule which would have allowed GE components and we testified at the Seattle hearing held by the Department. APHIS must proceed in a manner which guarantees that contamination will not occur, even if this means denying permission to plant GE alfalfa.
Although the evaluation foresees damage to family farms and organic markets, APHIS fails to affirm policies which would carry out its duty to mitigate such harms. Contamination by GE alfalfa violates the basic tort ideas of nuisance and trespass (although most farmers are economically not able to challenge a giant corporation such as Monsanto).
You suggest that consumers will forgive unintentional contamination, but intention is irrelevant to the Organic Standards and to the protection of human health. Consumers have a legal right to demand that products live up to their labeling. Additionally the claim that consumers will forgive unintentional contamination is unsubstantiated. Most surveys of US consumers indicate that they want to know that their food is free of any kind of contamination; further, most surveys point out the vast majority of US consumers do not want to have unlabeled GE food in their grocery stores.
We urge you to redo the EIS and adequately perform an assessment which includes these important factors. (Comment Number: APHIS-2007-0044-1544-1)

Response: APHIS affirms that the DEIS did adequately address economic concerns of producers for GE sensitive markets. The DEIS did analyze the impact on organic markets under the scenario of decreased demand for organic products due to GT alfalfa deregulation. This analysis is presented in appendix S of the DEIS. In regard to the mixing of non-GE or organic alfalfa with GT alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). The commenter makes a general statement about the analysis in the EIS being inconsistent with relevant Codex standards and the "Protocol."
If the commenter is referring the Cartagena Protocol, the US is not a party. With regard to Codex standards, the commenter did not refer to a specific standard or how the assessment is deficient, so APHIS cannot respond to a specific issue. However, the US regulatory review of GE crop plants is consistent "Guideline for the Conduct of Food Safety Assessment of Foods Derived from Recombinant-DNA Plants."
http://www.codexalimentarius.net/web/standard_list.do?lang=en

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Comment Excerpt Text:
I am against the introduction of a new GE agriculture crop, as already all the former environmental impact evaluation for other already aproved GE crops were proven afterwards to be biased , from severeal reasons and I would choose from the bulk the most condemned by the ecologists : the rush to introduce it, the investigative party that was financed by the seed producer. It suffices to mention all the contamination reports issued .Of course the debate weather weeds would become resistent to Glyphosate due to cultivation of the glyphosate tolerant alfalfa is completely unessential.Firstly because this herbicide far from being innocuous , and I will not quote all recent ,modern facilities and measurements toxicology studies,has also shown to increase stress in GM modified plants supposed to resist it lowering yield.Also taking

into account that this plant is particularly difficult to pollinize and already the entomologists are worried about the high bee mortality several studies about GM alfaalfa pollinization is to be taken since I have not found any scientific evidence of it in databases. (Comment Number: APHIS-2007-0044-2225-1)

Response: APHIS acknowledges the comment. The analysis provided in the DEIS, along with the revisions incorporated in the FEIS are sufficient per the CEQ regulations for complying with NEPA. For information regarding about the CEQ regulations requirements on scientific integrity for NEPA analysis, see the response to comment APHIS-2007-0044-9936-35 for issue 2.0. Glyphosate resistant weeds are discussed in appendix G, section IV C and I. Colony Collapse Disorder is discussed in appendix O. Studies on GT alfalfa have not shown a decrease in yield when compared to conventional alfalfa. See section IV F for a discussion of management practices.

Comment Excerpt Text:
I will not buy GE Alfalfa and GE Alfalfa-Derived Meat Dairy Products. This regulation/non-regulation does not Protect All Farmers, Organic Included, Who Wish to Choose to Grow Non-GE Crops; this documentation must be or re-written to do so. GE Alfalfa Would Significantly Increase Pesticide Use and Increase Harm to Human Health and the Environment and that is incredibly undesirable for me and for the sake of my children. Protecting Organic Farmers is part of the mandate of the USDA. Any threat to the sustainability of small farmers is a threat to small communities and local economies; if this legislation passes as written, then broken local economies, bankrupt small farms, and the torn fabric of small town America would lay at the feet of the USDA. The EIR is completely inadequate and the conclusions made in this document are not sufficently supported to merit approval. (Comment Number: APHIS-2007-0044-2256-1)

Response: APHIS acknowledges the comment. In regard to health effects, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0. For more information regarding the impact to small farms, see the response to comment APHIS-2007-0044-4913-7 for issue 5.1.

In regard to the comment about inadequacy of the EIS, APHIS maintains that the analysis provided in the DEIS, along with the revisions incorporated in the FEIS, are sufficient per the CEQ regulations for complying with NEPA.
For information regarding about the CEQ regulations requirements on scientific integrity for NEPA analysis see the response to comment APHIS-2007-0044-9936-35 for issue 2.0.

Comment Excerpt Text:
The necessary case-by-case evaluation has not been provided in this EIS, as many of the conclusions are based on the “nothing bad has happened yet” philosophy to scientific analysis. At the very least, humans will be secondary consumers of GT alfalfa via meat, dairy and honey, and the uptake of genetic material from GT crops is not speculation, but scientific fact. (Comment Number: APHIS-2007-0044-2325-6)

Response: See the response to comment APHIS-2007-0044-10562-1 for issue 2.0.

Comment Excerpt Text:
Please DO NOT approve the new Genetically modified Alfalfa seed that Monsanto has developed. There is not enough LONG-TERM research being conducted on the currently approved GM products to determine if more should be allowed to be released. This research should include heath/envirionmental/ and pollination effects on all levels of the food chain. Until a thorough independant investigation has been conducted we should realize the potential catastrophic effect GM crops could have on our bio-systems!!!!!!! (Comment Number: APHIS-2007-0044-6700-1)

Response: See the response to comment APHIS-2007-0044-10562-1 for issue 2.0.

Comment Excerpt Text:
On page 98 of the EIS appears the statement, No Medicago species are native to the Western Hemisphere; hence, there will be no impact on the natural genetic resources of these species from release (of Roundup Ready alfalfa) in the United States. Evidently whoever made that statement was unaware that black medic, often considered a weed, is scientifically named Medicago lupulina. Although not native to the U.S., M. lupulina originated in Chile, definitely part of the western hemisphere. Alfalfa's scientific name is M. sativa. One must question what other pertinent facts the preparers of the environmental impact statement are conveniently unaware of. (Comment Number: APHIS-2007-0044-6788-1)

Response: Appendix W of the DEIS states that, "18 Medicago species are known to be naturalized (free-living) or possibly so within the United States, of which only M. lupulina (black medic) is widely naturalized throughout the United States. None of these species are native to the United States, and none are sexually compatible with M. sativa." It has been widely established (see Bagavathiannan and Van Acker 2009) that the genus Medicago, including the species M. lupulina has originated and naturally occurs in the near middle east (Asia Minor, Transcaucasia, Iran, and Turkmenistan). Medicago lupulina did not originate in Chile, there are no natural species of Medicago in the Western Hemisphere.

Comment Excerpt Text:
I am seriously concerned about the safety and long term effects
of GMO alfalfa seed. This is an open pollinated crop and is moved around by pollinators. You can not restrict this after it is out in the open. It is totally irresponsible to allow this technology to exist. Many scientific studies have been done. They all point to serious long term negative effects. Why is this information being ignored? (Comment Number: APHIS-2007-0044-7049-1)

Response: See the response to comment APHIS-2007-0044-9936-35 for issue 2.0. For more information about health effects, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
Please understand that the EIS dismisses the adverse economic effects that contamination by RR alfalfa will have on organic alfalfa seed and hay growers, producers of organic livestock, and exporters of alfalfa to sensitive markets. We eat organically, and feel we have a right to choose to eat food that is not genetically contaminated. (Comment Number: APHIS-2007-0044-7096-1)

Response: APHIS acknowledges the comment. In regard to impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to impacts on international trade, see the response to comment APHIS-2007-0044-3404-1 in issue 5.4. In regard to consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
I have a right to eat organic, non-GM foods and your approving GM seed is taking this right from me. You might wonder why I want organic food, food grown from seed that has evolved naturally over thousands and millions of years. The reason: that type of food is in harmony with my body that evolved along with that food. GM food, in contrast, has been produced without any real concern for consumer health. A recent study links GM food with organ damage. (See "A Comparison of the Effects of Three GM Corn Verities on Mammalian Health" by Joel Spiroux de Vendômois, et. al. in Int J Biol Sci 2009; 5:706-726.) Another study based on Monsanto's own data by Dr Gilles-Eric Seralini, from the University of Caen, showed that GM food could cause liver and kidney damage. (http://www.dailymail.co.uk/news/article-1244824/Fears-grow-study-shows-genetically-modified-crops-cause-liver-kidney-damage.html#ixzz0fIIM4AfD)
In fact, far too little research has been done on consumer health effects to justify releasing GM crops, including the contemplated alfalfa. (Comment Number: APHIS-2007-0044-7453-2)

Response: See the response to comment APHIS-2007-0044-9936-35 for issue 2.0. For more information about health effects, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 and APHIS-2007-0044-11328-1 for issue 6.0.

APHIS has noted your cited study and has addressed it in the response to comment APHIS-2007-0044-7453-2 for Issue 6.0.

Comment Excerpt Text:
I would like to voice my opinion that the Environmental Impact Statement inadequately answers two critical points which require a complete understanding before this product can receive unregulated status:
1. It fails to address the risk of cross-pollination in large populations, taking into account realistic statistical analysis. This failure leaves open potential risks from the uncontrolled spread of these genetic traits into the current wild and cultivated alfalfa genomes.
2. It fails to address realistic human and animal health concerns which may result from either or both the increased use of glyphosate on these crops, and direct secondary health effects from these genetic changes. Recent published studies in Austria indicate that there are significant

biological health concerns from other glyphosate-tolerant plants, which are not yet flly understood. Until the results of that study have been fully investigated it is extremely risky to allow the intoduction of yet another glyphosate-tolerant plant. (Comment Number: APHIS-2007-0044-9571-1)

Response: APHIS acknowledges the comment. See the response to comment APHIS-2007-0044-9936-35 for issue 2.0. In regard to the adventitious presence of GT alfalfa with non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to health effects, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
The DEIS is arbitrarily and capriciously flawed in structure, process and substance.

The DEIS is flawed in structure because it is overly narrow in scope and stripped of any alternatives besides complete, unconditional deregulation. This contravenes NEPA and the PPA.

The DEIS is arbitrarily and capriciously flawed in process because, rather than informing APHIS's deregulation decision on GT alfalfa, the DEIS's analysis is predicated on the pre-determined and separate conclusion that APHIS will deregulate GT alfalfa, making the entire NEPA analysis a foregone conclusion – a meaningless paper exercise.

The DEIS is arbitrarily and capriciously flawed in substance because its analysis on numerous impacts is inadequate to comply with NEPA, because it entirely fails to address other significant issues, and because its conclusions that GT alfalfa will lead to no significant impacts to the environment, U.S. agriculture and public health are contrary to the record evidence. Deregulation of GT alfalfa would have numerous significant impacts on U.S. agriculture and the environment that must be acknowledged, analyzed, and meaningfully considered.

APHIS should have consulted with the Fish and Wildlife Service (FWS) about the significant impacts of deregulating GT alfalfa on protected species. By failing to adequately assess the foreseeable impacts to protected species and failing to consult, APHIS violated the Endangered Species Act (ESA).

The APHIS decision to deregulate GT alfalfa does not comply with the Plant Protection Act (PPA) and is not based on sound science. The Roundup Ready alfalfa system violates the PPA in that it promotes the proliferation of plant disease agents; noxious, herbicide-resistant weeds; and economic impacts that will harm the agricultural economy. (Comment Number: APHIS-2007-0044-9936-1)

Response: The EIS has adequately addressed the potential significant effects and evaluated the significant issues as raised by the public, state and local agencies, and other Federal agencies. Based on public comments on the DEIS, an additional alternative has been added to the FEIS that were not considered in detail in the DEIS. This alternative are intended to more fully examine the potential impacts to non-GE farmers. Full descriptions of this added alternative and

alternatives rejected from further consideration are included in chapter 2 of the FEIS. In addition, chapter 4 of the FEIS has been updated with analyses of this alternative.

APHIS began an analysis of possible impacts of GT alfalfa on threatened and endangered (T&E) species with a request to the United States Fish and Wildlife Service (USFWS) on January 8, 2008 for a list of species, and a discussion of the action area, and the scope of a possible consultation. APHIS operates under a "decision tree" which helps BRS determine what issues need to be brought to USFWS for consultation, either formal or informal. APHIS completed an analysis of impacts on T&E species, and determined that the product would have no impact on any of those plants or animals reviewed that would overlap with alfalfa production sites. As stated by USFWS in their section 7 consultation technical assistance instructions (see http://www.fws.gov/midwest/endangered/section7/s7process/7a2process.html), responsibilities under 7(a)(2) of "implementing regulations (50 CFR 402), Federal agencies must review their actions and determine whether the action may affect federally listed and proposed species or proposed or designated critical habitat. To accomplish this, Federal agencies must request from the Service a list of species and critical habitat that may be in the project area or they can request our concurrence with their species list. Once a species list is obtained or verified as accurate, Federal agencies need to determine whether their actions may affect any of those species or their critical habitat. If no species or their critical habitat are affected, no further consultation is required. If they may be affected, consultation with the Service is required. This consultation will conclude either informally with written concurrence from the Service or through formal consultation with a biological opinion provided to the Federal agency." APHIS contracted with an expert organization to assess the potential impacts of glyphosate on terrestrial and aquatic organisms, both plants and animals and this is presented in appendix N of the DEIS. APHIS completed its analysis of potential impacts on T&E species with reference to this analysis, and in the absence of likely impacts, was not required to further pursue consultations with USFWS.

Comment Excerpt Text:
Public health issues may be significant environmental impacts. The CEQ regulations explain what factors may be significant effects on the human environment and one such factor is "[t]he degree to which the proposed action affects public health or safety." [Footnote 69 40 C.F.R. § 1508.27(b)(2).] Moreover in the APHIS draft programmatic EIS, issued July 7, 2007, APHIS listed impacts on human health as a category of impacts of its NEPA assessment. [Footnote 70 DEIS at 67-90.] Accordingly, APHIS's DEIS must address any potential human health or safety risks and determine whether those human health and safety impacts are significant.

If those impacts are to be found not to be significant, there must be a convincing statement of reasons. Here there is no meaningful analysis by the agency of potential human health impacts or a convincing statement of reasons why such impacts may not be significant. APHIS has not complied with NEPA. APHIS cannot solely rely on another agency's evaluation of effects under a separate statute to adequately fulfill its own NEPA obligations. Health impacts are cognizable impacts pursuant to NEPA that require an EIS if they may significantly impact the "human environment." These impacts are interrelated to the environment because they would stem from the biological contamination of natural alfalfa (through cross-pollination and other means) and cause unknown and unwilling human exposures. Accordingly, APHIS has its own duty to

comply with NEPA, including assessment of potential significant impacts to public health and safety.

APHIS must not merely defer in toto to FDA: FDA's voluntary consultation process is extraordinarily weak. It is based on a statement of policy, not a binding regulation. GE crop developers may choose to consult with FDA, but this process is vitiated by its voluntary nature and a lack of any established testing standards; in particular, GE crop developers seldom if ever conduct animal feeding trials with GE crops for the purpose of detecting potential toxicity. The manufacturer merely sends FDA a summary of its findings. FDA makes no findings. FDA did not prepare any NEPA documentation (no EA nor EIS) on its policy nor provide notice and comment. In any event, APHIS cannot solely rely on another agency's evaluation of environmental effects under a separate statute to adequately fulfill its own NEPA obligations. [Footnote 71 Save Our Ecosystems v. Clark, 747 F.2d 1240, 1248 (9th Cir. 1983); Oregon Envtl. Council v. Kunzman, 714 F.2d 901, 905 (9th Cir. 1983).] (Comment Number: APHIS-2007-0044-9936-23)

Response: The DEIS adequately address the human health risks. Nevertheless, the analysis for this issue in the FEIS has been improved to more accurately address the impacts on human health. Also, APHIS incorporates the information and analyses performed by EPA and FDA relative to their authorities. APHIS must also conduct an independent evaluation of the information and analysis provided by other agencies and is responsible for its accuracy. For more details, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
In preparation of the DEIS, APHIS failed to consult with the FWS as is required under Section 7 of the Endangered Species Act (ESA) on the potential effects on threatened and endangered species and their critical habitats.

The ESA requires APHIS to consult with FWS and/or NMFS to determine "whether any species which is listed or proposed to be listed [as an endangered species or a threatened species] may be present in the area of such proposed action." [Footnote 78 16 U.S.C. § 1536(c)(1); 50 C.F.R. § 402.12(c) (requiring federal agencies to request information regarding listed species and critical habitat from the Department of the Interior).] If APHIS learns from FWS and/or NMFS that threatened or endangered species may be present, a biological assessment must be prepared to identify any endangered species or threatened species which are likely to be affected by such action. [Footnote 79 Id.] The initial request for information from FWS and/or NMFS is a predicate to further agency action and cannot be ignored. [Footnote 80 Thomas v. Peterson, 753 F.2d 754, 764 (9th Cir. 1985).]

Accordingly, prior to a completion of the deregulation, APHIS must demonstrate that at the very least, it has consulted with the United States Fish and Wildlife Service ("FWS") and/or the National Marine Fisheries Service ("NMFS") and taken the first step in considering the impacts of an APHIS deregulation of GT alfalfa on threatened or endangered species. As has become APHIS' pattern, it once again failed to take even the first step by doing any consultation with any

other agency regarding endangered species. [Footnote 81 Center for Food Safety v. Johanns, 451 F.Supp.2d 1165, 1182 (D. Hawaii 2006).] APHIS has already once been previously found to have violated the ESA when it skipped this initial, mandatory step of obtaining information about listed species and critical habitats from FWS and/or NMFS. [Footnote 82 Center for Food Safety v. Johanns, 451 F.Supp.2d 1165, 1182 (D. Hawaii 2006).] The court emphasized that regardless of whether there is any evidence that species or habitat may be harmed in any way, "an agency violates the ESA when it fails to follow the procedures mandated by Congress, and an agency will not escape scrutiny based on the fortunate outcome that no listed plant, animal, or habitat was harmed." [Footnote 83 Id.] (Comment Number: APHIS-2007-0044-9936-26)

Response: Regarding the comment about USFWS consultation, see the response to comment APHIS-2007-0044-9936-27 for issue 4.1.

Comment Excerpt Text:
APHIS's NEPA analysis is also improperly predetermined.

While NEPA does not mandate any particular results, its main purpose is to foster better decision-making by agencies. See 42 USC 4321; 40 CFR 1501.1(c). Here, the decision to deregulate GT alfalfa, which this DEIS is supposed to inform and foster, has already been determined. APHIS has already concluded, based on its 11-page Plant Pest Determination (Appendix W) that it must deregulate GT alfalfa. See, e.g., DEIS, at 164 ("If APHIS determines that GT alfalfa does not pose a plant pest risk, then APHIS has no regulatory authority to deny the deregulation of GT alfalfa events J101 and J163"). The Court's required NEPA analysis then becomes nothing more than a meaningless paper exercise. It does not matter what its analysis is of risks because according to APHIS, it cannot or will not do anything different anyway. See DEIS, p.164 (discussing risks such as "increased prevalence of the gene product in the environment" and "potential increase in glyphosate use"). If the Plant Pest Determination is the agency action that determines whether or not GT alfalfa will be deregulated, then the agency's NEPA assessment should inform that decision. APHIS's process here turns that on its head, using the already finished Plant Pest Determination to short-circuit and prejudge the NEPA analysis. (Comment Number: APHIS-2007-0044-9936-5)

Response: APHIS has not made a final decision on the regulatory status of GT alfalfa. This EIS and subsequent Record of Decision will be used by APHIS in determining the regulatory status of GT alfalfa. A primary purpose of NEPA is informed decisionmaking. An EIS shall provide full and fair discussion of significant environmental impacts and shall inform decision-makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment. It shall be used by Federal officials in conjunction with other relevant material to plan actions and make decisions (40 CFR § 1501.2). APHIS Plant Pest Risk Assessment (PPRA) is used to assist the Agency in identifying the range of alternatives to be analyzed in the EIS and also is used to inform and support the analysis of potential impacts on the human environment. The PPRA (appendix W) is an analysis of potential plant pest risk and is not the final determination on the regulatory status of GT alfalfa.

Identifying APHIS regulatory authority by no means prejudges the EIS' NEPA analysis, but allows for a full and rigorous analysis of potential impacts on the human environment. Factors used in determining an Agency's Preferred Alternatives, in addition to economic, environmental and technical considerations, also include the ability to fulfill the agency's statutory mission and responsibilities. To be clear and transparent to the decisionmaker and the public, APHIS has identified how its regulatory authority would be carried out under the alternatives. By disclosing this information, APHIS is ensuring that information relevant to its decisionmaking authority is being made available before decisions are made and before actions are taken.

2.1.1 Issue 2.1.1 - Assumptions

Comment Excerpt Text:
On page 98 of the EIS appears the statement, No Medicago species are native to the Western Hemisphere; hence, there will be no impact on the natural genetic resources of these species from release (of Roundup Ready alfalfa) in the United States. Evidently whoever made that statement was unaware that black medic, often considered a weed, is scientifically named Medicago lupulina. Although not native to the U.S., M. lupulina originated in Chile, definitely part of the western hemisphere. Alfalfa's scientific name is M. sativa. One must question what other pertinent facts the preparers of the environmental impact statement are conveniently unaware of. (Comment Number: APHIS-2007-0044-6788-1)

Response: See the response to comment APHIS-2007-0044-6788-1 for issue 2.1.

Comment Excerpt Text:
APHIS's NEPA analysis is improperly narrow and its result improperly pre-determined.

APHIS begins from the faulty proposition that the scope of its NEPA review is limited to plant pests. (7 CFR Part 340). APHIS concludes repeatedly that because it concluded in its "Plant Pest Determination" (Appendix W) that "GT alfalfa is unlikely to pose a plant pest risk" its NEPA analysis is at an end. [Footnote 18 We also disagree that GT alfalfa is not likely to pose plant pest risks. See infra and other CFS comments submitted by Bill Freese. 19 7 U.S.C. § 7701(1).] See, e.g., DEIS at xv, 1, 11, 13-15, 161, 164. This is a legally improper and impermissibly constrains the issues APHIS must analyze under NEPA. APHIS' authority and mandate is quite broad: as the DEIS itself notes, it includes "protecting American agriculture," and "ensuring plant and animal health." By doing so, the agency aims to "improve agricultural production and competitiveness, and contributes to the national economy and public health." (DEIS, at xiii.) APHIS authority under the Plant Protection Act, 7 USC 7701 et seq. is also quite broad. The fundamental purpose of the PPA is the "protection of the agriculture, environment, and economy of the United States.19 With this purpose in mind, APHIS promulgated regulations to specifically implement the PPA to protect American agriculture from the recognized potential for GE crops to injure or damage agriculture, environment, and the economy. [Footnote 20 7 C.F.R. § 340 et seq.] The structure and scope of the DEIS is flawed to the extent it does not undertake its analysis of potentially significant impacts from this starting point. (Comment Number: APHIS-2007-0044-9936-4)

Response
APHIS certainly recognizes that pursuant to NEPA, the EIS must inform both the public and the decision maker of the environmental consequences that could result from the proposed action. APHIS does not think nor has it stated that the scope of its NEPA review is limited solely to plant pest effects or impacts. The analysis undertaken in the EIS is to analyze the environmental impacts that are likely to result from the reasonable alternatives considered in the EIS. The EIS should inform the decision maker of the environmental consequences associated with the action including the potential environmental effects associated with the reasonable alternatives evaluated in the EIS. On the other hand, the analysis and determination by APHIS under the Plant Protection Act is a different analysis pursuant to a different statute and set of regulations. Pursuant to the APHIS biotechnology regulations promulgated under 7 CFR Part 340, the fundamental analysis is to determine whether the GE alfalfa is or is not likely to pose a plant pest risk. It is true that the fundamental purpose of the Plant Protection Act is the protection of the agriculture, environment, and economy of the United States and it is very important to note that APHIS is authorized by the Plant Protection Act to accomplish that fundamental purpose by detecting, controlling, eradicating, suppressing, and preventing the spread of plant pests and noxious weeds. 7 CFR 7701(1). . APHIS does not believe that its NEPA analysis in the EIS is improperly narrow and its result improperly pre-determined. Additionally, APHIS believes that the organic, conventional, and genetically engineered sectors of agriculture can coexist and improve agricultural production and competitiveness, and contribute to the national economy and public health.
In accordance with the National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et seq.), APHIS published a notice in the Federal Register (73 FR 1198-1200) seeking public input to assist the Agency in defining the scope of an environmental impact statement (EIS) to identify and analyze any environmental impacts that could result from granting nonregulated status to the J101 and J163 GE alfalfa lines. From these comments and analyses of all pertinent data, the Agency identified and addressed all environmental impacts that could result from granting or not granting nonregulated status to GE alfalfa lines J101 and J163. Further, APHIS is issuing a FEIS that addresses public comments received on the DEIS in accordance with NEPA.

2.2 Issue 2.2 – Precedent setting

Comment Excerpt Text:
The USDA released its draft EIS on December 14, 2009. A 60-day comment period is now open until February 16, 2010. My understanding is that the USDA has not taken the concerns of non-GE alfalfa farmers, or organic dairy farmers seriously, for example, having dismissed the fact that contamination will threaten export markets and domestic organic markets.
This is the first time the USDA has prepared an EIS for any GE crop and therefore it will have broad implications for all transgenic crops, and its failure to address the environmental and related economic impacts of GE alfalfa will have far-reaching consequences. The Center for Food Safety is spearheading a campaign to make sure all affected parties know and are involved in the public process and have the opportunity to comment.
This is a call to action to all who have concerns about the environmental and economic consequences of uncontrolled nation-wide growth of GE alfalfa, to all who believe in the publics right to choose to eat non-GE food and the farmers right to sow the crop of his or her choice, and

to those who care about the impacts of pesticides and invasive weeds on biodiversity and endangered species.
Farmers, dairy producers, scientists, public interest organizations, and all concerned citizenry must make sure their voices are heard in this important process. At this stage, the most critical thing anyone can do is provide public comments indicating their concerns with GE Roundup Ready Alfalfa.
In particular, the EIS of the USDA dismisses the significance that GE alfalfa will broadly contaminate non-GE alfalfa. Opinions, studies (published or unpublished), anecdotal stories, and testing data exist about how contamination will occur and /or demonstrate that contamination has in fact occurred.
See: Jeffrey M. Smith, author of the Seeds of Deception
and Genetic Roulette -
http://www.organicco nsumers.org/articles/art icle_19484.cfm
http://www.responsib letechnology.org/GMFree/
HealthRisks/NewVideoPage /index.cfm
(Comment Number: APHIS-2007-0044-0880-1)

Response: In regard to impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to consumer choice, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to potential impacts on biodiversity and endangered species, see the response to comment APHIS-2007-0044-9936-27 for issue 4.1. In regard to the adventitious presence of GT alfalfa with non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Since the usefulness of glyphosate tolerant alfalfa will be limited in a few decades, the notion that many of today's growers want to use glyphosate tolerant alfalfa, and a
minority do not, should have little bearing to the USDA administrative decision that will have to stand for all time. It is highly likely that glyphosate tolerant alfalfa will be of little benefit 50 to 100 years from now. With the lack of the ability to control gene flow from glyphosate tolerant alfalfa, American growers and consumers will have this attribute for all time. (Comment Number: APHIS-2007-0044-10157-13)

Response: APHIS acknowledges the comment. In regard to gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. In regard to the cost benefit to GT alfalfa, see the response to comment APHIS-2007-0044-0511-1 for issue 5.8.

Comment Excerpt Text:
NCGA feels that the preponderance of evidence demonstrates that the deregulation GE alfalfa would exacerbate multiple issues in the United States including environmental problems, economic hardship and contamination of the organic and conventional alfalfa, dairy and beef industry. Inherent in this impact is the recognition that GE alfalfa, like other GE crops, cannot be contained once it is released for commercial growing. We have presented considerable research which shows that gene flow in alfalfa as well as other GM crops can and will result to

neighboring plants and that such plants can confer fitness advantages in wild populations. In particular, the ecological nature of alfalfa- that it is a perennial crop, that it is pollinated by bees and that it has feral relatives further exacerbates any potential opportunity to control its natural gene flow. As a result of this gene flow, which is most certainly going to occur, GE alfalfa will create unprecedented environmental risks including the continued evolution of glyphosate resistant weeds, including resistance of noxious weeds, an increase in more potent and toxic herbicides and the evolution of organic and wild alfalfa plants. Additional and emerging scientific evidence also shows that the glyphosate resistant gene, CP4 EPSPS, has the potential to persist in ecosystems and be passed on to other products such as milk, with unknown and unexamined consequences for ecological and human health. (Comment Number: APHIS-2007-0044-11018-17)

Response: In regard to gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for issue 3.1. In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for issue 3.6. In regard to the comment about an increase in more toxic herbicides, see the response to comment APHIS-2007-0044-0402-1 for issue 6.3.

Comment Excerpt Text:
Alfalfa is the first perennial, insect pollinated crop to be genetically engineered and recommended for deregulation and approval. Alfalfa is a unique crop whose characteristics including high genetic diversity, perenniality, quick re-growth, persistence, deep tap root system, drought and cold tolerance and seed dormancy, can contribute to its fertility. As Bagavathiannan et al. (2009) importantly note,

"With these traits alfalfa is equipped to invade and dominate unmanaged habitats. Feral alfalfa populations can and will act as bridges for long-distance gene flow and facilitate the adventitious presence of novel traits in the environment. As such, feral populations will become a potential barrier for achieving coexistence of transgenic and non-transgenic alfalfa fields." (Bagavathiannan et al. 2009).

With this assertion, NCGA will present data that demonstrates that the assumption of APHIS that organic alfalfa will not be contaminated by GE alfalfa is false and further, that GE alfalfa has the potential perpetuate a variety of other negative environmental impacts including glyphosate resistant weeds. (Comment Number: APHIS-2007-0044-11018-8)

Response: GE alfalfa would not be the first perennial crop to be granted nonregulated status. For example, Papaya, Plum and Cichorium intybus were previously deregulated (http://www.aphis.usda.gov/biotechnology/not_reg.html) . In regard to gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. In regard to the adventitious presence of GT alfalfa with non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
GE alfalfa would be the first perennial crop to be approved for genetic modification and release. GE-contaminated plants could be scattered along the roadsides and in fields, living and producing more GE-contaminated pollen for years. (Comment Number: APHIS-2007-0044-11969-2)

Response: In regard to gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. In regard to the adventitious presence of GT alfalfa with non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
The development of an EIS on genetically-modified Round-up Ready alfalfa marks the first of its kind for a genetically-modified crop. It is essential that practices be employed, allowing for a full and thorough analysis of the data in this document, to establish the best standards for review of similar documents in the future. (Comment Number: APHIS-2007-0044-1221-2)

Response: APHIS ensures that the scientific analysis, as provided in the DEIS and updated in the FEIS, is accurate and is based on high-quality information.

Comment Excerpt Text:
IF THEY REGULATE RR THE ABILITY FOR US TO COME UP WITH OTHER ADVANCMENTS WILL BE HINDERED DRASTICALLY. ALFALFA IS THE ONLY CROP THAT HAS VERY LITTLE OPPORTUNITY TO IMPROVE ITS PRODUCTION. IF RRA IS NOT ALLOWED THE OTHER ADVANCMENTS SUCH AS LOWLIGNAN WILL NOT BE ALLOWED EITHER MOST LIKELY. (Comment Number: APHIS-2007-0044-2210-2)

Response: APHIS acknowledges the concerns expressed, which are addressed in the DEIS in section IV D.

Comment Excerpt Text:
As an organic Citrus producer the GMO Alfalfa may not seem to be a big issue but the allowance of GMO's that can cross contaminate any organic crop is of major concern. It just happens that GMO Alfalfa is the first to hit the light of day and will be the basis upon which future decisions are based. As growers of non GMO crops it is important to us to protect the integrity of the non GMO plants. Cross contamination of Alfalfa is highly likely which will affect other products not just Alfalfa. Organic milk, cheese, meat etcetera can all be contaminated by the introduction of GMO Alfalfa. Part of the USDA's job is to protect and regulate the Organic industry as charged in the NOP. How is the USDA going to tell an organic grower that has been cross contaminated by a GMO crop that he can no longer sell his crop as organic if the USDA itself allowed the promulgation of the GMO crop in the first place. It is imperative that the USDA does not grant GMO Alfalfa a non-regulated status. (Comment Number: APHIS-2007-0044-2662-1)

Response: In regard to the National Organic Program, see the response to comment APHIS-2007-0044-10866-5 for issue 3.3. In regard to the adventitious presence of GT alfalfa with non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
GE alfalfa would be the first perennial crop to be approved for genetic modification and release. GE-contaminated plants could be scattered along the roadsides and in fields, living and producing more GE-contaminated pollen for years. Comment Number: APHIS-2007-0044-4347-2

Response: GT alfalfa would not be the first perennial GE crop to be permited under APHIS' regulations. Many other perennial crops have been genetically engineered including plums, papaya, and eucalyptus, among others. (http://www.aphis.usda.gov/brs/not_reg.html). In regard to gene flow in perennial vs. annual plants, see response to APHIS-2007-0044-0337-1 for issue 3.. In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
I don't have an issue with necessarily genetic food if they have been tested. However, I DO, have an issue that our current laws allow for genetic food to be patent.
This is A BIG ISSUE because the germination to other fields is impossible to fully control. Thus, it will allow Monsanto to sue, under our current law, other farmers who are not using their genetically engineered seeds, but their fields carry the genes due to cross germination that took place with the winds. This for me as a citizen is seen as a monopolization attempt.
Thus, Im very against this idea unless our laws change which most likely they will not.
(Comment Number: APHIS-2007-0044-5225-1)

Response: In regard to the adventitious presence of GT alfalfa with non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). Regarding the legal liability for unintentional presence of GE content in non-GE crops, see the response to comment APHIS-2007-0044-6376-1 for issue 5.1.

Comment Excerpt Text:
New crops/traits: There are many new traits under development, both in current crops with GM technology, as well as with new crops. The attached table summarizes my assessment of recent traits under development and at varying stages of commercialization planning. Information provided in this table likely captures known traits under development, though it may not be exhaustive due to the anecdotal release of information related to trait development. Nevertheless, it is certainly representative. These observations were also recently echoed by the President of Syngenta who indicated that "We're heading into an era where there will be so many new technologies

that the old standbys, like Roundup Ready, will gradually lose their hold and will be replaced by dozens of different options for the farmer" (Pillar, 2009).
The results illustrate a number of important points. First, a large number of traits are anticipated to be commercialized in the next 10 or more years. For corn and soybean, there are 21 and 22 new GM traits, respectively. Second, in many cases the forthcoming traits would result in competing solutions for the same problem. Third, some of these are producer traits, some are processor traits and others are consumer traits. Though producer traits dominated early commercialization, as the market matures, focus of trait development has expanded to consumer and processor traits. Finally, besides the development of GM traits on corn and soybeans, there are a number of important crops in which GM trait research is just commencing and will result in new traits in the coming decade. These include notably, rice and wheat, as well as perhaps others. (Comment Number: APHIS-2007-0044-6486-4)

Response: See response to comment APHIS-2007-0044-7620-38 for Issue 13.

2.3 Issue 2.3 – Confidential business information (CBI)

Comment Excerpt Text:
I am writing to register my opposition to allowing genetically-modified plants/crops in the United States. To allow such a practice is alarming to me.
As a concerned consumer, I actively look for and purchase organic foods as much as possible and also look for information that a plant food and its ingredients have not been genetically modified and irradiated.
There is absolutely no reason to allow foods to be genetically modified, except to allow a major company greater profits without any concern for the end consumers in this country. To allow GM foods in the United States will create health concerns in this country. This country needs to get in tune with the rest of the world, such as Europe that prohibits GMO food/crops. Increasing the use of herbicides for GMO crops further pollutes our water, our food, our health. In a time when Americans are getting sicker and fatter all the time, this country needs to take a responsible, educated approach and ensure that consumers have food grown and available that is as natural as possible.
We do not need GMO foods. We need to protect small family farmers, conventional farmers, and organic farmers from the dangers of cross-contamination of GMO crops. To do so, the USDA must simply prohibit GMO crops in the United States to protect farmers and the consumers.
I am requesting that you extend the comment period for another 30 days. With the recent release of your document over the holidays, the public needs additional time to be aware of this issue and have time to review the document.
I would also request that you release the PLANT PEST DETERMINATION document so that the public can review that document and understand the basis for how the USDA intends to recommend GM alfalfa, a decision that I encourage you to reverse. (Comment Number: APHIS-2007-0044-5372-1)

Response: APHIS acknowledges the comment. Section IV.E of the DEIS provides an extensive analysis of potential adverse health effects and concludes that the current weight-of-evidence from similar GE crops suggests that the transgenic CP4 EPSPS protein present in GT alfalfa

poses negligible risk to humans, livestock, and wildlife. For further details regarding health impacts and the risk of herbicide increase use, see the second response to comment APHIS-2007-0044-0278-1 for issue 6.0.

In regard to potential genetic exposure, the DEIS addresses the adventitious presence of GE alfalfa in non-GE alfalfa. As discussed in appendix V 5.5-5.11 of the DEIS, coexistence strategies (e.g. equipment sanitation, harvest management, field separation, contractual practices) can limit the occurrence of GE traits from non-GE alfalfa below seed certification thresholds (0.5 percent).

In regard to the extension of the comment period, the initial 60 day comment period was 15 days greater than the 45 day comment period required by the Council on Environmental Quality (40 CFR § 1506.10). However, in response to public comments, the comment period was extended an additional 15 days. APHIS maintains that this extended 75-day comment period did provide ample time for substantive comments.

In regard to the last comment, the Plant Pest Risk Assessment for Glyphosate-Tolerant Alfalfa Events J101 and J163 was included as appendix W in the DEIS of which was available for public comment.

2.4 Issue 2.4 – Docket

Comment Excerpt Text:
*Tell USDA to Extend the Comment Period:

USDA provided only a 60-day comment period, from Dec 16-Feb 16.

The document is almost 200 pages, 1400 with appendices. The comment period began right before the holiday season. This is the first EIS the agency has ever conducted for any GE crop. Given these factors, and its failure to release its "Plant Pest Determination," USDA should extend the comment period at least 30 days to give the public adequate time to comment. (Comment Number: APHIS-2007-0044-0948-8)

Response: In conformance with EPA requirements, the DEIS was mailed to libraries and individuals prior to the beginning of the comment period. The Council on Environmental Quality (40 CFR § 1506.10) NEPA-implementing regulations require a 45 day public comment review period for a DEIS. The initial comment period was 60 days, and in response to comments received, APHIS extended the period by 15 days for a total of 75 days. APHIS maintains that this extended 75-day comment period did provide ample time for substantive comments.

Comment Excerpt Text:
I am writing to urge you to extend the comment period, and to please NOT deregulate genetically engineered alfalfa. I am very concerned about the inevitable risk of contamination to

organic agriculture, and to our food source at large. I do not believe this product can coexist with non-GMO agriculture without contamination. (Comment Number: APHIS-2007-0044-10494-1)

Response: Regarding the suggestion to extend the comment period, see the response to comment APHIS-2007-0044-0948-8 for issue 2.4. In regard to the adventitious presence of GE alfalfa with non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
The Cornucopia Institute is formally requesting that the USDA, through the Animal, Plant and Health Inspection Service (APHIS), extend the public comment period on the Genetically-Engineered Glyphosate-Tolerant Alfalfa Environmental Impact Statement [Docket No. APHIS-2007-0044].
We are asking that comment period be extended by an additional 30 days, and to a total of 90 days, rather than the 60 day comment period as noticed in the Federal Register announcement of the rule proposal.
There are compelling reasons supporting a longer public comment period, including:
The Environmental Impact Statement (EIS) was released on Friday, December 18, 2009. The one paragraph announcement of the release (bundled within the EPA's announcement of nearly a dozen other EIS's) coincided with the busy holiday period at the end of the year, and made awareness and review of this important document difficult during this timeframe.

The Cornucopia Institute has been a plaintiff in the federal court case that stipulated the requirement by APHIS to conduct an EIS on genetically-modified Round-up Ready alfalfa. Given the timing of the release of the document, Cornucopia's legal counsel was unable to provide an adequate review of the lengthy and complex 1476 page document until January 14, 2010. (Comment Number: APHIS-2007-0044-1221-1)

Response: Regarding the public comment period, see the response to comment APHIS-2007-0044-0948-8 for issue 2.4.

Comment Excerpt Text:
The majority of Cornucopia's 3000 members are organic family farmers, many of them engaged in various facets of organic livestock agriculture. Nearly 30% of Cornucopia's members lack email communication ability, including a sizable percentage who are members of the old order Amish communities. Communicating the details of the EIS with these farmers, who are directly impacted by the approval of genetically-modified Round-up Ready alfalfa, and allowing them to have meaningful input into the EIS would greatly benefit from the requested 30 day extension of the public comment period. Many of these same farmers will by necessity only be alerted to and able to respond through standard mail.
For all of these reasons, The Cornucopia Institute respectfully requests that the USDA and APHIS to extend by 30 days the public comment period on the Genetically-Engineered Glyphosate-Tolerant Alfalfa Environmental Impact Statement. This would provide an end date of March 16, 2010 for public comment. (Comment Number: APHIS-2007-0044-1221-3)

Response: Regarding the public comment period, see the response to comment APHIS-2007-0044-0948-8 for issue 2.4.

Comment Excerpt Text:
The Cornucopia Institute is formally requesting that the USDA, through the Animal, Plant and Health Inspection Service (APHIS), extend the public comment period on the Genetically-Engineered Glyphosate-Tolerant Alfalfa Environmental Impact Statement [Docket No. APHIS-2007-0044].
We are asking that comment period be extended by an additional 30 days, and to a total of 90 days, rather than the 60 day comment period as noticed in the Federal Register announcement of the rule proposal.
There are compelling reasons supporting a longer public comment period, including:
• The Environmental Impact Statement (EIS) was released on Friday, December 18, 2009. The one paragraph announcement of the release (bundled within the EPA's announcement of nearly a dozen other EIS's) coincided with the busy holiday period at the end of the year, and made awareness and review of this important document difficult during this timeframe.
• The Cornucopia Institute has been a plaintiff in the federal court case that stipulated the requirement by APHIS to conduct an E/S on genetically-modified Round-up Ready alfalfa. Given the timing of the release of the document, Cornucopia's legal counsel was unable to provide an adequate review of the lengthy and complex 1476 page document until January 14, 2010.
• The development of an EIS on genetically-modified Round-up Ready alfalfa marks the first of its kind for a genetically-modified crop. /t is essential that practices be employed, allowing for a full and thorough analysis of the data in this document, to establish the best standards for review of similar documents in the future.
• The majority of Cornucopia's 3000 members are organic family farmers, many of them engaged in various facets of organic livestock agriculture. Nearly 30% of Cornucopia's members lack email communication ability, including a sizable percentage who are members of the old order Amish communities. Communicating the details of the EIS with these farmers, who are directly impacted by the approval of genetically-modified Round-up Ready alfalfa, and allowing them to have meaningful input into the EIS would greatly benefit from the requested 30 day extension of the public comment period. Many of these same farmers will by necessity only be alerted to and able to respond through standard mail.
For all of these reasons, The Cornucopia Institute respectfully requests that the USDA and APHIS to extend by 30 days the public comment period on the GeneticallyEngineered Glyphosate-Tolerant Alfalfa Environmental Impact Statement. This would provide an end date of March 16, 2010 for public comment.
An expedited response to this request would be greatly appreciated because of the lead time, and expense, required, as a small public charity, to communicate with our

membership and other organic livestock producers/alfalfa growers. (Comment Number: APHIS-2007-0044-12470-1)

Response: Regarding the public comment period, see the response to comment APHIS-2007-0044-0948-8 for issue 2.4.

Comment Excerpt Text:
NOTE:Your bar on the left hand side asking for state or province does not allow me to typ "Colorado." I had to choose "Hawaii" to complete this form. (Comment Number: APHIS-2007-0044-1578-1)

Response: APHIS apologizes for any problems encountered with the submission of comments. A few commenters did encountered problems with the electronic menus used for this project. Changes were made to the comment process as difficulties came to our attention. We have noted the commenter's appropriate geographical association and made corrections in the administrative record.

Comment Excerpt Text:
Lastly, I would like to ask that you extend the consumer comment phase of the deregulation process. Comment Number: APHIS-2007-0044-3024-1

Response: See the response to comment APHIS-2007-0044-0948-8 for issue 2.4.

Comment Excerpt Text:
Also the public to become informed- please extend the deadline and release the plant pest determination for comment. (Comment Number: APHIS-2007-0044-3225-2)

Response: See the response to comment APHIS-2007-0044-0948-8 for issue 2.4.

Comment Excerpt Text:
good idea,
but your state drop down does not work and will not let me put nebraska in the state. (Comment Number: APHIS-2007-0044-3271-1)

Response: See the response to comment APHIS-2007-0044-1578-1 for issue 2.4.

Comment Excerpt Text:
PLEASE forward to USDA could NOT type in govt agency and pull down menu did NOT work. (Comment Number: APHIS-2007-0044-3734-2)

Response: See the response to comment APHIS-2007-0044-1578-1 for issue 2.4.

Comment Excerpt Text:
Please also extend the comment period. (Comment Number: APHIS-2007-0044-4417-2)

Response: See the response to comment APHIS-2007-0044-0948-8 for issue 2.4.

Comment Excerpt Text:
I am a small beekeeper located in Wisconsin (one of the top 10 honey production states). The loss in honeybees last year was 50%. We are still unsure of the reason, but GMO corn may be a culprit. Until we can determine for a fact that genetic modification of forage crops is not contributing to the decline of honeybees, we cannot afford to authorized another crop.
At a minimum, I am requesting that USDA extend the comment period to allow more commentary on something that may radically effect an insect that is necessary for the production of food crops. (Comment Number: APHIS-2007-0044-5067-1)

Response: Regarding the request to extend the comment period, see the response to comment APHIS-2007-0044-0948-8 for issue 2.4. In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for issue 3.1.

Comment Excerpt Text:
I am very concerned about the introduction of GE alfalfa. I do everything I can to avoid eating genetically modified foods and animals that eat genetically modified foods. I will boycott this and any other genetically modified plant and its resulting products.
Genetically modified foods need to be submitted to strict tests for safety and need to be regulated to prevent contamination with other non-gentically modified crops. Right now, farmers and consumers have no protections against gentically modified foods.
GE alfalfa would take away the property rights of organic farmers who can do little to nothing to prevent their non-GMO crops from being cross-polinated by GMO crops. It would also take away consumer's freedom to choose products that did not come from or are not GMOS. Contamination in organic alfalfa by GE alfalfa would be devestating to organic farmers who need to feed their cows non-GMO alfalfa.
The USDA was created to protect farmers, not drug or seed companies. The USDA needs to be open about GE alfalfa and it's negative effects on the environment and human health through increased pesticide use. The USDA needs to be open and honest and allow farmers and consumer to know the truth about GE alfalfa and all GMOs. Extend the comment period and stand up for real farmers. (Comment Number: APHIS-2007-0044-5275-1)

Response: In regard to the adventitious presence of GE alfalfa with non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to impacts on organic farming, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to the request to extend the comment period, see the response to comment APHIS-2007-0044-0948-8 for issue 2.4. Since the DEIS provides an environmental analysis of the adverse impacts to the environment from increased pesticide use, APHIS maintains that the public has been adequately informed.

Comment Excerpt Text:
I am writing to register my opposition to allowing genetically-modified plants/crops in the United States. To allow such a practice is alarming to me.
As a concerned consumer, I actively look for and purchase organic foods as much as possible and also look for information that a plant food and its ingredients have not been genetically modified and irradiated.
There is absolutely no reason to allow foods to be genetically modified, except to allow a major company greater profits without any concern for the end consumers in this country. To allow GM foods in the United States will create health concerns in this country. This country needs to get in tune with the rest of the world, such as Europe that prohibits GMO food/crops. Increasing the use of herbicides for GMO crops further pollutes our water, our food, our health. In a time when Americans are getting sicker and fatter all the time, this country needs to take a responsible, educated approach and ensure that consumers have food grown and available that is as natural as possible.
We do not need GMO foods. We need to protect small family farmers, conventional farmers, and organic farmers from the dangers of cross-contamination of GMO crops. To do so, the USDA must simply prohibit GMO crops in the United States to protect farmers and the consumers.
I am requesting that you extend the comment period for another 30 days. With the recent release of your document over the holidays, the public needs additional time to be aware of this issue and have time to review the document.
I would also request that you release the PLANT PEST DETERMINATION document so that the public can review that document and understand the basis for how the USDA intends to recommend GM alfalfa, a decision that I encourage you to reverse. (Comment Number: APHIS-2007-0044-5372-1)

Response: Regarding the request to extend the comment period, see the response to comment APHIS-2007-0044-0948-8 for issue 2.4. Regarding the health effects of GT alfalfa and glyphosate, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
Please protect my family from the harmful effects of GE alfalfa and please extend the comment period so that more consumers are aware of this issue. (Comment Number: APHIS-2007-0044-6563-1)

Response: Regarding the request to extend the comment period, see the response to comment APHIS-2007-0044-0948-8 for issue 2.4. Regarding the effects of GT alfalfa on humans, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0 and the response to comment APHIS-2007-0044-11034-2 for issue 6.1.

Comment Excerpt Text:
By all accounts the EIS conducted by APHIS has been thorough. Furthermore, the subsequent 75-day comment period (a full 30 days more than the required 45) and 4 listening

sessions are reasonable and give stakeholders ample time and opportunity to provide feedback. (Comment Number: APHIS-2007-0044-7091-1)

Response: APHIS acknowledges the comment. As noted in response to comment APHIS-2007-0044-0948-8 for issue 2.4, a full 75 days were given for public comment.

Comment Excerpt Text:
No Spray Zone is a non-profit citizen group dedicated to ecologically sound pest management practices that do not compromise public health. Our members are very concerned about their ability to buy organic and non-GM foods.
First, we request that the USDA extend the comment period beyond February 16, 2010 to allow more consumers to comment on this vital food security issue. (Comment Number: APHIS-2007-0044-7408-1)

Response: Regarding the request to extend the comment period, see the response to comment APHIS-2007-0044-0948-8 for issue 2.4.

Comment Excerpt Text:
In my opinion insufficient time has been given to respond to a 200 page document, and additional time should be given to allow comment. (Comment Number: APHIS-2007-0044-7446-1)

Response: Regarding the request to extend the comment period, see the response to comment APHIS-2007-0044-0948-8 for issue 2.4.

Comment Excerpt Text:
We feel strongly that a 60 day comment period for a 2000 page document released over the holidays is not sufficient time to educate people and prepare statements based on available information. (Comment Number: APHIS-2007-0044-7955-1)

Response: Regarding the request to extend the comment period, see the response to comment APHIS-2007-0044-0948-8 for issue 2.4.

Comment Excerpt Text:
The USDA's Environmental Impact Statement on genetically engineered alfalfa paves the way for the unregulated commercialization of Monsanto's Roundup Ready alfalfa. As a consumer of organic food, I strongly oppose this action because it will result in the genetic contamination of organic food.
With respect for the views of the Secretary of Agriculture and other proponents of genetically modified crops, this issue is too important to push through over the objections of millions of consumers, and thousands of experts; and especially so because the effects on the environment, and human health will be almost completely irreversible. It is extremely irresponsible to take

such measures at this time. Please reconsider and invite more research and opinions from experts who disagree with the Secretary's position on this issue. (Comment Number: APHIS-2007-0044-9305-1)

Response: APHIS acknowledges the comment. In regard to consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to the adventitious presence of GE alfalfa with non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response) and APHIS-2007-0044-0677-1 for issue 6.1. In regard to the effects on human health, see response to comments APHIS-2007-0044-0278-1 for issue 6.0 and APHIS-2007-0044-0382- for issue 6.0.

3.0 Issue 3 – Plant Genetics and Gene Flow

Comment Excerpt Text:
There are over 20 types of herbicides other than Roundup.
Weed resistance to roundup is unrivaled by any other herbicide because of over use.
Alfalfa is a perinnial not an annual. RR alfalfa will EVENTUALLY contaminate all conventional alfalfa. How did the conventional alfalfa get planted along side all the roads in Noth America? There is no way to enforce fields from going to seed. Self enforcement for (stewardship) is a joke. Just look at the fields that have gone to seed because of a lease lost or bank repo.
Keep the technology in annuals---not perinials!!!!!!!!!! (Comment Number: APHIS-2007-0044-0337-1)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6.

In regard to the comment on GE annual versus perennial plants, APHIS evaluates GE plants for plant pest risk. This assessment includes the biology of the plant that is transformed. Perennial habit alone does not increase the likelihood of a plant establishing feral populations or of persisting in the environment. Annual plants also can form feral populations or establish in the environment. Therefore a policy based on perennial habit alone would not be supported by science.

In regard to alfalfa volunteer weeds, see the response to comment APHIS-2007-0044-10263-8 for Issue 3.4.

Comment Excerpt Text:
I live in North Central Iowa, teach at North Iowa Area Community College in a Health Program and am extremely concerned about the prospects of Round-Up Ready (RR) alfalfa and the impact it would have on the health and well-being of my family, my neighbors, and farmers.
From my perspective, Big Ag bureaucrats do not stop to think about the true environmental impact, soil health, human health, and the overall health of all living things when making decisions about approving the use of a product such as this.
I agree with many of my friends and family who believe that dollar signs drive this enterprise, not compassion, and most certainly NOT a concern for human health.
There are studies which show that nutritional value declines in GM crops; that the Cauliflower Mosaic Virus used in DNA recombination of RR crops is disruptive to the intestinal flora and reactivates other dormant pathogens in livestock. RR species have proven to be adeptly promiscuous in spreading their genetics, and if allowed will compromise all pure seed supplies of alfalfa in only a handful of years. Round-Up has proven toxic to amphibians and pollinators, two integral components of healthy wetlands and prairies.
Then there is just what my logical cognition tells me to be concerned about, which is that the pesticides infused in these GMO products are NOT a good thing to have in our food system. We dont yet understand the full impact of how products such as RR crops can affect the health of all

living things and until we understand, it would only make common sense to NOT allow their use. If you even suspected someone was poisoning you, would you just sit there and wait to see what the outcome might be?
I encourage that a decision be made based on the current research data and the potential for harm that products such as this could have. We need to consider what type of an environment we are passing on to future generations, one that is healthy or one that has been modified and compromises the health of all living things. I stand against RR alfalfa (Comment Number: APHIS-2007-0044-0382-1)

Response: In regard to the comment that Roundup is toxic to amphibians and other pollinators, see the response to comment APHIS-2007-0044-0352-1 for Issue 6.3

In regard to the comment that GT alfalfa is less nutritious, see the response to comment APHIS-2007-0044-11037-18 for Issue 6.3.

With regard to the comment on Cauliflower Mosaic Virus see response to comment APHIS-2007-0044-0382-1 for Issue 6.0.

In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for Issue 5.2.

Comment Excerpt Text:
We are very much opposed to using any Roundup Ready seed, mainly because we have maintained the integrity of our own seed for many generations. We have a strain that obviously could not be duplicated given today's adulteration and modification of many seeds being marketed.
We are required to leave our fields non-contaminated by using the purest seeds and fertilizers, and our adjoining neighbors are complying with this practice as well to insure that the soil and water remains safe for us and future generations (Comment Number: APHIS-2007-0044-0393-1)

Response: APHIS acknowledges the comment. Communication with neighbors is an important component of coexistence. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
As a shareholder in a small dairy I am concerned about GE alfalfa. Our cows are pasteured in the warmer months and eat sileage in the winter. One of the reasons I own a share in this herd is because they are fed properly so I can eat properly. I have actively sought foods that have not been genetically engineered.
My concern with GE alfalfa rests on the knowledge, from gardening and farming for many years, that anything introduced into an ecosystem will disperse itself if conditions are favorable for its growth. GE alfalfa, growing in a field next to my grazing cows, will soon be part of their forage.

Glyphosate-Tolerant alfalfa would be able to out compete conventional alfalfa in areas where chemical drift has occurred. This is a common problem and a growing concern among growers and consumers alike.
Genetically Engineered crops are untested for long term effects on the environment and those that eat them. They also appear to be extremely difficult to eradicate from areas in which they are unwanted. Planting a GE crop is akin to planting Queen Ann's Lace next to a carrot field destined for seed production. Those carrots will never again have the sweetness desired by those of us who will eat them.
Please take some time and think about the ramifications of allowing Glyphoste-Tolerant afalfa into commercial production. Contamination of conventional alfalfa with Glyphosate-Tolerant alfalfa is not reversable. As farmers and consumers we will lose our ability to choose.
I am confident that the USDA is interested in the views of all parties. Speaking only for myself as a consumer I feel more testing must be done before I will feel confident in the long term effects of any genetically modified crop, including Glyphosate-Tolerant alfalfa (Comment Number: APHIS-2007-0044-0410-1)

Response: Unlike the example of Queen Ann's Lace next to a carrot field where seeds will be produced, gene flow from GT alfalfa to a pasture is unlikely if it is grazed before seed is set. Gene flow requires that pollination occurs, the seed develops, and the seed germinates and establishes as a plants. When pastures are frequently grazed they are unlikely to set seed. In regard to gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
Alfalfa is a crucial animal feed for my organic operation. My customers demand non-GMO feeds for my meat and dairy animals. The ubiquity of roundup-ready crops, the control of the US's seeds and food crops by a few multinational corporations, and the trivialization of cross-pollination with older heirloom varieties of these crops is truly frightening. Please stand with American farmers AGAINST Monsanto's hijacking of crop genetics and seed saving. American Farmers DON'T WANT GMO crops. I expect due diligence from my governmental regulatory agencies to fully study the longterm invasion of extant varieties by the new GMO varieties, and to fully study the longterm health impacts to livestock and human health. NO GMO. (Comment Number: APHIS-2007-0044-0443-1)

Response: APHIS acknowledges the comment. Under the appropriate conditions, cross-pollination can occur between any sexually compatible varieties of crops and is not specific to GE varieties. This includes cross-pollination between heirloom varieties and nongenetically engineered modern varieties as well as GE varieties.

In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

In regard to the effects of GT alfalfa on human and animal safety, see the response to comment APHIS-2007-0044-0278-1 for Issue 6.0

In regard to the adventitious presence of GT alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I am writing in opposition to the planting of genetically-engineered (GE) Roundup Ready alfalfa, given the increasing evidence that GE alfalfa will threaten the rights of farmers and consumers, as well as damage the environment.
Allowing Roundup Ready alfalfa to be grown without regulation would be the end of farms that choose not to use Monsantos products. Since bees spread pollen over long distances, its inevitable that the GE pollen will invade conventional and organic alfalfa, making it virtually impossible to grow non-GE alfalfa in just a few years.
What's more, GE alfalfa threatens the organic industry, where products must not be polluted by genetic modification. In order for milk and other dairy products to be marketed as organic according to the USDA's own standards, no less! certified organic alfalfa must be used as forage. When contamination of GE alfalfa becomes widespread, organic dairy farmers will no longer be able to give that assurance.
I urge you to support family farms as well as consumers right to know whats in their food by preventing the planting of GE alfalfa.
(Comment Number: APHIS-2007-0044-0476-1)

Response: In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1. In regard to impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for Issue 5.0.

Comment Excerpt Text:
I take exception to in the DEIS for glyphosate tolerant alfalfa.
1. Alfalfa is somewhat tolerant of glyphosate now. Monsanto should not be allowed to take credit for what already exists. It should be known what is responsible for the current tolerance and Monsanto should not be allow to claim that tolerance.
2. Is there some reason the Monsanto seed cant be made mule sterile? Seems possible from a company that can alter genes.
3. Alfalfa can bloom in 20 days if the weather conditions are right. Escape stalks and those that are knocked down in the harvest process will bloom even quicker.
4. The claims that no till in roundup ready alfalfa help in controlling erosion are incorrect. No one tills alfalfa now except to level fields that are rough from gophers etc. Roundup ready alfalfa will receive the same treatment.
5. Bindweed is not removed with glyphosate. The weed claims are incorrect.
6. The cost of Round up Weather max is higher than using Diuron for winter annuals and Clethodim for grass. Cost is $2 per acre per year more for Weather Max.
7. A 6-year life of the stand amortized with 8% interest makes glyphosate tolerant fields cost $71.68 more over the 6 years. Assumes normal seed cost $3.00 per pound. The extra spent on glyphosate seed could be used to pay off debt or saved. About $6.20 per acre forever.
8. The better weed control from use of glyphosate is deceptive, because the people that have a problem now are not using what is available and already on the market. Conditions that prevent

correctly timed and use of chemicals now will not change, like weather, timing and laziness or unwillingness to pay the cost.
9. I wonder if a study of the tree losses (Pine Ash Oak Etc.) has been looked into. Glyphosate is probably not the culprit, but the agrobactrium that injects the snippet of DNA into the alfalfa gene is also responsible for burls on the trees. It has been altered with salmonella DNA and may be responsible for the mutation of other disease (Comment Number: APHIS-2007-0044-0511-1)

Response: In regard to comment 1 that alfalfa is already glyphosate-tolerant, Alfalfa events J101 and J163 were engineered to be glyphosate-tolerant by inserting a gene into the alfalfa genome that codes for the enzyme 5-enolpyruvylshikimate-3-phosphate synthase (CP4-EPSPS) that continues to function in the presence of glyphosate. This tolerance is higher than tolerance that occurs naturally in alfalfa. For more information, see Appendix W in the FEIS.

In regard to comment 2, that alfalfa should be made sterile, plant reproduction is genetically complex and it has been shown to be virtually impossible to block plant fertility 100 percent. In regard to comment 3, that alfalfa can bloom in 20 days, data used in the FEIS do not support your comment.

In regard to comment 4, Appendix V.2.1.1 of the FEIS states that weed-free alfalfa stands may result in longer stand life, which may subsequently result in less tillage and will help with controlling erosion. More information on conservation andno till can be found in Appendix J.3.2.3.

In regard to comment 5, the FEIS supports your comment as Appendix G lists bindweed as one of 18 weeds that are both resistant to glyphosate and are traditionally listed as problems in alfalfa.

In regard to comments 6 and 7, Appendix K of the FEIS analyzes production costs. Although the values and assumptions are not expected to be applicable to all cases, the analyses is intended to illustrate the economic factors affecting the decision to adopt or not adopt GT alfalfa. The rate of adoption would be affected by farmers in varying circumstances finding it in their economic interest to adopt or not adopt GT alfalfa. The rest of the economic analysis remains valid under both a low or high rate of adoption.

In regard to comment 8, FEIS appendix J.2.7.2 states that GT alfalfa is not expected to be adopted in areas where alfalfa is minimally managed and where inputs are low. In terms of whether growers follow Monsanto's Best Management Practices, it is a contractual agreement between the grower and Monsanto, so the consequences of not following the agreement are determined by Monsanto. Updated information on farmer compliance can be found in appendix V of the FEIS.

In regard to comment 9, regarding pine tree losses, it is true that Agrobacterium is responsible for crown galls in some species of trees. However, the Agrobacterium used in the transformation process of GT alfalfa was nonvirulent as it lacked pathogenicity genes. Additionally, Agrobacteria were eliminated from plant tissues after transformation. For more information on

plant transformation and the DNA used to develop the GT alfalfa plants see appendix W of the FEIS.

Comment Excerpt Text:
I am writing in support of deregulation of Roundup Ready alfalfa for the benefit of Colorado alfalfa and cattle producers. I have conducted weed science research at Colorado State University for 24 years and most recently have worked with Roundup Ready alfalfa since 2003. Roundup Ready alfalfa production is efficient, effective, and impressive for several reasons. First, crop safety is excellent from the small seedling stage to 6 year old stands I am doing research on. Second, weed control is excellent and superior to current weed control in conventional alfalfa. Third, the Roundup Ready alfalfa production system virtually guarantees production of high value dairy quality hay with every cutting. In three years of research comparing conventional alfalfa to Roundup Ready alfalfa, there is a consistent yield and weed control advantage for Roundup Ready alfalfa. Glyphosate is a very safe herbicide for use in Roundup Ready alfalfa, providing excellent weed control. Establishment of a new alfalfa stand is very easy with Roundup Ready alfalfa; you spray the new stand when it is quite small, killing all the weeds and leaving just alfalfa plants to establish. We are able to get 2 alfalfa cuttings in Colorado in the year of establishment. Finally, as alfalfa stands begin to decline after 3-5 years of production, weeds will begin to invade a thinner alfalfa stand and reduce forage quality. With the application of glyphosate, one can keep these weeds from dominating the field. We know that cutting an alfalfa stand 3-5 times per growing season helps provide additional weed control. My opinion is that the Roundup Ready alfalfa system provides a grower with maximum flexibility. If weed are present and pose a problem, then spray with a recommended rate of glyphosate. If weeds are not a problem, do not apply glyphosate. This provides maximum income potential for the grower while helping to protect the environment in a sustainable manner. I support deregulation. (Comment Number: APHIS-2007-0044-0584-1)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment.

Comment Excerpt Text:
I'm writing to protest the move to make genetically modified alfalfa to non regulated status. This move is specifically aimed at benefiting Monsanto. Pollen from genetically engineered crops has been shown to affect other crops farther away. This natural occurrence of wind spread pollen POLLUTES unsuspecting farmers who are then SUED by Monsanto. Organic farmers and especially livestock and dairy farmers will suffer if GE alfalfa is unregulated and allowed to spread to other alfalfa fields. Genetically engineered crops should be a regulated biohazard as it can spread unchecked and pollute the genetics of other nearby fields.
The entire farming industry suffers from the current business practices in the genetically engineered crop industry.
I want to feed my baby organic dairy and organic foods and meat. Please do not make it more difficult to find these products. (Comment Number: APHIS-2007-0044-0595-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0. In regard to impacts on organic farmers and downstream sources (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

In regard to the adventitious presence of GT alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-6376-1for Issue 5.1 (paragraph 1 of the response).

In regard to lawsuits from Monsanto, see the response to comment APHIS-2007-0044-6376-1 for Issue 5.1.

Comment Excerpt Text:
As a grazer within the agriculturally rich state of Kansas, I am opposed to the deregulation of the two lines of genetically engineered alfalfa. A genetically engineered forage species, of which alfalfa is one of the most important, will end up economically and agronomically hurting livestock producers, especially grazers. Also, the long-term environmental and health implications of introducing foreign genes into ecosystems and our food systems has yet to be established.
From an economic and agronomic perspective, a good grazer is reliant on the reasonably priced availability of a wide variety of forages species and varieties uniquely adapted to specific climates and soil types. Livestock producers and particular grazers have small profit margins, and are not positioned to pay the high overhead costs that have driven the genetically engineered grain seed markets. Grazers will not be able to collect their own forage seed, and an open pollinating plant like alfalfa will cross pollinate non-GE alfalfa varieties reducing the availability of regionally adapted varieties. Higher seed costs, the loss the ability of grass/forage farmers to use their own seed, and the potential loss of regionally adapted varieties will negatively impact farmers.
Perennial forages such as alfalfa are much different plants than annual grain crops. These plants have complex and long term interactions with natural ecosystems. Introducing foreign genes into these plants may well have long term negative interactions with the environment that cannot be realized over a short-term study. In addition, a gene resistant to a pesticide will encourage greater reliance and use of pesticides which studies continue to reveal may have more negative impacts on the environment and our own health (Comment Number: APHIS-2007-0044-0622-1)

Response: Introduction of a GE trait into a crop species does not necessarily result in reduction in genetic diversity of available varieties because the trait can be crossed into any variety. However it is true that if the trait is very popular, then the same variety but without the GE trait may no longer be produced due to low market demand. Varieties that are optimized for regional needs may still be available in non-GE forms. Farmers that grow varieties that are not subject to Technology User Agreements are able to harvest their own seed. The issue of adventitious presence in seed stocks is discussed at length throughout the FEIS. In particular Section IV.B.4 and appendix V discuss pollen mediated gene flow between fields.

In regard to the impacts on beef markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.
In regard to the link between glyphosate and health effects, see the responses to comment APHIS-2007-0044-0278-1 for Issue 6.0.1.
In regard to the impacts of GE crops on the environment, see the response to comment APHIS-2007-0044-5302-1 for Issue 4.0.

In regard to impacts on non-GT alfalfa hay and seed markets, see response to comment APHIS-2007-0044-9882-1 for Issue 5.0.
In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
I am an owner of a certified organic and a non-gmo seed company in the Midwest. We market our products across the US. I have chosen these lines of seed materials to fill specific markets in the agriculture sector. I am not against the use of gmos for those who wish to use them as long as they do not limit the opportunity for me and my customers to choose in a similar manner. We have found ways to co-exist with GE soybeans and seed corn, although the burden of proof far too often comes upon the organic/ non-gmo producer.
RR alfalfa is a whole different issue. Once in the market place, this material will limit and eventually remove any choice I, as a seed supplier, can offer to our customer base. We are already struggling to find quality alfalfa seed producers and this will continue to discourage any new producers who may be interested in our production. The risks of contamination are far too great and once contaminated there is no recourse. We cannot control where a bee will travel and what pollen it is carrying. Adventitious drift is one thing; deliberate pollination by an unsuspecting bee just going about its natural course is another. My, and my customer's choice is gone (Comment Number: APHIS-2007-0044-0692-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0. In regard to the burden of control measures, see response to comment APHIS-2007-0044-11689-10 for Issue 9.0.
In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1.

Comment Excerpt Text:
Dear USDA
I am very very concerned about the contamination of organic and even standard food by Monsanto's genetically engineered "roundup ready" alfalfa, and any other genetically engineered food. I do not want engineered food in what I eat. I do not trust it, and I do not trust Monsanto to keep its product contained. How can it? Can it control the bees that visit the plants, some of them able to cross -pollinate at distances of 6 miles? Can it control the winds, or the birds that might eat the seed and then carry it elsewhere? In fact, wherever Monsanto's genetically engineered seeds have been used, there has been contamination. There are more than 200 cases of cross pollination in the last decade.
So, no, do not allow the use of genetically engineered alfalfa. Do not allow Monsanto to dictate the rules. I do not want milk from cows that ate transgenic food. I do not want meat from cows that ate transgenic food. I do not want eggs from poultry that ate transgenic food.
It is your job to protect me, the consumer, and to protect the farmers who want to have the right to grow organic if they choose. Please, do your job (Comment Number: APHIS-2007-0044-0803-1)

Response: In regard to gene flow due to unintentional mixing and distribution of seed, see the response to comment APHIS-2007-0044-10263-5 for Issue 3.2. In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1.

Comment Excerpt Text:
Contamination of organic alfalfa by GM alfalfa is unacceptable to both consumers and farmers of organic alfalfa and organic meat and dairy products. There are not sufficient practices guaranteed to prevent contamination of organic alfalfa, as evidenced by the widespread contamination of organic canola, soy and corn by GMO pollen. The contamination of organic crops with GM pollen is a significant issue which needs to be addressed by the USDA prior to allowing GM alfalfa to be grown in the US.
Additionally, as incidences of glyphosate resistance in weeds continue to increase, the need for non-glyhposate weed management tactics is increasingly imperative. The expansion of herbicide tolerant crop species to include alfalfa will increase the selection pressure for glyphosate resistance in weed populations, rendering glyphosate ineffective, as has been the case for previous herbicides and pesticides. The argument that glyphosate tolerant alfalfa will replace more toxic herbicides may be true in the short-term, however it will also hasten the inevitable loss of glyphosate as an effective weed management tool in the longer-term, actually hastening the return to use of more toxic herbicides.
As a citizen in Wisconsin, where more acres of alfalfa are grown than in any other state, and where the dairy industry is a central part of the social and economic fabric of our communities, I urge you to reconsider your evaluation of the impact of glyphosate tolerant alfalfa, and I do not support its release. (Comment Number: APHIS-2007-0044-0814-1)

Response: In regard to past adventitious presence cases, see the response to comment APHIS-2007-0044-9936-10 for Issue 11.15. In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0. In regard to increased use of glyphosate, see the response to comment APHIS-2007-0044-0402-1 for Issue 6.3. In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response to comment APHIS-2007-0044-9936-19 for Issue 3.6.

Comment Excerpt Text:
I buy organic produce, often from small farms. I am very concerned that genes inserted into alfalfa plants will migrate into organic feedstocks and produce. I want the freedom and information to chose non-genetically modified produce, and meats and dairy produced without genetically modified feed.
I do not believe the current study adequately protects organic farmers from the loss of market value should their crops become contaminated and no longer organic. The "USDA Organic" label should mean no genetic modification anywhere in the production cycle, not even from accidental contamination.
Furthermore, I am very concerned that migration of genes from alfalfa to other plants, bacteria, animals, and fungi may occur, and the manufacturer will be utterly incapable of removing these genes from circulation should a future problem arise. (Comment Number: APHIS-2007-0044-0863-1)

Response: In regard to gene flow due to pollen, see response to comment APHIS-2007-0044-12026-7 for Issue 3.0.
In regard to organic markets, see response to comment APHIS-2007-0044-0863-1 for Issue 5.2.

Comment Excerpt Text:
If glyphosate-tolerant (Roundup Ready) alfalfa is deregulated, there will be contamination of conventional alfalfa fields--fields providing vital nutrients to organic dairy operations and beef operations. I am a consumer of organic dairy and meat products because I consider the purchases I make with my food dollars to be a form of voting. I vote for organic products because when practiced correctly, organic agriculture requires a smaller-scale, closer relationship between the farmer and his farm. In a word: husbandry. If USDA deregulates glyphosate-tolerant alfalfa, my vote for organic dairy and meat products will become as meaningless as a ballot with "hanging chads." Organic means 100 PERCENT ORGANIC--that's the purpose for the Organic Standardand the implication of the USDA organic seal. We are not living in an "open range" era, where traits from one farmer's crop should be able to enter a neighbor's field. Only if, or when, transgenic crops can be contained within the fields of the producers growing those crops should more transgenic crops be deregulated. Meanwhile, I expect the USDA to protect organic farmers and all farmers who choose to grow non-transgenic crops. Protecting those farmers will ensure that consumers' rights are simultaneously protected. The best way for the USDA to ensure that protection is to STOP relying on Monsanto's business-as-usual "best practices," which will only guarantee widespread contamination. In other words, when it comes to the commercialization of transgenic crops, USDA should function as the regulatory agency it is: regulate, don't vacillate. (Comment Number: APHIS-2007-0044-0913-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response). In regard to the National Organic Program, see response to comment APHIS-2007-0044-10866-5 for Issue 3.3.

Comment Excerpt Text:
Scientist finding many negative impacts of Roundup Ready GM crops
GM Watch
Friday, 08 January 2010 13:52
http://www.gmwatch.org/index.php?option=com_content&view=article&id=11840:scientist-finding-many-negative-impacts-of-roundup-ready-gm-crops
What types of things are you seeing in the Roundup Ready system?
RK: “This system is altering the whole soil biology. We are seeing differences in bacteria in plant roots and changes in nutrient availability. Glyphosate is very systemic in the plant and is being released through the roots into the soil. Many studies show that glyphosate can have toxic effects on microorganisms and can stimulate them to germinate spores and colonize root systems. Other researchers are showing that glyphosate can immobilize manganese, an essential plant micronutrient.”
What are glyphosate's impacts on beneficial soil bacteria?

RK: “The most obvious impact is on rhizobia, a bacterium that fixes nitrogen. It has been shown that glyphosate can be toxic to rhizobia. (Nitrogen fixing bacteria are important to soils because nitrogen is the most commonly deficient nutrient in many soils.)”
What about research showing increased incidence of Fusarium in Roundup Ready GM crops?
RK: “We've taken field surveys and seen an increase in Fusarium with the use of glyphosate. Some Roundup Ready varieties even without using glyphosate tend to be more susceptible to being impacted by Fusarium. It could be an unintended consequence of genetic manipulation that could make it more susceptible.”
Your paper also mentioned the potential of glyphosate to contaminate groundwater.
RK: “Yes, under certain circumstances. The big assumption for claims that glyphosate is benign is that it isn't immediately absorbed by the soil. But research is showing that isn't necessarily true; that it is still available in the soil. If soil is full of phosphorous, glyphosate could leach into ground water. For example, farmers may use manure from confined animal feeding operations as a fertilizer. The soil will then contain high amounts of phosphorus, which overwhelms the soil. Any glyphosate that hits the soil will be a potential contaminant. It can stay in the soil or it might run off into streams or waterways.”
What about glyphosate resistant weeds?
RK: “We have eight different species of glyphosate resistant weeds in Missouri. Some species of Johnson Grass are found in fields where Roundup is used year after year. It is a very aggressive weed. To solve the problem of weed resistance, genetic engineers are developing soybeans that tolerate Roundup and Dicamba, another herbicide. They are incorporating another gene resistant to another herbicide. When resistance happens again, will they then develop a plant resistant to five or six herbicides? It's an illogical circle.” (Comment Number: APHIS-2007-0044-0933-7)

Response: In regard to soil biology, the news article provided by the commenter does not include citations of actual studies. The points in the article, however, are covered in responses to other more specific comments under Issue 3.6, Issues 4.1 through 4.4, and Issue 8.3. In regard to future creation of varieties with multiple transgenes, see response to comment APHIS-2007-0044-9936-20 for Issue 13.

Comment Excerpt Text:
Comments on document ID APHIS-2007-0044-0253 “Glyphosate-Tolerant Alfalfa Events J101 and J163: Request for Nonregulated Status -- Draft Environmental Impact Statement”

Gene flow
The EIS confidently states that “contractual ‘best practices’ have been found to produce non-GT alfalfa seed with >99.5 percent purity.” This figure apparently is based on a claim by a GT alfalfa producer, using a separation distance of 900 feet between glyphosate-tolerant (GT) and non-GT alfalfa seed fields; 1 mile separation if Alkali bees are employed; and 3 miles if honey bees are pollinating.

It is not acceptable for APHIS to rely solely on industry claims, given the obvious conflict of interest. Indeed, this industry based claim is readily refuted.

Numerous experts have documented that bees fly much further. A classic 3-year study [Eckert, 1933] found bees forage up to seven miles. Another [Chaney 1985] found that bees placed for alfalfa pollination collected 10 times more safflower pollen as alfalfa pollen, even though the nearest safflower field was 5 miles away.

In yet another study specifically designed to study pollen movement from alfalfa seed production fields, Hammon et al [2006] found the GT alfalfa gene at 83% of all collection sites, out to a distance of 1.7 miles. Yet the farthest distance bees can move pollen could not be determined, since the RR gene was found at the most distant site from the nearest pollen source/seed field. The RR seed was present at 19 of the 23 collection sites; the percentages ranged from 0.18 to 9.46%.

The 99.5 percent purity rate is no more realistic as a standard than 9.46%. To be based on sound science, “Best Practices” must require what science shows as typical bee foraging behavior: a minimum of 7 miles as a buffer zone around all GT alfalfa fields.

Even with a minimum of 7 mile buffers, significant gene flow is inevitable from birds, weather and other unpredictable factors.

There is not a single deregulated GE plant that has not significantly contaminated the rest of the seed supply. Most recently, this was demonstrated to be true even with an unapproved variety of experimental GE rice that contaminated fields in five states.

But contamination is widespread even with self-pollinating crops such as soy. The Union of Concerned Scientists reports that two respected laboratories have found GE traits in at least 50 percent and as much as 83 percent of the traditional soybean seeds bought by farmers. The UCS says it’s likely the contamination is a symptom of generally porous seed production and distribution systems. (Comment Number: APHIS-2007-0044-11328-1)

Response: In regard to behavior of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1. In regard to past adventitious presence cases, see the response to comment APHIS-2007-0044-9936-10 for Issue 11.15.

Comment Excerpt Text:
Comments of the Stanislau County Farm Bureau regarding APHIS-2007-0044 - Determination of Regulated Status of Alfalfa Genetically Engineered for Tolerance to the Herbicide Glyphosphate.

Other plant scientists and researchers provide further scientific documentation supporting APHIS's deregulation decision. In a peer-reviewed study, the Council for Agricultural Science and Technology (CAST), published a peer-reviewed study titled "Gene Flow in Alfalfa: Biology, Mitigation andPotential Impact on Production" (Special Publication No. 28, September 2008). In its study, CAST reports, "Alfalfa is not sexually compatible with any other wild or cultivated plant species in the United States (McGregor 1976). Unlike the majority ofbiotech crops grown today, the primary commodity for alfalfa is forage hay, not seed. The fact that the production of

viable seed is required for gene flow has large implications for potential gene flow in alfalfa. Although the potential for seed-mediated gene flow does exist, best management practices in the cleaning and management of seed harvesting and processing equipment are effective in managing admixtures between GE and conventional alfalfa seed. Coupled with cultural and rotational practices to manage volunteer seedlings, seed-mediated gene flow in alfalfa likely will be very low."

"Because hay is grown primarily for forage use and since it produces its optimum quality at the pre-to"early bloom state the likelihood of gene flow is largely non-existent."

The CAST report further states, "The predominance of hay versus seed acres and commonlyused harvest timing for hay production suggests, that at anyone time, more tIian 99% ofU.S. alfalfa (compare total hay and seed acres, USDA-NASS 2007a) is likely to be without flowers , (vegetative) or in an early stage of flower development. It is therefore atypical, sporadic, and rare that managed hay fields sustain flowers or, subsequent to flowering, produce any viable seed."

"Although the potential for pollen-mediated gene flow from feral alfalfa or hay-to-seed production exists, it commollIy is controlled through various management practices and is limited by the low relative pollen abundance ofthe source versus recipient seed production fields during flowering. The primary mechanism for pollen-mediated gene flow in alfalfa is from one seed field to another."

"Gene flow is managed proactively in conventional commercial seed production to optimize varietal genetic purity. The key mitigation strategy used to manage gene flow commercially 'is the planned spatial isolation of one seed production field from another. Results from several gene flow experiments have provided pollinator-specific, science-based isolation guidelines designed to minimize gene flow from GE alfalfa to conventional varieties. These isolation distances have been adopted by the industry for RRA seed production and serve as a model for future biotech crops in alfalfa. The National Alfalfa and Forage Alliance (NAFA) Best Management Practices protocol also calls for regular testing ofAP in conventional seed lots using publicly available test kits to assess the adequacy of stewardship standards (NAPA 2008). This testing ensures a dynamic process to monitor and, if necessary, to adjust the isolation requirements for GE alfalfa seed production."

According to the CAST authors, understanding potential gene flow in alfalfa hay and seed production is an important first step in developing management strategies designed to mitigate gene flow. The authors conclude that sufficient scientific data are available to design these strategies and, as outlined in this document, those strategies will be successful in managing gene flow from GE to conventional alfalfa hay and seed production.

Furthermore, according to the CAST report, "For gene transfer to occur between one hay field and another, several steps must be completed, each of which has a certain probability. Pollen flow requires insect pollinators and is insufficient by itself for gene transfer. If gene flow is to have an impact on hay production, it must result in fertilization ofii flower; production and dehiscence of a viable seed; germination; and establishment of a plant contributing to the biomass ofthe surrounding hay crop (CFIA 2005). Although gene transfer from one alfalfa hay field to another is possible theoretically, a range of environmental barriers make hay-to-hay gene movement a very low-probability event. These barriers include:

1. (Common) grower practices to harvest alfalfa in a vegetative to early flower stage before significant flowering for high-quality forage;
2. A general scarcity of appropriate pollinators;

3. The frequent and complete removal of all above-ground plant mass--- preventing seed set; (cuttings in California range from 7-8 in the Central Valley, 10-11 in Southern California to 2-3 in the colder, mountainous areas of California-California information added) and,
4. The demonstrated inability ofthe rare seed that is set in hay fields actually to germinate, grow, and compete with existing plants to result in a viable plant that contributes to the dry matter of the forage crop," according to CAST authors.
From the seed production perspective, a different set of circumstances exist, but safeguards also are in place to prevent gene spread.
The CAST study reports: "In the Pacific Northwest, the overwhelming amount of seed production is for domestic markets, and leafcutter bees are used as primary pollinators. In this region, a 900-ft isolation distance (the same isolation requirement for foundation class seed) between biotech and conventional alfalfa seed production is used to manage seed purity and AP to <0.5%, a common industry standard for AP tolerance in conventional seed of other crop species. .In specific fields in niche areas ofthe West (e.g., tWo counties in south-central Washington), alkali bees are used alone or in combination with leafcutter bees to pollinate commercial seed fields. The Best Practices isolation minimum for alkali bee-pollinated fields is 1 mile. Alfalfa seed growers can limit gene movement from GE trait seed production fields to feral alfalfa by managing the feral alfalfa plants, routinely mowing roadsides, and controlling alfalfa sowing and vegetation in areas such as fencerows, ditches, or irrigation canals. Ip general, professional alfalfa seed growers find it beneficial to control feral vegetation in waste areas so that the weeds do not multiply and do not harboror attract untreated pests. It takes only a single management act on a feral alfalfa plant to eliminate it or its potential to form feral seed, or to disrupt the synchrony needed for successful GE trait gene flow from a commercial seed field. Seed production of feral alfalfa also will be limited by flower and seed-feeding insects such as Lygus bugs, tlu'ips (Frankiniella spp.), and seed chalcid (Bruchophagus roddi G.). Gene flow from seed production fields to feral aifalfa is, and will be, mitigated with management by RRA seed growers who are required by contract to control feral alfalfa in the vicinity oftheir seed production fields (Fitzpatrick et aL 2007b). Mitigation (i.e., coexistence) strategies for intentional management ofpollen-mediated gene flow from GE seed (or hay) fields, coupled with the low likelihood of effective pollen-mediated gene flow from feral plants to commercial alfalfa hay or seed fields, limit the risk of feral alfalfa plants being an effective bridge between commercial GE and non-GE hay or seed production fields.
In California, more than 60% of seed production is for AP-sensitive export markets, and honeybees are used as primary pollinators. In this area, a 3-mile isolation distance is being used to manage AP to a non-detectable level. This isolation standard is more than 95 times the standard isolation requirement of 165 ft for conventional certified seed. This honeybee isolation distance was adopted by a California seed industry stakeholder group convened by the University of California Seed Biotech Center in 2005 (University 2005). The common ground for the alfalfa industry consensus-building initiative is that an effective GE-alfalfa seed production coexistence and trait stewardship strategy needs to be science-based, marketsensitive, and pollinator-specific. The NAFA Best Management Practices protocol has been adopted-and implemented by all three NAFA member companies that currently produce, or intend to develop or produce, GE alfalfa seeds." (Comment Number: APHIS-2007-0044-11621-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

In regard to the CAST report and the NAFA BMPs, please see updated sections IV.B.3, IV.H.2.a and Appendix V of the FEIS \

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Comment Excerpt Text:
UCS COMMENTS ON GENE FLOW AND CONTAMINATION
Gene flow is important for the evaluation of risks from genetically engineered crops because it may result in contamination of non-engineered crop varieties or wild plants that are related to the crop. Contaminated crop varieties may result in economic harm to farmers of organic or non-engineered crops, while gene flow to wild crop relatives may result in environmental harm. Gene flow is the movement or transfer of genes from one source or location to another. For example gene flow occurs when pollination of non-GT alfalfa from a GT alfalfa results in seeds that contain the GT gene produced by the non-GT alfalfa plant. The movement of pollen leading to pollination is called pollen flow, which is a step in the gene flow process.
Pollination in alfalfa depends upon bees, so these pollinators are critically important when considering pollen flow and gene flow. Gene flow can also. Gene flow can also occur by the mixing of seed of GT alfalfa with non-GT seed, or the movement of seed from one area to another, such as by animals. If these seeds are saved for future planting, they may be contaminated by the Gt gene. Seed produced on alfalfa plants may also fall to the ground where they can grow into plants containing the GT gene—a process called self-seeding.
Pollen flow distances and frequencies may be highly variable. The gene flow values used in the DEIS to set isolation distances do not adequately account for this variability, including factors that may, singly and in combination, cause gene flow percentages to exceed 0.5 percent. This is because many environmental conditions can influence pollen flow distances. Each of these environmental conditions can interact to increase or decrease pollen flow distances. Together, the natural variability in these environmental conditions means that the limited values for gene flow used by APHIS and Monsanto/FGI, based on only a few experiments, will not determine the percentage of growers of non-GT alfalfa that will experience contamination at levels exceeding 0.5 percent. Factors that are important for determining pollen flow variability include: relative size of pollen source (e.g., GT alfalfa field) and recipient pollen fields, ambient temperature, pollinator species, pollinator numbers, pollinator behavior, pollen longevity, wind, rain, ambient temperature, and alternative pollen sources. The small number of studies relied upon by APHIS is unlikely to detect the range of values for all of these parameters that may occur in the environment of widely grown, commercialized GT alfalfa.
We provide several reasons why we believe that APHIS has not adequately supported its assertion that gene flow would be limited to less than 0.5 percent.
1) Pollen Flow Studies
a) Pollen Flow from GT to Non-GT Alfalfa Seed Production Fields
i) APHIS Failed to Justify Its Exclusion of Important Data in Setting Isolation Distance for GT Alfalfa Stewardship Programs

The DEIS refers to several studies performed in collaboration with Monsanto/FGI that were relied upon to set minimum isolation distances between GT and non-GT seed production fields. Among these, several papers by Fitzpatrick and others (2003, 2007, cited in the DEIS) were used to derive an estimate of about 0.2 percent gene flow at 900 feet when alfalfa leafcutter bees are the pollinator. Similarly, isolation distances of 1 mile were set for alkali bees (but with few supporting data), and 3 miles for honey bees. These isolation distances are required by the Monsanto Technology Agreement and the FGI Stewardship Practices (hereafter referred to as stewardship proposals) for separating seed production fields, but are not required to separate GT alfalfa hay fields from non-GT alfalfa seed production fields. A summary figure, DEIS Figure V-6, shows gene flow frequency curves based on data gathered in studies done by the applicants and their collaborators.

Based on the data gathered, the 900-foot isolation distance for alfalfa leafcutter bees allows the highest gene flow levels, typically about 0.2 percent in experimental trials. This value is only 2.5 fold less than the 0.5 percent gene flow value referred to by APHIS. Several factors described in the following sections may also increase the amount of contamination from the observed amounts in these relatively few studies.

St. Amand et al. [Footnote 1: St. Amand, P.C., Skinner, D.Z., and Peaden R.N. 2000. Risk of alfalfa transgene dissemination and scale-dependent effects. Theor Appl Genet 101:107–114], who were not associated with Monsanto/FGI, found much higher gene flow—22 percent from alfalfa seed fields at 1 km from the source—caused by leafcutter bees than did Teuber et al. (2004, cited in the DEIS), in collaboration with Monsanto/FGI, who found 0.2 percent outcrossing (pollen flow) at 1.5 km due to honeybees.

The DEIS excludes the data from St. Amand et al. from the gene flow frequency curves used to determine the isolation distances in the stewardship plans, without providing adequate justification. St. Amand et al. show much greater gene flow than the data from Fitzpatrick, and therefore the exclusion of the St. Amand et al. data serves to reduce the amount of observed gene flow in the DEIS data. Conversely, inclusion of the St. Amand et al. data would give much higher gene flow frequencies at the isolation distances proposed by Monsanto/FGI and accepted by APHIS.

APHIS attributes the high numbers found by St. Amand et al. to the clonal nature of the pollen recipient plants, and the small size of the recipient plots. It may be further argued that these conditions would not be found in commercial plantings of alfalfa, and therefore, are factors that artificially increase gene flow frequencies.

St. Amand et al. should not be omitted from the determination of isolation distances based on these arguments. It is true that clonal plants and small pollen recipient populations may contribute to the results seen by St Amand et al. However, APHIS is wrong to conclude that the St. Amand et al. results can be attributed to these two factors alone because numerous other factors (listed in the “Gene Flow” section above and discussed below) can affect gene flow distances, as the agency admits. APHIS neither shows that clones of small recipient alfalfa populations are responsible for all or most of the larger frequencies of gene flow observed by St Amand et al. nor the impact of other important factors on these results. ii) Data Used to Validate the Proposed Stewardship Isolation Distances Are Inadequate Data from commercial alfalfa seed production fields by FGI (2007, cited in the DEIS) intended to validate the field trial data of Fitzpatrick et al. Teuber et al., are inadequate. Although the larger size and relative sizes of pollen source and recipient fields in the validation studies are important determinants of gene flow frequencies, APHIS uses too few data at important isolation distances—up to several times

farther than the minimum allowed in the stewardship proposals— to reliably determine gene flow frequencies at these important distances.

Table 1 in FGI (2007) (not shown in DEIS appendix Q discussion of the validation research) shows that the large majority of isolation distances used in this research are much greater than the minimum allowed by the stewardship proposal. The large majority of the non- GT alfalfa fields in this study are at distances at least 3 or more times the minimum isolation distances. Most of the data are therefore from distances where less gene flow would be expected even under conditions that favor gene flow. This is because gene flow distribution curves are typically "L" shaped, with gene flow frequencies dropping rapidly with distance from the source field, and then often leveling off at very low frequencies for long distances (a leptokurtic distribution—Ellstrand 2003) [Footnote 2: Ellstrand, N.C. 2003. Dangerous Liaisons: When cultivated plants mate with their wild relatives. Johns Hopkins University press, Baltimore, MD]. Most gene flow occurs at distances represented by the vertical leg of the "L", at shorter distances from the GT alfalfa field. For example, as can be seen in DEIS Figure V-8, there is little gene flow past about 1000 feet for leafcutter bees, but considerably more at shorter distances.

Although these validation studies do provide some useful data for gene flow at longer distances, they say almost nothing about gene flow within several times the minimum allowed isolation distance where the large majority of gene flow would be expected to occur. For example, of the 59 fields where alfalfa leafcutter bees were the main pollinator, only three recipient fields were at distances of less than 2,500 feet from a source field. Therefore, only about 5 percent of the data points are at distances within almost three times the minimum isolation distance allowed by the stewardship proposals. And of these three, one had a gene flow frequency of 0.18 percent—close to what was found by the earlier experiments using smaller fields at similar distances.

These are too few data points at these important isolation distances to perform meaningful statistical analysis. It would also be improper to fit a gene flow frequency curve to these data, even including the data from longer distances, because the shape of the curve for distances up to several times the minimum isolation distance could not be accurately determined.

Alfalfa leafcutter bees, for which the 900-foot isolation distance would apply, are considered to be the most efficient alfalfa pollinators, and therefore are very important and widely used.

There are even fewer data for alkali bees. None of the 22 test fields that measured gene flow were within three to five times the minimum Monsanto/FGI isolation distance of one mile from pollen source fields. This is especially troubling because the DEIS presents no other detailed data on gene flow from alkali bees, and none of the major research papers cited by APHIS or Monsanto/FGI focus on alkali bees, which can be important in parts of the West, for example, California, where a significant proportion of U.S. alfalfa seed is grown.

For these two important bee pollinators, the commercial-scale field validation data that both APHIS and Monsanto/FGI claim are of key importance, add little or nothing to our understanding of gene flow frequencies at the most important distances from GT alfalfa fields.

For alfalfa pollinated by honeybees, the data are more useful, with 11 of 34 fields within three miles of GT alfalfa fields—the minimum allowed isolation distance for honeybees—and three more at three to five miles.

Although the distribution of field separation distances in this validation study may have reflected the existing commercial alfalfa fields, and therefore may have been a realistic representation of these distances at the time, this is likely to change if GT alfalfa is fully commercialized. At the time of these experiments, only a total of a few hundred thousand acres of GT alfalfa was

planted, with a proportion devoted to seed production, out of about 23 million acres of alfalfa in the U.S.

With full commercialization, alfalfa seed production fields could often be much closer together than occurred in the FGI (2007) validation studies. If alfalfa follows the pattern of other engineered crops, the GT alfalfa acreage could reach 15 to 20 million acres, occupying proportionately many more seed fields and proportionately much more land than the fields of the 2007 studies.

In summary, data suggest that for alfalfa leafcutter bees in particular, the minimum isolation distance between GT alfalfa and non-GT alfalfa seed producing fields could commonly allow gene flow frequencies of 0.2 percent or more. First, the St. Amand et al. study suggests that much higher levels of gene flow may occur. Second, the commercial-size field study that APHIS and Monsanto/FGI relies on heavily to support their proposed isolation distances are seriously deficient at the most important isolation distances, and therefore add little to the other data for alfalfa leafcutter and alkali bees.

iii) The Influence of Field Size on Gene Flow Distances

Large commercial-size fields—as used in the validation research—do not necessarily have lower gene flow frequencies than smaller research plots. The expected gene flow frequencies for commercial-sized fields will therefore likely be as high or higher than seen in the smaller-scale research plots.

The DEIS suggests that the larger size of the fields used in the validation studies makes them a more realistic test than the smaller fields used in previous studies, and thereby also implies that the smaller scale studies are not reliable by themselves. We agree with this assessment.

It cannot be assumed that larger fields will lead to lower levels of gene flow—in fact the opposite has been observed. Rieger et al. [Footnote 3: Rieger MA et al. 2002. Pollen-mediated movement of herbicide resistance between commercial canola fields. Science 296:2386-2388. The actual gene flow percentages in Rieger et al. (2002) cannot be compared with or used for alfalfa for several reasons, including differences in pollination biology of canola and alfalfa.] noted greater gene flow frequencies and gene flow distances between commercial-sized canola fields than had been seen in studies using smaller fields. The DEIS correctly notes that relative sizes of pollen-donor (GT alfalfa) and recipient fields (non-GT alfalfa) is important. [Footnote 4: Rieger MA et al. 2002, op. cit.] In Rieger et al. (2002), the pollen donor and recipient fields were of comparable size, as would often be expected for commercial alfalfa seed production fields.

iv) Pollen Flow from GT Hay Fields to Non-GT Alfalfa Seed Fields

The stewardship proposals for reducing gene flow from GT-alfalfa hay fields to non-GT alfalfa seed production fields are based on a small number of studies (conducted in 2000 and 2006) cited by the research brief by Teuber and Fitzpatrick (2007, cited in DEIS). These studies show gene flow to alfalfa seed plots of about 0.2 to 0.3 percent at the minimum isolation distance of about 165 feet and 0.14 to 0.23 percent between 215 and 300 feet (Table 1 of Teuber and Fitzpatrick). In other words, even in these limited studies, which do not include all of the environmental variables that could increase gene flow, it was common to find gene flow frequencies of about half or more of the 0.5 percent mark cited by APHIS.

The DEIS notes that the two studies that contributed to Teuber and Fitzpatrick (2007) had higher percentages of flowering (50 percent and up to 20 percent) than is typical for alfalfa hay fields—which often are harvested at 5 to 10 percent flowering. It should not be assumed that gene flow from hay fields at 20 or 50 percent flowering will necessarily cause more gene flow than fields at 5 to 10 percent flowering. It should also not be assumed that where gene flow is higher at higher

flowering rates that gene flow would be double or five times the amount at 10 percent flowering. No support is provided to suggest the latter relationship between flowering percentage and gene flow, and many biological phenomena do not follow such linear relationships.

In particular, data for 50 percent flowering do not show clearly higher gene flow than when flowering is at 20 percent based on Figure 1 on page 3 of Teuber and Fitzpatrick, so it is unclear what the relationship between percent flowering and gene flow may be. One complication for comparing these data is the use of alfalfa leafcutter bees in the former (50 percent flowering) and honeybees in the latter (20 percent or less flowering) studies. Honeybees can pollinate at longer distances than leafcutter bees, but at these shorter distances (less than 1000 feet), it is unclear that honeybees would have an advantage.

The experimental design of at least some of the experiments used by Teuber and Fitzpatrick may have favored reduced gene flow compared to some real-world situations. Figure 1 on page two (a different Figure 1 than above) shows an alfalfa hay field surrounded by four seed fields. But in commercial situations, it is possible for non-GT seed fields to be surrounded by several hay fields, which may increase gene flow.

Hay fields will often also be much larger than the hay fields in the experiments of Teuber and Fitzpatrick, and many times larger than seed fields. This can lead to increased gene flow, and gene flow at longer distances [Footnote 5: [no information]]. Strikingly, the validation studies in commercial fields discussed in the previous section apparently did not include GT hay field to non-GT seed field gene flow. Even at the recommended flowering of less than 10 percent, St. Amand et al. [Footnote 6: St Amand et al. 2000. op.cit.] show that considerable levels of gene flow may occur from hay fields—15 percent gene flow from hay to seed fields at 1 km compared to 22 percent for gene flow between seed fields for leafcutter bees. As with gene flow between alfalfa seed production fields, the data from the St. Amand et al. research has been excluded from the determination of isolation distances for GT alfalfa hay fields to non-GT alfalfa seed production fields without adequate justification.

For all of these reasons, it is untrue, as asserted by the DEIS, that studies used by Monsanto/FGI to set isolation distances represent worst-case scenarios. A worst-case scenario for hay flowering would occur when the field goes to 100 percent flowering due to inclement weather preventing mowing or other reasons. And the size and position of hay fields also do not represent worst-case scenarios.

The DEIS remarks that nearby GT alfalfa farmers can be asked not to let any flowering occur in their hay fields, or that isolation distances can be increase from 165 feet. But non-GT farmers have no control over this. A grower of GT alfalfa hay may rightly point to the 165-foot isolation distance and 10 percent flowering limits in the stewardship proposals and reason that this is what was determined by APHIS to be sufficient.

In summary, GT gene flow from GT hay to non-GT seed fields is likely to often approach the 0.5 percent limit set by APHIS for contamination, and several parameters noted above may push gene flow amounts higher in practice. Overall, for both hay-to-seed and seed-to-seed gene flow, the DEIS relies on unsupported assumptions and inadequately evaluates several important factors that may influence gene flow to conclude that gene flow will remain under 0.5 percent. Additional factors considered in the following sections may contribute further toward higher amounts of contamination in many instances.

2) Pollinators and Pollination

Pollinators are often supplied to alfalfa grown for seed to ensure high seed set, but pollinating bees may also be present due to either native bee species such as bumblebees, alkali and

leafcutter bees or feral bees such as the alfalfa leafcutter or honey bees. Although the DEIS downplays the importance of native or feral bees, other expert sources comment that alfalfa leafcutter bees are common and widespread in Canada and the United States. [Footnote 7: Alfalfa Leafcutter Bee, http://www.nbii.gov/portal/community/Communities/Ecological_Topics/Pollinators/Pollinator_Species/Inver tebrates/Bees_and_Wasps/Leafcutter_Bees/Alfalfa_Leafcutter_Bee/ , last accessed March 3, 2010; Parker F.D. and Torchio, P.F. Management of Wild Honey Bees, http://maarec.cas.psu.edu/bkCD/management/wild_bees.html] APHIS does not provide data that support its contention of low amounts of feral or native bees.

The DEIS incorrectly downplays the possible role of bees that are naturally present (feral or native), and a major recommended mitigation measure is to avoid using domesticated bees where gene flow may be an issue. On page 98 of the DEIS, a description of the stewardship plan notes that isolation distances between fields depend upon which species of bees are used as pollinators—that is, bees brought to the farm for the purpose of pollination rather than wild bees—for example:

"…when farmers contract with FGI to grow and produce alfalfa seed and use leafcutter bees for pollination, the distance between GT and non-GT alfalfa seed production fields must be greater or equal to 900 feet."

While high seed set is less likely to be achieved without supplying bees, it is a mistake to assume that pollination from feral or native bees could not produce a substantial amount of gene flow. Although alfalfa seed producers routinely supply bees for pollination, the requirements for high levels of seed production require many more bees than the much smaller amounts of gene flow that would cause contamination problems.

High absolute pollination frequencies also should not be confused with high percentages of GT pollination of non-GT flowers—high percentages of gene flow may occur with either high or low absolute pollination levels. In particular, it is the percentage of GT seed found in non-GT seed that is the primary issue rather than the absolute amount of seed produced, and if fewer bees are present this percentage may sometimes be as high as if more bees were available. One factor that may reduce this percentage somewhat is the reduced need to forage over greater distances when the ratio of bees to flowers is lower. But this would not necessarily preclude considerable percentages of GT pollination of non-GT alfalfa.

In most cases, where bees are supplied for pollination of seed fields, they will be the most important source of pollination. Neither APHIS nor Monsanto/FGI have presented data to show that feral or indigenous bees would not contribute measurably to gene flow. In particular, fields separated by a 900-foot isolation distance for alfalfa leafcutter bees might experience significant gene flow if substantial numbers of bees that routinely pollinate at longer distances—such as honeybees, alkali bees, or bumblebees—are present.

3) Feral Alfalfa and Gene Flow

The DEIS downplays the possible contribution of feral alfalfa as a source of gene flow to non-GT alfalfa seed. APHIS acknowledges that alfalfa has properties that contribute to its ability to compete outside the cultivated environment, which leads to the establishment of feral alfalfa populations.

Autotoxicity of alfalfa is discussed by APHIS as a counter to the spread of the GT gene in feral alfalfa, but autotoxicity is not a bar to gene flow. The persistence of feral alfalfa has been documented, [Footnote 8: Bagavathiannan, M.V. and Van Acker, R.C. 2009. The biology and ecology of feral alfalfa (Medicago sativa L.) and its implications for novel trait confinement in

North America', Critical Reviews in Plant Sciences 28: 69 — 87] and these stands, as well as newly established stands, require reseeding to persist over long periods of time because individual alfalfa plants, although perennial, usually survive less than 10 year (5 or 6 years is often given as typical). Autotoxicity occurs within a few feet of a plant, so the dispersal of the small and light seed, including by animals, beyond the immediate proximity of existing plants allows new colonization.

The GT gene is unlikely to provide selective advantage to feral GT alfalfa plants, but there is no evidence that it has a fitness cost either. For example, feral creeping bentgrass containing the GT gene has become established in Oregon. [Footnote 9: Reichman, J.R. et al. 2006. Establishment of transgenic herbicide-resistant creeping bentgrass (Agrostis stolonifera L.) in nonagronomic habitats. Molecular Ecology doi: 10.1111/j.1365-294X.2006.03072.x] Therefore, feral alfalfa that is pollinated with the GT gene can be expected to survive as well as non-GT alfalfa. APHIS incorrectly argues that unless the GT gene has a selective advantage—which is probably not the case in the absence of glyphosate herbicide—the gene would disappear from feral populations. This is contradicted by population genetic theory, [Footnote 10: Ellstrand, N.C. 2003. op. cit.] which shows that a neutral gene would be maintained at levels equal to the frequency of gene flow once fixed in the population—i.e., once levels above what may be lost due to stochastic processes occur. Such levels could be expected when feral plants exist near GT alfalfa fields. High percentages of the GT gene could also be present, and be maintained through founder effects. This could occur if GT alfalfa feral plants started new populations. Selection due to the use of glyphosate herbicide may also increase the proportion of GT feral alfalfa. Glyphosate is one of the most commonly used herbicides for weed control outside the agricultural environment. Even when feral alfalfa itself is not the target of weed control in these non-agricultural areas, because it may grow in mixed stands that can contain other weeds species, control of those other weeds (see Bagavathiannan and Van Acker 2008, Figures 1—4) [Footnote 11: Bagavathiannan and Van Acker. 2008. The feral nature of alfalfa and implications for the co-existence of genetically modified (GM) and non-GM alfalfa. http://umanitoba.ca/outreach/naturalagriculture/articles/feral_alfalfa_report.pdf] may inadvertently select for feral GT alfalfa.

Although APHIS seems to minimize gene flow consequences of gene flow from GT feral alfalfa to non-GT alfalfa grown for seed, we agree with Bagavathiannan and Van Acker that “[a]ny unintended gene escape into feral populations [of alfalfa] will eventually result in adventitious presence in non-transgenic alfalfa fields in the landscape”. [Footnote 12: Bagavathiannan and Van Acker. 2009. op. cit.]

It is difficult to predict the amount of gene flow from feral alfalfa. Together with the other factors discussed here, feral GT alfalfa could contribute to gene flow to non-GT alfalfa fields.

4) Seed Contamination and Human Error

Both contamination by seed and human error can contribute to gene flow. APHIS says little about the possibility of contamination of non-GT seed by GT alfalfa seed, and nothing about human error (or intentional non-compliance with stewardship requirements) resulting in gene flow through pollen or seed.

The stewardship agreement calls for cleaning of seed-handling machinery, but academic agricultural scientists have pointed out that this is unlikely to eliminate gene flow because it is difficult to thoroughly clean the interior compartments of much of this machinery, [Footnote 13: Andow, D. et al. 2004. A growing concern: Protecting the food supply in an era of pharmaceutical and industrial crops. Union of Concerned Scientists, Washington, DC] especially

with such small seeds as alfalfa. The quantification of this source of mixing of GT and non-GT alfalfa is difficult, but may be more than negligible.

Human error is also likely to contribute to gene flow (Marvier and Van Acker 2005). [Footnote 14: Marvier, M and Van Acker, R.C. 2005. Can crop transgenes be kept on a leash? Front Ecol Environ 3(2): 93–100] It should be noted that StarLink corn was grown under a stewardship program that was intended to keep this corn solely in the feed, not food, supply. That program failed. Although the amount of contamination was small, this crop was grown on less than 1 percent of corn acres for a short period of time. GT alfalfa, by contrast (and based on other GT crops) may be grown on a substantial percentage of alfalfa acres for many years.

It is also not known how much of the StarLink contamination was attributable to human error rather than inherent weaknesses of the program, but it should stand as a warning concerning the industry's capacity to segregate engineered from non-engineered crops. Research on herbicide-tolerant canola in Canada also shows widespread contamination of certified non-engineered seed. [Footnote 15: Friesen, L.F.,Nelson, A.G, Van Acker, R.C. 2003. Evidence of contamination of pedigreed canola (Brassica napus L.) seedlots in western Canada with genetically engineered herbicide resistance traits. Agron J. 95:1342–1347] Significantly, the Association of Official Seed Certifying Agencies has set a 0.25 percent maximum level of contamination for certified varietal canola seed, and has provided guidelines including isolation distances to achieve this level of contamination, which is half of what APHIS says is acceptable for GT alfalfa contamination. Yet Friesen and colleagues found that 11 percent of samples had very high levels of contamination— exceeding 2 percent. And 52 percent of seed lots exceeded the desired stewardship level of 0.25 percent. The highest level of contamination was nearly 5 percent.

APHIS and Monsanto/FGI may argue that their plan is better, but the track record of the industry reveals how difficult it is to maintain these standards. Fundamentally, the Monsanto/FGI stewardship plan relies on the same mechanisms, primarily isolation distance, that have failed to prevent gene flow and contamination in the past, and where examined closely, have allowed gene flow in many instances that substantially exceeds target levels.

5) Combined Effects of Bees, Inclement Weather (Increased Flowering of Hay Fields), Feral GT Alfalfa, Seed Contamination, and Human Error

The DEIS does not appear to quantify the possible combined contributions of factors discussed in sections 1 to 4 above. This seems to be in part because APHIS dismisses the contribution from some of these sources of gene flow. We disagree with the agency's assessment for the reasons stated above. Certainly APHIS has made no attempt to quantify the possible impact of some sources such as gene flow from feral alfalfa, contaminated machinery, human error, and variation from place to place in the presence of wild or feral bees. Even if these sources are small in isolation, their combined effect may be significant.

We also believe that APHIS has significantly underestimated possible gene flow amounts from bee pollination under several scenarios, as discussed in 1 and 2 above. The DEIS is based on limited field trial data, much of which is inadequate because it relies on small pollen-source fields that underestimate gene flow amounts, [Footnote 16: Rieger et al. 2002 op. cit.] while the validation studies used to justify the stewardship proposals were highly deficient at the most important isolation distances and did not even include GT hay field to non-GT seed field gene flow. Other published data contradict the data the agency relied upon. [Footnote 17: St. Amand et al. 2000 op. cit.]

Taken together, these flaws show that APHIS has not made a convincing argument to support its claim that gene flow from GT alfalfa to non-GE alfalfa will be below 0.5 percent.

6) Gene Flow into Rangeland and Pasture

Alfalfa is often planted in mixed stands with grasses for harvest or as pasture, and is seeded into rangelands. The DEIS says little about the effects of gene flow from GT alfalfa hay or seed fields into nearby managed pasture or rangeland. For example, there are no data regarding the proximity of alfalfa fields (for seed or hay) to managed pasture or rangeland.

Where GT alfalfa fields are near rangeland or managed pasture, gene flow from the GT alfalfa—whether hay that is at less than 10 percent flowering or seed fields—into the pasture or rangelands is likely to occur. Furthermore, because of the iterative effects of gene flow (see section 7 below) that can occur year after year for pasture or rangeland that is allowed to reseed itself, initially low percentages of gene flow may increase over time.

Although autotoxicity can limit seeding of alfalfa into alfalfa fields, this is less likely to be a problem in rangeland or mixed pasture where alfalfa is only one among several species of plants. Because autotoxicity only functions close to an alfalfa plant, seed that is deposited away from existing alfalfa plants may grow (see section on Feral Alfalfa above). Pasture that includes alfalfa usually also other species (mixed species).

On page 99, the DEIS incorrectly states that it is "reasonable to predict" that gene flow from GT alfalfa to the subspecies falcata, which is being used on rangelands, would produce progeny that are less hardy than the falcata parents. Alfalfa is claimed to be less well adapted to rangeland than falcata, and progeny are claimed to have traits that are intermediate compared to the parents—hence less fit or competitive for rangeland than the falcata parents.

APHIS seems to imply that the progeny of GT alfalfa and rangeland falcata would be less fit than the falcata parents and therefore would not survive as well. This may not be true in many environments. First, the DEIS presents no evidence that feral alfalfa could not survive in mixed stands with falcata. By contrast, Bagavathiannan and Van Acker (2009, p. 72—73) [Footnote 18: Bagavathiannan and Van Acker. 2009. op. cit.] note that M. sativa and M. falcata hybrids are "vigorous and fertile" and that member do the M. sativa complex (which includes M. sativa and M. falcata) can occur sympatrically (i.e. in the same environment).

Non-GT pasture or rangeland may therefore be contaminated by GT alfalfa, and this may eventually lead to significant contamination levels. There are no provisions in the stewardship proposals to mitigate this gene flow. A critical issue is the amount of reseeding that occurs by plants in the field. APHIS should determine how frequently this occurs before drawing conclusions about contamination of pasture or rangeland.

7) Iterative, or Cumulative, Gene Flow Effects Over Time

APHIS treats gene flow as if it were a one-time event when in fact cumulative gene flow may increase over time. In general, gene flow for a specific gene will occur from higher toward lower frequency fields (Ellstrand 2003, Table 4.3, row 1, page 34). [Footnote 19: Ellstrand, N.C. 2003. op.cit.] Unless previous GT contamination is removed or reduced between seasons, additional gene flow will add to the percentage of contamination each time gene flow occurs. Theoretically, this could continue year after year until the non-GT alfalfa had as high a percentage of the GT gene as the GT alfalfa. Such high levels of gene flow would not happen in practice. And gene flow may not occur every year, or the frequency of gene flow when it occurs may vary from year to year. Nonetheless, without removing previous contamination, the level of contamination will increase over time. Because of this iterative process, even low levels of gene flow in any single year could eventually result in unacceptable levels. For example, if gene flow were 0.1 percent per year, the 0.5 percent threshold that APHIS refers to as a benchmark would be exceeded in about 6 years. Even by APHIS's own standards, based on the proposed stewardship program,

gene flow from a GT alfalfa seed field to a non-GT alfalfa seed field pollinated by leafcutter bees, with an isolation distance of 900 feet, could easily experience annual gene flow of 0.2 percent. The 0.5 percent threshold would then be exceeded in about 3 years, and one percent would be reached in 5 years.
Of course, contamination from gene flow can be reduced—whether due to a single-year event or after multiple years. But this would require quantitative monitoring for gene flow and, more importantly, eliminating seed batches that are contaminated, at the expense of a farmer that did not invite this expense. If the entire lot is contaminated at unacceptable levels, it is unclear what the recourse of the farmer would be, other than to enter the GT alfalfa commodity stream, which may mean loss of premiums—especially if the farm is organic. (Comment Number: APHIS-2007-0044-12026-7)

Response: APHIS acknowledges that gene flow in alfalfa can occur through a number of pathways. These include insect mediated pollen transfer and pollination, secondary seedlings, impure seeds, transfer to wild relatives, adverse weather conditions and human error.

In regard to the comments that there were not sufficient studies on pollen flow, the expanded gene flow analysis in Section IV.B of the FEIS discusses the potential for gene flow from GT alfalfa from a variety of sources.

The potential for gene flow between populations of alfalfa (seed fields, hay fields, and feral and other alfalfa) is summarized in Table 4-3 and discussed in Appendix Q and Appendix V (Section 5.0) of the DEIS. Appendix V 3.0 of the DEIS notes that pollen flow and gene flow are not synonymous terms even though they are sometimes used interchangeably. For example, pollen may land on a flower and pollinate it, but if the plant is mowed before seed sets, then gene flow has not occurred.

In regard to the comments on the amount of gene flow based on the size of the field being planted, please see an expanded discussion in Appendix V 5.1.2 of the FEIS.

In regard to the comments on the relationship between gene flow and number of plants flowering, please see an expanded discussion in Appendix V 4.0 of the FEIS.

Gene flow from GT hay fields to non-GT alfalfa seed fields is summarized in Table 4-3 and appendix V of the DEIS. Appendix V notes that the likelihood of gene flow from GT alfalfa to alfalfa seed is dependent on multiple factors including: probability of synchronous flowering, availability of pollen from seed fields, pollinator activity on days of synchronous flowering and placement of beehives, distance between seed fields and feral alfalfa, probability of seed maturation and probability of seed germination. Additionally, Appendix V notes that hay to seed gene flow is less likely than seed to seed gene flow because hay fields do not usually have more than 10 percent bloom, and that is only for a few days. In addition, certified and foundation seed fields are required to have specific distances between them and other alfalfa fields. There are some farmers that grow uncertified seed which could be immediately adjacent to GT alfalfa hay fields thus GT alfalfa could cross-pollinate with conventional alfalfa.

Feral alfalfa and methods to control it are summarized in Table 4-3 and in Table H-1 and appendix J of the DEIS. Appendix V notes that the likelihood of gene flow from GT alfalfa to feral alfalfa is dependent on multiple factors including: probability of synchronous flowering, availability of pollen from seed fields, pollinator activity on days of synchronous flowering and placement of beehives, distance between seed fields and feral alfalfa, probability of seed maturation and probability of seed germination. An expanded discussion of gene flow related to feral alfalfa is in Appendix V.5.2.3 of the FEIS.

In regard to the comments on gene flow due to human error, please see the response to APHIS-2007-0044-9936-9 for Issue 3.1(paragraph 2 of the response).

In regard to the comments on the combined effects of bees, inclement weather (increased flowering of hay fields), feral alfalfa, seed adventitious presence, and human error, APHIS acknowledges that the combination of multiple factors may have complex affects on gene flow and has addressed this in the revised Section IV.B.4 and Appendix V in the FEIS

Gene flow into rangeland or pasture, either as seed to hay or hay into hay, is summarized in Table 4-3 and discussed in Appendix V 5.2 of the DEIS. APHIS acknowledges that gene flow into rangeland or pasture may differ from gene flow into hay fields and has expanded the discussion in Appendix V.5.2.3 in the FEIS

Gene flow to M. falcata species and the fitness of such hybrids, is discussed in Chapter 4.B.4 of the DEIS. As stated in the DEIS, hybrids with mostly sativa parentage are predicted to be hardier than the original GT alfalfa but have less rangeland hardiness than the falcate parent. AHPISAPHIS acknowledges that feral alfalfa could survive in mixed stands with falcate and that M. sativa and M. falcate hybrids could potentially remain in rangelands and pastures and has expanded the discussion in Section IV.B, Appendix V.5.2.3 and Appendix H 2.2.1 of the FEIS.

In regard to the comments cumulative effects of gene flow over time, please see revised Section IV.B.4 in the FEIS.

In regard to the comments on the likelihood of feral GT alfalfa maintaining the glyphosate resistance gene, please see the revised V.5.2.3 in the FEIS.

In regard to comments that reduced fitness has been found with some herbicide-resistant weed species please see the revised Appendix V.5.2.3 in the FEIS.

Comment Excerpt Text:
I am concerned about allowing GE alfalfa into production. Genetic drift poses substantial risk to any Organic or Non GE producer's ability to remain indenpedant from this technology. Please consider the economic impacts on small producers. (Comment Number: APHIS-2007-0044-2214-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0. In regard to economic impacts, see the response to comment APHIS-2007-0044-2214-1 for Issue 5.

Comment Excerpt Text:
AOSCA agrees with the science-based process utilized by APHIS to complete the DEIS and its determination that alfalfa containing traits J101 and J163 should no longer be considered as regulated materials.

AOSCA works closely with official seed certifying agencies in the United States that provide third-party inspection and verification services to insure that seed produced within their jurisdictions meets accepted standards in accordance with the US Federal Seed Act and AOSCA Genetic and Crop Standards. Seed certifying agencies have been in operation since the early-1900's, providing field inspections and process audits to insure that varietal purity is maintained in a wide variety of agricultural seeds and propagating materials. These Agencies certify seed according to AOSCA standards for over sixty major crop types, thus providing confidence in Certified seed that facilitates the efficient trade of seed in domestic and international markets. AOSCA seed certification standards are equivalent to OECD seed standards used in the international seed market.

Using experience gained from decades of seed certification activities, the US seed industry has successfully developed seed production processes that lead to pure seed, coexistence, and export market stability for other crops that contain biotech traits.

The alfalfa seed market is well-positioned to experience the same success by using programs developed with the input from seed certifying agencies and industry partners.

Export seed markets are vitally important to the US seed industry and international buyers recognize the value of seed produced under credible stewardship programs.

Given that the alfalfa crop produced is most often harvested in the form of hay, genetic introgression of glyphosate-tolerant alfalfa into conventional alfalfa varieties may occur during seed production in surrounding areas. Alfalfa seed is produced in concentrated areas in California, Washington, Idaho, Wyoming, Nevada, Montana, Oregon, Utah, Arizona, and South Dakota. Each of these states had 3,000 acres or more of alfalfa seed production in 2007, according to the APHIS DEIS (page 44), and production acres were concentrated within each of those states to relatively small geographic areas. Seed certification standards and practices administered by AOSCA member agencies provide third-party validation that the seed produced is true to variety and genetic purity at high levels of 98% or better. Seed contractors, producers, and conditioners of certified alfalfa seed are held to high levels of stewardship through the oversight of AOSCA member agencies, all with the intended goal of producing seed of physical and genetic purity that meets the demands of seed consumers.

In addition to basic seed certification standards, AOSCA member agencies have also been involved in the development of two programs designed to provide improved stewardship of

genetically-enhanced (GE) alfalfa in relation to the unintentional integration of GE traits into conventional varieties. The AOSCA Alfalfa Seed Stewardship Program (ASSP) and the North American Forage Alliance Best Management Practices (BMP) have been developed to assist in the production of glyphosate-tolerant alfalfa seed in a manner that reduces the unwanted movement of genetic material (gene flow) in alfalfa and to provide additional confidence that unwanted DNA is not introduced into conventional and organic seed.

The AOSCA ASSP is designed to assist alfalfa seed growers in the production of seed destined for markets with a heightened sensitivity to genetically-enhanced alfalfa. We expect this Program to be an important tool for seed producers as the introduction of genetically-enhanced traits becomes more common in the alfalfa industry.

The NAFA BMP is a contractual agreement between trait providers, alfalfa seed production companies, and alfalfa seed growers, requiring that each follow specific management practices for all aspects of alfalfa seed production. Its goal is to keep adventitious presence of unintended traits at a minimum. Representatives of our organization served on a panel that reviewed data submitted for over 1000 seed lots. (Comment Number: APHIS-2007-0044-5056-1)

Response: APHIS acknowledges the comment. The FEIS includes a discussion of both of the stewardship programs described by the comment.

Comment Excerpt Text:
GMOs have, in fact, been unconditionally approved, without allowing the scientific community or the public to thoroughly debate the various potential threats that we may all face. Some of the most important issues are the propagation and regulation of crops containing pharmaceuticals, and protection of organic and conventional farmers, whose fields may risk contamination by GMO crops being grown in their area.
Additionally, organic producers and handlers may potentially be de-certified, sued, or otherwise financially damaged if their crops or processed products become contaminated by GMOs. In fact, such losses have already occurred in our state when a Nevada-based organic processor recently lost over $100,000 as a result of GMO-contaminated “certified organic” soybeans, purchased from the Midwest. We also cite the landmark case where Monsanto prevailed legally against a Canadian farmer, when they (Monsanto) discovered GMO plants on his land that he neither planted nor wanted. (Comment Number: APHIS-2007-0044-5057-2)

Response: In regard to lawsuits from Monsanto, see the response to comment APHIS-2007-0044-6376-1 for Issue 5.1.

In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

In regard to the National Organic Program, see the response to comment APHIS-2007-0044-10866-5 for Issue 3.3.

Comment Excerpt Text:
I do not want genetically modified food in my food supply. I choose to eat food that is not genetically modified. As you know, seeds spread and GMO seeds contaminate other fields. I do not want to eat cows or pigs or chickens that have eaten GMO alfalfa. Since the inception of GMO food, auto-immune diseases have increased dramatically in this country. GMO food is not safe for consumption - human or animal. I am not part of your science experiment. Do not allow GMO Alfalfa into the food supply (Comment Number: APHIS-2007-0044-5210-1)

Response: In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for Issue 5.2.

Comment Excerpt Text:
Thank you for the opportunity to comment on the EIS for glyphosate tolerant alfalfa. My family chooses organic products because we support sustainable agriculture as a very important solution to some very difficult current issues. There is no room for GE alfalfa in the agricultrual landscape of our country. Unintentional contamination of non-GE crops is very likely and will undermine the USDA National Organic Program. To release yet another bio-tech crop that will only increse the use of pesticides is unconscionable. Please consider the far-reaching effect this product will have (Comment Number: APHIS-2007-0044-5222-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I am very much against deregulation of roundup ready alfalfa. Our pure, organic foods need to be protected from GMO contamination!! (Comment Number: APHIS-2007-0044-5229-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I am very much against deregulation of roundup ready alfalfa. Our pure, organic foods need to be protected from GMO contamination!! (Comment Number: APHIS-2007-0044-5230-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Think about this.... The big picture? We know that genetically modified corn and soybeans have invaded farms where they have not been planted by the farmers. We know that Monsanto has successfully sued these farmers for patent infringement. Worst of all, we know that these strains have proliferated where they have not been invited or wanted.

The bigger picture, and perhaps the "match-point" for Monsanto?... field contamination of pure plantings by genetically modified plants = the end of the organic movement, which is currently, I believe at a tipping point in consumer demand.
I care about my foods. I grow what I can from seeds that I either save myself or obtain from suppliers of organic heirloom varieties. I see our food becoming less and less recognizable. I witness the lavor value and nutrient content of supermarket chicken, pork and beef being compromised by modern growing methods, methods that neither help small local farms, nor provide for a humane existence for these animals.
Let me be very clear. I care deeply about the quality of the food I eat myself and that consumed by the planet, and the people I know care. It is unfathomalbe to me that Monsanto was ever able to patent any living organism. Nature is chaotic by definition and genetically modified plants will find their way into areas where they are not wanted. I believe when this happens, the invaded farmer should be able to sue the Monsanto invader, not the other way around.
Further, it is not acceptable that approval of this strain be made without any kind of protections for the environment, consumers, or farmers who chose not to be a part of this uncontrolled experiment. The evidence is in on corn and soybeans and the only winner has been Monsanto.
Unacceptable. Unbelievable. Inconceivable. Irreversable!
Don't take my organic option away from me without my consent!
Sylvann Welcome
President, Welcome Endeavors, LLC; Sweet Traditions Kringles (Comment Number: APHIS-2007-0044-5233-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response). In regard to lawsuits from Monsanto, see the response to comment APHIS-2007-0044-6376-1 for Issue 5.1.

Comment Excerpt Text:
Tell USDA You Will Reject GM Contaminated Alfalfa and Alfalfa-Derived Foods
o USDA claims that consumers will not reject GM contamination of organic alfalfa if the contamination is unintentional or if the GM material is not transmitted to the end milk or meat product. Tell USDA that when you buy organic milk, you want to know it comes from cows that did not eat any GM alfalfa, does not contain any BGH, and was not exposed to any other genetically modified organism.
? Tell USDA to Protect All Farmers Who Wish to Choose to Grow Non-GM Crops
o Although USDA says it supports of all types of agriculture, the agency refuses to consider any future for alfalfa that would include protections from contamination for organic and conventional farmers and exporters.
? Tell USDA That Protecting Farmers is Its Job and that Relying Solely on Monsantos Business as Usual Best Practices Ensures Widespread GM Contamination
o USDA claims that Monsantos seed contracts require measures sufficient to prevent contamination, and that there is no evidence to the contrary. In the lawsuit requiring the EIS, the Court found that GM contamination had already occurred in the fields of several Western states with these same business-as-usual practices in place! The EIS itself acknowledges that GM contamination may happen. In general, where other GM crops were approved without restriction,

contamination of organic and conventional seeds and crops is widespread and has been documented around the world.
That GM Alfalfa Would Significantly Increase Pesticide Use and Thereby Harm Human Health and the Environment
o USDA admits, correctly, that introduction of Roundup Ready alfalfa will increase Roundup use. However, USDAs claims that the increase is not significant and that Roundup will replace other, more toxic herbicides are flat-out wrong. The agencys own studies acknowledge the great majority of alfalfa is currently grown without the use of any herbicides at (Comment Number: APHIS-2007-0044-5235-1)

Response: In regard to consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for Issue 5.6. In regard to impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for Issue 5.0 and the response to comment APHIS-2007-0044-4913-7 for Issue 5.1. In regard to glyphosate replacing more toxic herbicides, see the response to comment APHIS-2007-0044-0402-1 for Issue 6.3.

Comment Excerpt Text:
I do NOT want my food genetically modified. It changes the natural structure of the plant. I want to feel assured that when I buy organic, I am NOT buying GMOs. Monsanto's seeds are contaminating the fields of organic farmers. This must stop.
I am relying on you, as my government, to do what's in the best interest of consumers, like me. Instead, we have allowed Monsanto to monopoliize our food industry over the last decade because of a lack of regulation.
Thank you for being on our side. (Comment Number: APHIS-2007-0044-5238-1)

Response: In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for Issue 5.2.

Comment Excerpt Text:
Please protect Michigan organic farmers against genetically engineered "Round-up Ready" Alfalfa. It would contaminate live stock in Michigan and all over the U.S.
Please do not let the FDA approve it for commercial use.
We are not guinea pigs for Monsanto GE seed, foods, and feed.
Please help stop this.
Thank you,
(Comment Number: APHIS-2007-0044-5244-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:

Please do not release G-T Alfalfa. Farms who don't want contamination from pollen or ferral plants need to be protected. Asking farms that rely on bees to move hives to avoid pollen transfer is impractical.
Many studies indicate that livestock do better eating conventionally bred varieties of crops anyway.
Monsanto has already done enough damage to seed stocks and family farms through their bullying, bribing, and deceit.
Forage exports will be hurt along with the negative effects of local backlash.
Despite claims by bio-tech, G-T Alfalfa simple isn't necessary to have a successful crop. The negative consequences of its release vastly outweigh the benefits to the few.

(Comment Number: APHIS-2007-0044-5246-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0. In regard to bee management see response to comment APHIS-2007-0044-10091-1 for issue 3.1With regard to GT alfalfa as livestock feed see response to comment APHIS-2007-0044-0362-1 for issue 4.4 In regard to export markets see response to comment APHIS-2007-0044-3404-1 for issue 5.4

Comment Excerpt Text:
Please do not approve a nonregulated status for genetically engineered alfalfa. It will contaminate organic and other seed stock. We do care about the source of our food and knowing that it is organic or other. This will make your job more difficult in the future, because popular culture is moving toward more "natural" and "organic" food. If this is allowed to go unregulated and contaminate other crops (and thus livestock that feed on it), you will not be able to control the labeling and categorization of the food. The USDA will be held responsible for that task. Thank you for your consideration (Comment Number: APHIS-2007-0044-5247-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Dear USDA,
We are opposed to glyphosate-tolerant alfalfa. Our first concern is the negative impact this GMO-alfalfa will have on organic milk production. It will curtail effective organic production as the 10's of millions of organic consumers define it and expect it. This leads into our second concern, which is genetic purity and ownership. Pollen drift will be a huge issue. Bees pollinate alfalfa -- and they will not stay within one field. As a result, modified alfalfa pollen will mix with original public-domain strains. Given alfalfa is a perennial crop and a stand has variable aged plants, who owns the mixture of plants? The owner of the trait or the farmer who was the unintended recipient of the unwanted pollen on his/her volunteer plants? The legal record for such issues suggests traditional - and especially organic - farmers will be penalized to the point of being forced out of business. This is entirely inconsistent with USDA's 160 year-old national mandate.

Our final point is there are agronomic reasons to NOT release a GMO-version of this plant. Traditional alfalfa breeding as funded by USDA continues to result in significant increases in yield. The payoff is far more than in corn, say. Many farmers are not currently adequately fertilizing alfalfa for phosphorus, potassium and micronutrients. Those nutrients limit its yield -- not weeds. So, why modify it for a specific herbicide? Especially why modify it to handle a herbicide given alfalfa requires bees to pollinate it and increased reliance on a herbicide will result in an unintended reduction in bee viability. We realize in theory a herbicide has no impact on an insect. But the peer-reviewed literature shows herbicides consistently impact animals and the ecosystem. Isn't that why EPA regulates them? Finally, how will the subsequent crops be established? I guess deep fall plowing to eliminate volunteer alfalfa? Erosion will skyrocket! (Comment Number: APHIS-2007-0044-5274-1)

Response: In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1. In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0. In regard to the burden of control measures, see response to comment APHIS-2007-0044-11689-10 for Issue 9.0. In regard to economics, see the response to comment APHIS-2007-0044-5274-1 for Issue 5.0. In regard to ecosystem effects, see the response to comment APHIS-2007-0044-5274-1 for Issue 4.0.

Comment Excerpt Text:
I am very concerned about the introduction of GE alfalfa. I do everything I can to avoid eating genetically modified foods and animals that eat genetically modified foods. I will boycott this and any other genetically modified plant and its resulting products.
Genetically modified foods need to be submitted to strict tests for safety and need to be regulated to prevent contamination with other non-gentically modified crops. Right now, farmers and consumers have no protections against gentically modified foods.
GE alfalfa would take away the property rights of organic farmers who can do little to nothing to prevent their non-GMO crops from being cross-polinated by GMO crops. It would also take away consumer's freedom to choose products that did not come from or are not GMOS. Contamination in organic alfalfa by GE alfalfa would be devestating to organic farmers who need to feed their cows non-GMO alfalfa.
The USDA was created to protect farmers, not drug or seed companies. The USDA needs to be open about GE alfalfa and it's negative effects on the environment and human health through increased pesticide use. The USDA needs to be open and honest and allow farmers and consumer to know the truth about GE alfalfa and all GMOs. Extend the comment period and stand up for real farmers (Comment Number: APHIS-2007-0044-5275-1)

Response: In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for Issue 5.2.

Comment Excerpt Text:
Roundup Ready alfalfa is very important to the success and profitability of many of the farmer customers I work with. The technology has been proven to be environmentally safe with little to no threat of being reproduced through pollen transfer. An overwhelming majority of alfalfa cut

and baled well in advance of pollen shed. Also, I am not aware of any alfalfa in the market that I work that is grown organically. I think the technology and use of Roundup Ready alfalfa is very important to the advancement of agriculture.

As a seed company professional, I support the deregulation of alfalfa engineered for tolerance to the herbicide glyphosate. The environmental impact statement prepared by the Animal and Plant Health Inspection Service in Docket No. APHIS-2007-0044 validates and ensures the safe production of glyphosate tolerant alfalfa.

Biotechnology-based breeding methods safely enhance and extend a crop's yield potential, feed value, adaptation, pest tolerance, environmental benefits, crop management and utilization options, as other biotech crops have demonstrated.

The overwhelming majority of alfalfa acres – 99.6 percent – produce only forage, which means farmers harvest their fields before alfalfa plants accept or produce pollen. More than 75 percent of alfalfa forage is used on the same farm where it is grown. Only 1 percent of U.S. forage is organically grown. Stewardship practices allow for the successful coexistence of organic, conventional and Roundup Ready alfalfa, allowing each market segment to be served.

A national alfalfa industry consensus plan for seed and hay industry coexistence and stewardship was adopted in June 2008 under the auspices of the National Alfalfa and Forage Alliance (NAFA). Coexistence plans for seed production and other markets are comprehensive and science-based. The NAFA best practices have been validated i n two years of commercial seed production.

I urge the USDA to consider biotechnology's long history of success and allow alfalfa growers to join other American f armers in the benefits and new opportunities offered by biotechnology. (Comment Number: APHIS-2007-0044-5277-1)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I have been long concerned about GE crop contamination for its real threat to the purity and safety of our food system. Now that the USDA has acknowledged that GE contamination in alfalfa will adversely impact the organics industry and all affected please rule to forbid GE alfalfa production.
I feel strongly that the contamination of organic alfalfa, or any organic crop, from GE spores should be a top USDA priority in a world that suffers one ecological blow after another at the hands of big business. Please stand up for REAL food.
Any animal the eats GE grains or grasses passes something of them on through their meat or milk, making its way into thousands of consumer products. Consumers who are educated on this matter have long said keep GE ingredients out of my food, and so far only by purchasing

organics has this been possible. But it's clear that organic crops and animals that eat them are threatened each time another GE crop gets planted.
Please support a true food economy and don't allow GE alfalfa to become another conquest by the biotech industry and another nail in the coffin of TRUE FOOD that feeds, nourishes and protects...naturally (Comment Number: APHIS-2007-0044-5281-1)

Response: In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for Issue 5.2. In regard to the impact on organic markets, see response to comment APHIS-2007-0044-5281-1 for Issue 5.6.

Comment Excerpt Text:
Do not allow genetically modified alfalfa to be ingested by organically raised cows.
Because this would be the first perennial crop to be approved for genetic modification and release. Alfalfa is open-pollinated by bees. With bees traveling 4-6 miles, they can potentially spread the patented, foreign DNA to distant conventional and organic crops. The potential for biological contamination from a neighbor's field, even miles away, threatens the livelihood of organic farmers, dairies and other livestock producers. U.S. organic standards prohibit genetic engineering. Buffer strips and other devices required with other GE crops are essentially useless. As a perennial, it is very likely that genetically engineered volunteers will escape from farm fields and/or be scattered along roadsides from harvest and transport equipment. Escaped or feral plants will live on for years producing GE pollen to contaminate non-GE alfalfa.
The USDA's EIS maintains that avoiding GE contamination would be your responsibility as an organic producer. They say that all you have to do is change your planting and harvest schedules to "avoid simultaneous flowering" with RR alfalfa in your neighbor's field, and "disallow or remove commercial beekeepers' hives anywhere near your alfalfa field." Is this feasible? Tell the USDA that they need to protect all farmers and the livelihoods of those who choose not to grow RR alfalfa.
Ninety percent of all the alfalfa seed sold in the US comes from 5-6 compact geographic areas ideal for growing the seed in the Pacific Northwest and Canada . Yet the USDA's EIS fails to recommend significant isolation zones where the planting of GE alfalfa would be illegal, and help to protect the vital nature of uncontaminated alfalfa seedstock.
The vitality of the $25 billion organic industry is at risk (Comment Number: APHIS-2007-0044-5286-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0. In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1. In regard to isolation zones, see the response to comment APHIS-2007-0044-11741-4 for Issue 1.0.

Comment Excerpt Text:
GM alfalfa represents a major threat to organic farmers and organic dairy production. Organic farmers use alfalfa for feed and in crop rotations to maintain soil nutrient levels and organic matter, and to prevent nitrogen leaching.

GM alfalfa threatens the very fabric of the organic industry. In order for dairy products to be marketed as organic, certified organic alfalfa must be used as forage. When contamination of GE alfalfa becomes widespread, organic dairy farmers will no longer be able to give that assurance. Genetically engineered alfalfa will be devastating for organic dairy and livestock. Alfalfa is one of the main forages use and too important to do without."
Once we have Roundup Ready alfalfa, it will be virtually impossible to control the Roundup trait in seed.
This is because alfalfa is cross pollinated by bees, and pollen will travel easily from GM alfalfa to non-GMO and organic alfalfa. Even with the best isolation methods, you can't control bees; they can travel several miles.
We are going to get contaminated seed!
Jack Lazor, owner of Butterworks Farm in Westfield, Vermont, says the situation with GM alfalfa is similar to that of canola where GM varieties all but eliminated the organic canola market. "All you have to do is compare what happened with canola, which is also insect-pollinated," he says. "Why isn't the same thing going to happen with alfalfa?"
Protect American agriculture, not Monsanto (Comment Number: APHIS-2007-0044-5289-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0. In regard to behavior of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1.

In regard to the National Organic Program, see the response to comment APHIS-2007-0044-10866-5 for Issue 3.3.

Comment Excerpt Text:
As a farmer in Iowa, I do not support Round up ready alfalfa. They can not guarentee that GMO's will not contaminate by means of cross polllination or in the seed production side down the road or that there will not be GMO's present in my fields and in my crops. It is a highly possible unfair contamination to my fields, something I definetly don't want any part of!
James Joseph Welter (Comment Number: APHIS-2007-0044-5294-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I do care about the integrity of the organic label and the practices that support it. I feel the EIS study is wrong to assume that I will not change my buying practices regarding dairy and meat if I understand that their feed is no longer organic (which includes meaning that the feed has been grown from seeds that have been genetically modified/altered to tolerate branded (ROund up etc) herbicides.
I do not believe that industry best practices regarding the prevention of the spread or other contamination of GT/CM crops can be sufficiently rigorous given the variety of customers using them (Comment Number: APHIS-2007-0044-5318-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I am against deregulation of RR alfalfa because: I am concerned that GE Alfalfa will have a different nutritional profile that will be detrimental to some animals. I am concerned that honey bees might be affected. I am concerned there won't be enough safeguards to protect farmers who produce their own seeds from contamination by GE alfalfa, and for protection from legal action by Monsanto if their seeds become glyphosphate resistant. Furthermore, I think weeds will become glyphosphate resistant eventually. And that releasing glyphosphate into the environment is harmfull to amphibians (Comment Number: APHIS-2007-0044-5338-1)

Response: In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for Issue 5.2. In regard to potential health effects on honey bees and amphibians, see the response to comment APHIS-2007-0044-5338-1 for Issue 4.0.

Comment Excerpt Text:
As a consumer that is very interested in organically raised products, both vegetation and meat products, I am opposed to the non-regulated status of genetically modified alfalfa. About 75% of the corn grown in the U.S. today is genetically modified (which means it cannot reproduce; we are dependent upon seed makers to provide this "dead" seed). Crops as distant as 20 miles have been contaminated by GM corn, rendering those crops also dead and unable to reproduce. It is reasonable to expect that a similar contamination would occur with alfalfa. Aside from the negative dependency on seed producers and the potential health effects of GM foods themselves, this would render the raising of organic meat almost impossible.
Please don't allow this to happen (again)!
Thank you (Comment Number: APHIS-2007-0044-5378-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Please do NOT endanger our organic food supply by allowing the big corporations (in this case Monsanto) to put genetically modified alfalfa seed out there. We are loosing genetic diversity and the ability to allow farmers and gardeners like us to save seed which is vital to a safe organic food supply now and in the future. Do not allow this -- Docket No. APHIS-2007-0044 -- stop Monsanto and the other large corporations from monopolizing and threatening our American food supply. Thank you (Comment Number: APHIS-2007-0044-5381-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I strongly oppose the development of genetically-modified and herbicide-resistant plants. Please do not approve "nonregulated status" for Glyphosate-Tolerant Alfalfa. Your own study shows that there is a strong possibility of gene flow through natural pollination methods (p. 32 of this report), which is an unacceptable risk to the integrity of a number of agricultural products, including animal feed, honey, and nitrogen-fixing cover crops.
Please do NOT grant glyphosate-tolerant alfalfa non-regulated status. Please DO impose the most stringent regulations possible on the distribution of this crop. My preference, in fact, would be to ban GE organisms entirely, though apparently that option has been ruled out already. Failing that, please regulate GE crops with an eye to protecting non-GE crops from accidental gene drift and mixing, using isolation distances and any other reasonable measures (Comment Number: APHIS-2007-0044-5413-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
Genetically modified organisms must be regulated if the government is truly doing the job for which it was created -- protecting and serving the welfare of their citizens.
Glyphosate-tolerant alfalfa NEEDS to be regulated.
Please DO NOT allow the unregulated distribution of glyphosate-tolerant alfalfa.
The contamination of organic crops by GE alfalfa will cause incredible harm to organic and other farmers that do not use GE seeds.
Contamination of crops by GE seed is widespread, widely documented, and unavoidable once seed-producing GE crops are introduced to the environment -- even at test site levels.
Please consider the health and well-being of all the citizens and not just the profits of corporations.
Thank you (Comment Number: APHIS-2007-0044-5441-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
The long-term impact of Glyphosate-Tolerant strains of seed/plants on natural environments and livestock cannot be known at this time because there has not bee sufficient data collected. The inability to constrain genetic drift is alarming enough, and infringes on the rights of farmers to grow non-genetically modified or non-proprietary seed.
Please require further testing, and long term studies by third party entities to verify the genetics can be both contained and tracked. (Comment Number: APHIS-2007-0044-5461-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
I am a consumer of organic produce, meat, dairy, and other products. I am very concerned with GE contamination of crops and about overuse of pesticides. Please do not approve Glyphosate-tolerant alfalfa. (Comment Number: APHIS-2007-0044-6201-2)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response). In regard to pesticide overuse, see the response to comment APHIS-2007-0044-0402-1 for Issue 6.3.

Comment Excerpt Text:
Genetic engineers have never taken the reality of gene transfer into consideration when they have introduced genetically modified organisms into the environment. We are now beginning to experience the dire consequences of this oversight as their engeneered genes are spreading among and altering other organisms in the enviroment. (Watrud, et al, 2004)
Lipton, Ph.D., Bruce H.. Biology Of Belief. 7th Edition ed. New York City: p 14 (Comment Number: APHIS-2007-0044-6620-3)

Response: In regard to the genetic engineering process and unintended plant traits, see response to comment APHIS-2007-0044-7620-38 for Issue 13.

Comment Excerpt Text:
USDA failed to require an EIS when Monsanto first introduced GE Alfalfa. This is a serious flaw in the process to manage the global impact of gene drift from widespread planting of GE seeds. This further reduces our confidence in the ability of USDA APHIS to do its job of protecting the environment, and the health and safety of our food supply. (Comment Number: APHIS-2007-0044-7955-3)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
As a biologist working in the area of new crops, useful plant species, and conservation of traditionally used crop germplasm, I am concerned that prior to the release of this alfalfa, any possibility of the migration of genes to non GMO plants, that might result in a negative effect on crops grown on neighboring farms be completely ruled out. I trust that this will indeed be the case and would appreciate being kept informed of the progress of this applications. (Comment Number: APHIS-2007-0044-8613-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
It would expose livestock widely to both genetically engineered genes and pesticide residues. It would especially affect cows and horses--their health, their reproduction, and their byproducts, particularly milk.
Alfalfa pollen is carried far and wide by the wind and bees, so the presence of GM alfalfa in the environment would contaminate organic alfalfa, rendering organic dairy impossible. Consumers who eat alfalfa sprouts would be exposed directly, as well as those who eat meat (Comment Number: APHIS-2007-0044-9209-3)

Response: In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for Issue 5.2. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I'm writing to OPPOSE the request to approve genetically modified (glyphosate-tolerant) alfalfa as a nonregulated seed product. Alfalfa is an important feedstock in the production of naturally-produced, grass-fed beef, lamb, buffalo, and other meats. As a consumer who intentionally seeks out naturally-produced and organic meats, I am vehemently opposed to genetically-modified foods of ALL kinds, including GM alfalfa. GM crops have proven, time and again, their propensity to escape cultivation and spread--contaminating other varieties of that crop. That contamination would strip organic consumers and producers of their right to unadulterated food, as it is already doing in the case of corn, soy, rapeseed, and other GM foods. U.S. farmers are asking consumers to make their desires known. Please deny Monsanto's request for glyphosate-tolerant (genetically modified) alfalfa and preserve our ability to produce organic grass-fed livestock (Comment Number: APHIS-2007-0044-9231-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Alfalfa is the fourth most widely grown crop in the U.S. and a key source of dairy forage. The first perennial crop to be genetically engineered, GE alfalfa can regenerate itself from its root-stock. It is open-pollinated by bees, which can cross-pollinate at distances of several miles, spreading the patented, foreign DNA to conventional and organic crops. GMO-contamination of organic alfalfa is inevitable if the Obama Administration successfully commercializes Monsanto's GM alfalfa. (Comment Number: APHIS-2007-0044-9240-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response). In regard to alfalfa being the first perennial crop see response to comment APHIS-0044-11018-8 issue 2.2.

Comment Excerpt Text:
I want you to know I am entirely opposed to genetically modified alfalfa because without a doubt, it will contaminate all alfalfa with its genetic code, shutting down farmers who want to grow non-engineered alfalfa, eventually making the same unavailable.
I urgently demand that you reject this proposal from Monsanto to sell this genetically engineered alfalfa.
I do not want this genetically modified alfalfa to contaminate organic and other types of non-genetically modified crops. Monsanto's introduction of this crop will make it eventually unavoidable in all food chains making it impossible for consumers and farmers to opt out of this contamination.
As seen with Monsanto's other genetically modified crops, farmers of traditional, or organic non-genetically modified crops are being put out of business by cross-contamination in their fields. Organic farmer's livelihoods as well as the availability of non-genetically modified foods are at risk, and that is unacceptable to me.
Again, I urge you to reject Monsanto's application to market genetically engineered alfalfa.
(Comment Number: APHIS-2007-0044-9247-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Hay-to-hay interface is the most likely to occur. As shown in Figure 1, gene flow in this situation is an order of magnitude lower than with seed-to-seed. This is because, although hay may bloom prior to harvest, a germinating viable seed, required for the culmination of gene flow is highly unlikely (Putnam, 2006; Teuber et al., 2007). The most important factor for hay growers to maintain purity is to begin with certified seed for planting.
As in Van Deynze et al. (2008), Bagavathiannan and Van Acker (2009) present a comprehensive document on the biology of alfalfa with emphasis on potential gene flow due to ferality. Unfortunately, Bagavathiannan and Van Acker (2009) make deductions based on biology vs. actual production data. Furthermore, their conclusions on coexistence are based on zero tolerance for GE, a non-practical threshold for agriculture and one that is in practice in only a few exceptional cases. Even U.S. nutrition standards follow practical, non-zero thresholds for impurities and specific quality claims. Additionally, less than 5% of the alfalfa market (including export, domestic and organic) in the U.S. is estimated to be GE-sensitive (Putnam, 2006). Feral alfalfa has been shown to be a possible source of gene flow (Hammon et al., 2006). Data from the Hammon study indicated that there was no correlation between distance and gene flow up to 1.7 miles. Feral plants have a large disadvantage over commercial fields since they are not managed. As a result, there is a reduced chance of synchronous flowering and a very high chance feral plants are destroyed by insects and consequently, seldom produce viable seed (Hammon et al., 2006). Feral plants and natural populations do exchange genetic material. Although improved cultivars have perceived naturally advantageous traits, such as disease and insect resistance; this crosspollination has not resulted in outbreaks of uncontrollable feral populations. This is likely

due to a constantly changing environment that prevents selection for a single trait. The polyploid genetics and outcrossing nature of alfalfa also prevent fixing of genes or traits in one specific direction. The very low relative abundance of pollen and pollinators and the high degree of environmental stress on the feral plants relative to those within commercial seed production fields will reduce the likelihood and commercial importance of Seed-to-Feral and subsequent Feral-to-Seed or Feral-to-Hay gene flow risks to near zero. Gene flow due to adventitious presence in seed can be effectively managed though crop rotation and the use of certified seed. Although certified seed programs do not test for GE, they guarantee a high level of seed purity for variety type and seed contaminants (Van Deynze et al., 2008).
Coexistence
Coexistence strategies for alfalfa production systems have been developed and tested by growers and the seed industry with input from seed and hay exporters, growers, processors, seed companies and public scientists. For example, the science-based information outlined above was published and disseminated in 2005 at grower (Western Alfalfa Seed Grower Association symposiums) and seed industry (California Seed Association, American Seed Trade Association) meetings prior to commercialization of Roundup Ready alfalfa (Van Deynze et al., 2004b). For example, over 3000 copies of these publications were disseminated at the meetings over the past 3 years. Specific stakeholder meetings were held in Idaho and California (http://ucce.ucdavis.edu/files/filelibrary/5283/22000.pdf) and the publications were used to develop Best Management Practices. On October 10, 2007, a meeting was held by the National Alfalfa and Forage Alliance to specifically address coexistence in alfalfa. The meeting was attended by 70 growers, industry and public scientists representing conventional, organic and GE production systems. At these meetings and up to the present, Best Management Practices have been refined to allow farmers to coexist and have a choice of what production system is best for their particular markets. The resulting whitepapers addressing alfalfa hay and seed export markets, and organic production are available from the National Alfalfa and Forage Alliance at http://www.alfalfa.org/CSCoexistenceDocs.html. Furthermore, as an independent agency, AOSCA has developed its own best management stewardship program available for growers. Alfalfa farmers are well-informed, experienced seed growers who can apply these strategies to their specific farm situation. (Comment Number: APHIS-2007-0044-9304-6)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment. APHIS evaluated the references in this comment and added discussion of these references to Section IV.B.3 and Appendix V of the FEIS.

Comment Excerpt Text:
The perannual alfalfa grows from seed and regrows from roots after forage or seed crop harvest. The alfalfa blooms must be pollinated by other plant pollen carried by bees (leaf cutter, honey, alkali types) over distances up to several miles. This is the main source of contamination of conventional alfalfa with genetically engineered alfalfa. Isolation of fields by several miles have not worked with other crops and surely will not work with alfalfa.
The idea of allowing 1% contamination of GE seed in conventional varieties with a 2% max illegal above that will doom myself and others who produce forage and seed from the same fields. We produce up to half the annual seed production at economical costs. The 1% GE seed contamination when planted and harvested doubles every seed generation – 1% to 2%, 2% to

4%, 4% to 8%, and so on – on the average. This is well known by experienced alfalfa breeders. Alfalfa is normally grown for several years before the field is rotated into another crop. Alfalfa fixes nitrogen soil nutrition and improves soil texture at low fertilizer cost input (Comment Number: APHIS-2007-0044-9391-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
The genetic diversity of the alfalfa conventional seed must be maintained. GE alfalfa seed contamination would have a severe impact on this diversity. Historically, the European potato famine of the mid-1800s was caused by a lack of potato genetic diversity. (Comment Number: APHIS-2007-0044-9391-3)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Superior alfalfa genetics have evolved over decades in local environments. GE alfalfa contamination would cause a severe impact on seed reproduction. (Comment Number: APHIS-2007-0044-9391-4)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
While I agree with the general notion that genetically modified foods might be safe for human consumption and even offer advantages over conventionally bred crops, it should be up to the consumer to decide whether they want to purchase GM or conventional food items. The convenience to the farmer and the profit margin of agricultural industries should not be relevant measures for regulatory agencies.
The companies and farmers must be able to demonstrate that they can follow their product through the food chain and keep it from cross-fertilizing/breeding outside of controlled environments. In this case, this has not been achieved. The request for non-regulated status should thus clearly be declined (Comment Number: APHIS-2007-0044-9400-1)

Response: In regard to consumer choice see response to comment APHIS-2007-0044-9400-1

Comment Excerpt Text:
So please take my request seriously and represent my viewpoint. GMO-contamination of organic alfalfa is inevitable if the Obama Administration successfully commercializes Monsanto's GM alfalfa. I request that you do not let this commercialization happen. The

USDA's EIS needs to take the contamination of organic crops more seriously. As long as there is a risk of contamination, Roundup Ready alfalfa shouldn't be allowed. (Comment Number: APHIS-2007-0044-9423-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Farmers' have a fundamental right to sow the seeds of their choice but this choice can be eliminated by GE contamination. This happened in Canada when prairie organic grain farmers had to stop growing canola because there was no way to prevent contamination by cross-pollination with GE canola during the growing season, even if farmers could find uncontaminated seed for planting.
Organic farming is the only sensible environmental choice. It provides healthy food grown without pesticides or GE organisms, and it builds better soil. The future of organic farming is threatened by GE alfalfa.
I care about the contamination of organic foods from GE alfalfa. (Comment Number: APHIS-2007-0044-9446-2)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response). In regard to past adventitious presence cases, see the response to comment APHIS-2007-0044-9936-10 for Issue 11.15.

Comment Excerpt Text:
The RR gene will spread throughout the entire alfalfa population both domesticated and feral and cannot be recalled.

There are large amounts of feral alfalfa in seed producing areas of the western United States.

Gene flow from RR alfalfa seed fields to feral alfalfa will result in a high level of contamination, 25-35% in the first year. Gene flow from RR alfalfa forage fields will be significant, because the edges and border areas are seldom cut. These areas are left to blossom the entire season. See the contamination report attached.

The EIS says that the GE trait is NOT expected to impart increased fitness in feral alfalfa.(EIS pg 101). This assumption was made in a situation where glyphosate was absent. Page V62 EIS ”IN THE ABSENCE OF GLYPHOSATE exposure there is no adaptive benefit to feral plants containing the Roundup ready gene versus their conventional counterparts.”(Emphasis added) In the real world glyphosate is widely used in non crop land, particularly in the West. The statement that feral RR alfalfa plants will have no adaptive advantage is totally false. The RR gene in feral alfalfa will give it the ultimate advantage.

Also, on page V6Z of the EIS it is stated that “most seeds formed on feral alfalfa will likely perish; as most would fail to successfully germinate, compete, or establish outside of cultivation.” This is totally false. If this was correct, how does the feral alfalfa population maintain itself and spread? One feral alfalfa plant will produce on average 50,000 to 500,000 seeds during a life span of 3 or 4 years and only one of these seeds need to establish in order to maintain the feral alfalfa population.

Alfalfa has a high level of hard seed that can lay dormant in the soil for many years. Once a feral RR alfalfa goes to seed the soil will be contaminated with RR alfalfa seeds and it will be impossible to eradicate. The RR gene will leapfrog across the entire landscape within a few years. The EIS does not evaluate the role of hard seed.

For factors increasing the probability of gene flow see pages 104 & 105 of the EIS. The factors listed demonstrate how easily gene flow between alfalfa populations can occur. At the conclusion of this section, the author states the following:

“If alfalfa farmers take these factors into consideration and employ measures to counter these factors, such measures should also help farmers effectively reduce or prevent gene flow between neighboring alfalfa crops. Combined with the measures discussed above that can be employed to decrease the probability of gene flow between alfalfa fields and crops, we do not believe that the potential flow of genes and traits between alfalfa populations in the United States should amount to a significant impact on the human environment.”

Changing farming practices would require the cooperation of nearby landowners and farmers who would have no benefit from them only additional work and expenses. Furthermore, if there are no penalties for not following these changed farming practices, any suggestion or thought that these practices would occur or continue over any length of time is totally false. Even with a small amount of RR contamination there would be a huge impact on the export of US produced alfalfa seed.

Voluntary rules that cause a lot of extra expense to hay growers will not be followed. Controlling alfalfa around the borders of fields was not practiced when RR alfalfa was deregulated and will not be practiced. Asking honey bee keepers to keep their bees 3 miles away from RR alfalfa fields is ridiculous. Bee keeping sites are coveted by bee keepers as a valuable asset to their operation and they won’t give them up voluntarily just because they are asked to. Most bee keeping sites are not on seed grower’s property and the seed grower has no authority to tell bee keepers to take their bees away.....particularly within 3 miles of his operation.

Farmers who are not interested in planting RR alfalfa and who wanted to avoid contamination of their non-GM crops, (according to the impact statement, page S-30, b) Avoidance costs) could plant barriers around their fields (“buffer zones’), move to another location (“relocating to non-deregulated areas”), or have their crops tested for contamination levels (“requiring testing for GT alfalfa traits in alfalfa seeds used for production”).

The arrogance of Monsanto, Forage Genetics, and the USDA authorities supporting Monsanto is unbelievable! It is unjust and improper for them to suggest that conventional seed growers

should move their farming operation to another location so Forage Genetics and Monsanto can raise RR alfalfa anywhere they want.

From the EIS, page V87:"Feral plants are crop plants that grow and reproduce outside of cultivation. Feral alfalfa plants can sometimes be found on road edges, in fence lines, and in abandoned fields. In the US, feral alfalfa populations have occurred through unintentional plantings of cultivated varieties ("escapes" from cultivation) or, in some cases, they originated from intentional planting of the abandoned fields, roadsides or marginal lands. Feral alfalfa occurs at very low density and scale relative to cultivated alfalfa grown for seed or hay. Biogeographic survey data from six states indicates that for most agricultural areas feral alfalfa plants do not occur or are sparse (Kendrick et al.,20005). In a 2001/2002 multi-state survey, feral plants were found as dispersed plants or patches within 1.25 miles (2km) of cultivated alfalfa at only 22% of the survey sites (Kendrick et al.,2005) Feral alfalfa plants are sometimes managed on roadsides by clipping, either with hay being harvested or simply left on the ground along with other roadside vegetation.. Feral plants are sometimes completely unmanaged and given adequate moisture and timely presence of pollinators, can flower and set seed. Feral plants are susceptible to the environment (e.g. drought in the irrigated West) and insect (e.g.Lygus bugs in the West and potato leafhopper in the East) stresses common to the local area. Although alfalfa was introduced to North America more than 200 years ago, it is not considered weedy, noxious, or invasive in cultivated or feral settings."

The survey sites were 500 square meters (or approximately 75 feet by 75 feet square). There are approximately 8000 potential sites within 2000 meters of an alfalfa field. If 22% contained a feral alfalfa population, there would be over 1700 feral alfalfa populations within 2000 meters of the alfalfa field. This is a significant number of alfalfa plants. Control of these plants would be difficult, if not impossible, particularly when the land within 2000 meters is not controlled by the seed grower. The way this report was written the reader would get a false impression as to how much feral alfalfa is growing next to alfalfa seed fields.

Page V85 EIS 5.12.5.3 "Gene flow from the four large fields to the very small (1 square meter) pollen traps was notably higher, with 25% to 35% out-crossing measured at 1000 meters. Data is presented for percent out-crossing, but the number of seeds produced on each trap or trap plant (the sample size) was not reported." The large number of feral alfalfa plants in the farming areas and the high percent of gene transfer in just one season, guarantees the RR gene will be spread throughout the environment.

Common use of Glyphosate in these feral alfalfa areas will soon result in all of the feral alfalfa populations becoming contaminated with the Roundup Ready gene, because glyphosate will kill non-GE alfalfa seed leaving the contaminated GE feral alfalfa to flourish. In just a few years, the Roundup Ready gene will leapfrog over the entire landscape. Alfalfa's production of hard seed will make it impossible to recall this GMO plant.

The EIS fails to adequately assess the risks from feral alfalfa as a pollen bridge for contamination and the USDA must do further study on this important issue. The environmental impact statement did not discuss how farmers and seed companies complied with the Best Management Practices to control the spread of the RR gene when RR alfalfa was deregulated.

Compliance with Best Management Practices is voluntary and when RR alfalfa was deregulated Forage Genetics did not police the people who purchased RR alfalfa. (Comment Number: APHIS-2007-0044-9537-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.
In regard to the comment about misrepresentation of the amount of feral alfalfa present in fields next to alfalfa, it is impossible to accurately quantify the amount of feral alfalfa around each alfalfa field given landscape variability. Feral alfalfa can and sometimes does occur near alfalfa fields. There may be some regional variation in the frequency of this occurrence. This is likely to be influenced by the suitability of the land. Depending on who controls the land where the feral population sits, it may be more or less difficult to control and can contribute to gene flow of GT alfalfa.

Comment Excerpt Text:
ISSUE FIVE Stand Take-out of Conventional Alfalfa

At stand take out of conventional alfalfa, a burn down at a high rate of generic glyphosate is an inexpensive and widely used cultural practice because not only alfalfa but other weeds, such as quack grass, are killed. Crops can be immediately planted in fields sprayed with glyphosate but not with any other kind of herbicide.

If the conventional seed planted by the farmer was contaminated with only a slight amount of RR seed the surviving alfalfa plants that are GT will have to be removed by some other method. If they are not removed and RR soybeans or cotton are planted the GT alfalfa plants will survive, mature, and make copious amounts of seed, some of which will be hard seed that will emerge years later.

Herbicides other than glyphosate have serious problems with soil residues and volatility.2,4-D and Dicamba for example, are volatile and in warm temperatures the vapor can drift for miles causing serious stunting to crops such as sugar beets, dry beans, grapes, and other desirable plants. Herbicide residues will cause delayed planting dates and prevent some crops from being planted for years. Spring burn down applications of any herbicide other than glyphosate is very risky.

Monsanto and Forage Genetics are suggesting that the tolerance for the RR alfalfa gene in conventional alfalfa seed should be .5 to 1%. That is unacceptable particularly for the export market and most US Farmers. If a grower is planting conventional alfalfa they will not want to plant seed that is contaminated. RR alfalfa will be a new and difficult weed in other RR crops. Why wasn’t a tolerance for RR contamination established before RR alfalfa was deregulated in 2005? There have been no regulations regarding the RR contamination in conventional alfalfa seed and no tests are required. Since 2005 conventional alfalfa seed that is contaminated with the RR gene has been sold and planted. Who is going to take responsibility for the added cost to farmers to remove RR alfalfa in their fields? (Comment Number: APHIS-2007-0044-9537-5)

Response: In regard to stand removal practices for GT alfalfa, see the response to comment APHIS-2007-0044-11037-28 for Issue 7.1. The point regarding 0.5 percent to 1 percent adventitious presence effecting the use of glyphosate for conventional stand removal has been added to the discussion of stand removal in Appendix J 2.5.2 and Appendix G 3.1.2 of the FEIS.

Comment Excerpt Text:
No law or regulation requires farmers who plant Roundup Ready crops to implement practices that prevent cross-pollination with neighbors' crops. This has led to the inability to keep transgenic traits out of non-GE seed sources, including those that organic farmers rely on.
The EIS also states that stewardship practices laid out in organic system plans and Monsantos best practices are sufficient to minimize cross-fertilization between organic and GE crops (p. 103).
First, this statement regarding cross-fertilization places the burden of protecting the integrity of organic seeds, agricultural products, and markets solely on the shoulders of organic producers. This is an imbalanced and unfair burden. There needs to be mandatory regulation and enforcement of best practices for growers and patent holders of GE crops. The extent to which organic and non-GE seed is contaminated by GE material is unknown because it has not been comprehensively examined.
Second, the EIS assumes that commercial growing and harvesting of Roundup Ready alfalfa will always occur under ideal conditions. The EIS contends that alfalfa is harvested before 10% of flower, yet several factors keep farmers from harvesting at this ideal time, including poor weather. Farmers cannot always avoid hay stands going to bloom and producing viable pollen. Instead, the burden of protecting alfalfa plants and sensitive markets from transgenic traits, such as planting buffer areas, is completely transferred to the producer of organic and non-GE alfalfa.
Third, tests already reveal contamination of non-GE alfalfa. In these cases, segregation distances have proven ineffective. In December 2006, just over a year after Roundup Ready alfalfa was commercialized, the Idaho Alfalfa and Seed Clover Association reported that Roundup Ready alfalfa traits were found in conventional alfalfa seed in Montana, Wyoming, and Idaho, including foundation seed, which contained enough transgenic material to deem it useless as seed stock. This foundation seed was two miles from the nearest Roundup Ready field. At the time of these tests, segregation distances were set at 900 feet.
Also in 2006, the Colorado State University Extension tested feral alfalfa plants at 23 sites in Mesa County along roadsides, abandoned fields, and edges of active hay fields within two miles of Roundup Ready alfalfa seed fields. Transgenic gene flow was found at 83 percent of the collection sites. Complete segregation of Roundup Ready and organic and other non-GE alfalfa varieties is simply unlikely.
Given this evidence, APHIS should comprehensively examine the extent to which contamination has already occurred. At least 200,000 acres of Roundup Ready alfalfa were planted commercially before the courts ruling, as well as a number of experimental field trials. Once seed is contaminated, contamination expands along the entire chain of production, from seed to crop to final product. Collecting this data would inform this decision-making process and provide useful information to organic alfalfa and livestock producers.
MOA was happy with the U.S. District Court for the Northern District of Californias 2007 decision to require a full EIS of Roundup Ready alfalfa. In this decision, Judge Charles Breyer

wrote that to farmers and consumers organic means not genetically engineered, even if the farmer did not intend for his crop to be so engineered. Judge Breyer understood well that contamination of organic products by GE alfalfa removes choice from the organic farmers and consumers alike.
Therefore, the EIS should analyze the economic costs of contamination to producers of organic, natural, and conventional alfalfa seed, grass, hay, sprout, honey, livestock, meat, milk, and other foods. The impact of widespread contamination of organic alfalfa hay by GE alfalfa must take into effect the availability of organic feed for dairy cattle (and other organic livestock producers), the costs to organic dairy farmers and the organic dairy industry, as well as the price of organic milk to consumers
The EIS states that the supply of organic alfalfa hay and organic alfalfa seeds would not be directly affected by adoption of GE alfalfa (p. 133). APHIS said it did not have economic data or other related information to demonstrate economic ramifications to organic producers regarding loss of markets and increased production costs for protecting the integrity of products from GE crop gene flow (p. 132).
Keeping unwanted material out of organic fields can be a costly investment involving buffers, testing of source seed and crops, potential non-compliances, and changes to organic system plans to prevent contamination. Organic farmers currently have no recourse in the event GE material enters organic crops because the question of who is liable has not been determined. Organic farmers are left with the economic and agronomic costs of detecting and eradicating GE material; losing the genetic integrity of seed on which they rely; taking measures to avoid future contamination; and selling contaminated products into the conventional market, receiving a lower price for organically produced products. Sending contaminated products to the organic market threatens consumers trust in the credibility of this non-GE, high-value market. (Comment Number: APHIS-2007-0044-9561-2)

Response: In regard to the burden of control measures, see response to comment APHIS-2007-0044-11689-10 for Issue 9.0. In regard to seed stock adventitious presence, see response to comment APHIS-2007-0044-9936-7 for Issue 3.3.

Comment Excerpt Text:
As a farmer I am very much against approval of a non regulated status for genetically modified alfalfa in any form. As seen with other genetically modified crops, it ha not been possible to keep these crops from contaminating other crops. The effects of genetically modified crops has not been properly tested on humans or animals and it is irresponsible to move forward on this action until such effects have been fully documented over time. US farmers ask that you do not allow this to go forward. (Comment Number: APHIS-2007-0044-9601-1)

Response: In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for Issue 5.2. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:

Alfalfa is planted from seed. A stand will last 3-5 years, after which it is plowed under and rotated with another crop. The farmer will purchase new seed to reestablish the crop. Most of the issues related to gene flow are routinely encountered in alfalfa seed production and are not unique to genetically engineered (GE) alfalfa. Therefore isolation and mitigation procedures for maintaining genetic purity are well established.
Assuming there was gene flow from one RR field to a conventional or organic field, the gene flow would only affect the seed produced, not the plant that produces the seed. However, alfalfa is normally harvested before seed matures, or it will lose quality. Assuming farmer negligence, and the hay is harvested too later, the seed conceivably would mature and fall to the ground, but would most likely not be able to germinate due to autotoxicity– mature alfalfa plants secrete something that inhibits germination of their own seed, so alfalfa is seldom (almost never) planted immediately following a successful alfalfa crop. Rotation with other crops for one to two years are necessary to prevent autotoxicity effects from the previous alfalfa crop. If alfalfa crops are immediately followed with a subsequent alfalfa crop, effects ranging from total establishment failure to 40% yield reductions can be expected.
In summary, unless the actual seed stocks in certified seed fields were cross pollinated, the way alfalfa is seeded and harvested for hay pretty much ensures any adventitious presence of transgenic alfalfa would be somewhere between rare and non-existent. Thus, any argument that gene flow can cause widespread ‘contamination’ of organic alfalfa is ignoring the facts about alfalfa production and reproduction. (Comment Number: APHIS-2007-0044-9801-1)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment.

Comment Excerpt Text:
I have been involved in Minnesota agriculture all my life, having been born on a 1,140 farm in Dakota County that I farmed and managed until my retirement two years ago.
I have raised many crops of alfalfa, and always counted it as my best cash crop.
As a student at the University of Minnesota in the '70's, I wrote for the Minnesota Daily newspaper about ag issues, including Monsanto's RoundUp, which was being tested for its USDA label. At the time there were rumors that some of Monsanto's data didn't stack up, but they are not a company that anyone cares to buck. If you're a research agronomist, it can be a career killer.
Now Monsanto wants to release a "RoundUp Ready" alfalfa. If they are allowed to under the current legal regime, that will probably mean the end of all other seed producers.
Allowing a GMO seed producer to sue farmers and other seed producers for genetic drift is absurd and unfair. As long as that's the way that the law works, allowing a GMO alfalfa to be released will eventually force everyone else out of the business, with the result that alfalfa will become more or less a clone crop, a source of tremendous profit for Monsanto, but an expense and danger to the rest of the population.
I urge you to reject Monsanto's request for non-regulated status. (Comment Number: APHIS-2007-0044-9828-1)

Response: In regard to lawsuits from Monsanto, see the response to comment APHIS-2007-0044-6376-1 for Issue 5.1.

3.1 Issue 3.1 – Gene Flow Due to Pollen Transfer and Pollination

Comment Excerpt Text:
The USDA's Environmental Impact Statement on "Roundup-ready" Alfalfa needs to bear in mind five points:
1. GE crops are likely to pollinate neighboring fields. This has concrete consequences for neighboring farmers trying to achieve organic status.
2. GE crops that encourage spraying with herbicides support a mode of farming that destroys topsoil architecture and organisms. Many organisms, plants and fungi are required to create new topsoil out of organic matter. These organisms are decreased through heavy use of herbicides, insecticides and synthetic fertilizers. The productivity of topsoil is therefore lost over time.
3. GE crop contamination can decrease viability of neighboring farms for export to countries that do not accept GE crops.
4. Environmental and health impacts of Roundup have received very few research dollars in terms of overall contamination of river and groundwater systems and their impact on long-term health conditions. Allowing these crops to become widespread without a real understanding of their impacts is very risky.
5. Monsanto has consistently tried to use patent law to deny researchers the opportunity to study their products for adverse effects.
Thank you (Comment Number: APHIS-2007-0044-0375-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response). In regard to herbicide effects on soil environment, see the responses to other more specific comments under Issue 3.6, Issues 4.1 through 4.4, and Issue 8.3. In regard to impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for Issue 5.0. In regard to international trade, see the response to comment APHIS-2007-0044-3404-1 for Issue 5.4. In regard to health impacts, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for Issue 6.0. In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for Issue 5.2.

Comment Excerpt Text:
I am writing to plead with the USDA to keep GE Alfalfa regulated. All GE crops should be regulated. If a company like Monsanto will sue farmers when their GE pollen contaminates natural crops, their products should be treated like the carefully regulated intellectual property they insist they are. Regulate them like drugs.
Also, for the sake of the growing organic agriculture market, GE crops have to be regulated. GE, at least for now, is not allowed in organic production. Yet GE crops can contaminate non-GE crops, and this happens every year. This shouldn't be allowed. If farmers impinge on Monsanto's patent rights by doing nothing, farmers' rights to work with natural, safe, and healthful crops should be protected just as stringently.
Protect the people. Protect eaters. Protect the farmers. Monsanto can take care of itself.
Please, for the sake of food justice, keep this and all GE crops carefully regulated (Comment Number: APHIS-2007-0044-0391-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
While the long term effects of Genetically engineered organisms cross-pollinating with naturally occuring organisms cannot be fully understood, all GMOs should be regulated and prevented from contaminating the environment (Comment Number: APHIS-2007-0044-0458-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
Sirs, I am very much opposed to the approval of roundup ready alfalfa. As a dairyman and alfalfa grower for over 30 years, I have never wanted or needed to spray my alfalfa fields. Like a growing number of dairymen in my area, I now add grasses to my alfalfa seed. This is on the reccomendation of my dairy nutritionist and I am sold on it as are the cows.
There can be no doubt that contamination of non GMO alfalfa fields will occur. There are always areas of alfalfa fields that do not get cut before pollination, weather being the main reason. They have found the GMO corn gene in the native maize in remote areas Mexico. It is hard to believe that the GMO alfalfa gene won't cross a fenceline or road, and once the GMO genie is out of the bottle you can't put it back.
As far as profitability goes, the only ones making money off this will be, as in corn and soybeans, the manufacturers and sales businesses. Farmers need to ask themselves, are they really better off financially since the introduction of GMO corn and soybeans. High priced seed and high priced chemicals and the grain is worth the same price as before or less.
Conventional seed is becoming harder and harder to find as there are fewer seed varieties and seed companies to buy from. If left unchecked, farmers will be forced to buy there seed/chemical package from just 2 or 3 agribusiness giants.
The furure is in the seed. Thank you
(Comment Number: APHIS-2007-0044-0482-1)

Response: In regard to timing of alfalfa forage harvest, see the response to comment APHIS-2007-0044-10263-7 for Issue 3.1. In regard to impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for Issue 5.0. In regard to impacts on seed market concentration, see the response to comment APHIS-2007-0044-2225-3 for Issue 5.0.

Comment Excerpt Text:
I am strongly opposed to the allowing of Monsanto Corporation to sell genetically modified alfalpha. It has been amply demonstrated that genetically modified crops are able to spread their genes to neighboring, non-modified crops, either through pollen spread, or intentional contamination.
Buying organically raised meat, milk and eggs will be made much more difficult and costly.

I feel that more research will demonstrate a link between GM plants and the weakening of field crops could be shown.
Multiple instances of farms being contaminated by pollen from GM fields many yards apart are being seen, in Canadian rape (canola) fields, and others. Farmers are being visciously driven from business by Monsanto, through no fault of their own. Monsanto is the soul provider of GM seeds and thus a threat to try to maximize their own profits by raising prices, threats of lawsuits for even accidentally contaminated crops.
There is also very little research to prove that GM crops are not a potential hazard to human health.
For these reasons I ask that Monsanto not be allowed to put the consumers of the world at risk by releasing GM alfalpha.
Norman Hodge
(Comment Number: APHIS-2007-0044-0892-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0. In regard to impacts on organic farming and downstream markets (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for Issue 5.0. In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for Issue 5.2.
In regard to lawsuits from Monsanto, see the response to comment APHIS-2007-0044-6376-1 for Issue 5.1.

Comment Excerpt Text:
After concluding that no related, sexually compatible wild relatives of alfalfa exist in the United States, APHIS surmised that gene transfer could only occur through pollination by bees. In their analysis, APHIS uses an industry study conducted by Forage Genetics International[Footnote 1: McCaslin M, S Fitzpatrick, and P Reisen. 2000. "Summary of 2000 Alfalfa Pollen Flow Experiment." Forage Genetics International. http://www.naaic.org/publications/geneflowFGI2000/GeneFlowinalfalfa.html.] suggesting that the main pollinator bee for alfalfa – the alfalfa leafcutter bee (Megachile rotundata) – does not forage more than 600 feet from the nest. [Footnote 2: United States Department of Agriculture Animal Plant and Health Inspection Service. 2009. "Glyphosate Tolerant Alfalfa Events J101 and J163: Request for Nonregulated Status." Draft Environmental Impact Statement. December 2009. Page 95, Table 4-1.] Additionally, APHIS uses a single study[Footnote 3: Mueller, S. 2004. Seed production for genetically enhanced alfalfa. In Proceedings, 2004. National Alfalfa Symposium, 13-13 December, 2005, San Diego. UC Alfalfa and Forages Workgroup Web site, http://alfalfa.ucdavis.edu/symposium/2004/proceedings/Mueller_Seed%20Production20%Issues 20%fo%20GMO%Alfalfa.pdf] to support the fact that physical contact between bees at nest sites will not cause gene flow. Based on this limited information, APHIS concludes that gene transfer through bee pollination is not a concern. [Footnote 4: United States Department of Agriculture Animal Plant and Health Inspection Service. 2009. "Glyphosate Tolerant Alfalfa Events J101 and J163: Request for Nonregulated Status." Draft Environmental Impact Statement. December 2009. Page 95.]

However, the studies used by APHIS fail to adequately support this conclusion. First, the methods of the McCaslin study are fundamentally flawed. Based on a recommendation from an undisclosed source, McCaslin et al. used only two gallons of alfalfa leafcutter bees (20,000 loose cell larvae) per acre to study gene transfer amongst alfalfa plants. There is no standard stocking rate for leafcutter bees in alfalfa seed fields, with rates ranging from 2 gallons per acre up to 6 gallons per acre. [Footnote 5: Pitts-Singer, T. 2008. Past and Present Management of Alfalfa Bees. Bee Pollination in Agricultural Ecosystems. Oxford University Press.] Moreover, the USDA Agricultural Research Service (ARS) states that 40,000-60,000 leafcutter bees (or 4-6 gallons) are typically used in pollination of alfalfa seed crops. [Footnote 6: United States Department of Agriculture Agricultural Research Service. 2009. "Alfalfa Leafcutting Bee (ALCB)." April 3, 2009. http://www.ars.usda.gov/research/docs.htm?docid=18357&pf=1&cg_id=0. Accessed on February 11, 2010.]

In addition, the maximum forage distance for leafcutter bees is actually up to about one mile. [Footnote 7: Pitts-Singer, T. 2008. Past and Present Management of Alfalfa Bees. Bee Pollination in Agricultural Ecosystems. Oxford University Press.] As APHIS describes in the EIS, "alfalfa leafcutter bees will increase their foraging distance as the distance to high-reward resources (high nectar and pollen amounts) increases, and as closer resources become scarce." [Footnote 8: United States Department of Agriculture Animal Plant and Health Inspection Service. 2009. "Glyphosate Tolerant Alfalfa Events J101 and J163: Request for Nonregulated Status." Draft Environmental Impact Statement. December 2009. Page 95.] With a larger number of bees present, nearby high-reward resources will be tapped more quickly, thereby increasing foraging distances.7 Since McCaslin et al. studied the gene transfer effects with only 2 gallons of bees, it is very likely that the authors underestimated the potential gene flow of GE alfalfa and the extent of foraging distances for alfalfa leafcutter bees.

In a situation where there are insufficient pollen and nectar resources for all the bees (a situation generally characterized by high stocking rates – 4 to 6 gallons of bees per acre) some of the bees do not simply travel farther for food, but instead actually disperse and do not return to their nest. In such a scenario, a bee may visit flowers in the field where it was deployed7, then leave the field and travel some distance (potentially a mile or more) and establish a new nest near a food source with less competition from other bees. This could mean that a bee released in a GMO field would travel through that field, visit several flowers along the way, then take up residence in a nest adjacent to a non-GMO field. Therefore, without a geographic separation of several miles, the potential transfer of GE pollen to non-GE alfalfa seed crops by the alfalfa leafcutter bee may exist.

Further, leafcutter bees are not the only managed pollinators for alfalfa. The alkali bee (Nomia melanderi) is also used as a managed pollinator throughout the Great Basin and the Pacific Northwest. The alkali bee nests in dry lakebeds and forages over vast ranges (up to 3 miles from the nest site to get food). In several areas, alfalfa seed growers have been successful at establishing artificial nesting sites (simulated dry lake beds). Wild populations of the alkali bee also occur naturally throughout the west, and have a demonstrated preference for alfalfa flowers. [Footnote 9: Mader, E., M. Spivak, and E. Evans. 2010. Managing Alternative Pollinators. USDA Sustainable Agriculture Education and Research. National Handbook 11.]

Because of its wide distribution, strong affinity for alfalfa blossoms, and long-distance foraging, the potential exists for it to transfer GMO alfalfa pollen to non-GMO fields anywhere they are located within 6 miles from each other. Consider that with a 3 mile foraging RADIUS, that bees could forage in one compass direction, return to the nest, deposit their pollen load (with a few grains still adhering to their body), then forage in the opposite compass direction. Other native bees also routinely forage over significant distances, including bumble bees[Footnote 10: Teuber, L., Van Deynze, S., Mueller, M., McCaslin, S., Fitzpatrick, G. and G. Rogan. 2004. Gene flow in alfalfa under honey bee (Apis mellifera) pollination. Proceedings, 39th North American Alfalfa Improvement Conference, July 18-21, Quebec City, Canada.], which may range more than a mile from their nest, and could produce similar gene flow effects.

Honey bees represent an additional challenge to limiting gene flow between alfalfa varieties, particularly in California, where they are commonly managed for alfalfa seed production. In this scenario, the maximum foraging distance of honey bees is approximately 6 miles. Using the same scenario as the alkali bee above, this gives them a potential gene transfer zone of up to 12 miles. In fact, preliminary studies have already demonstrated sporadic honey bee mediated gene flow up to 2.5 miles between alfalfa seed fields in California.10

In addition, APHIS states that it is unlikely that physical contact between leafcutter bees at nest sites would result in gene flow, but fails to address the potential for gene flow to exist within honey bee hives. APHIS uses only one study[Footnote 11: Mueller, S. 2004. Seed production for genetically enhanced alfalfa. In Proceedings, 2004. National Alfalfa Symposium, 13-13 December, 2005, San Diego. UC Alfalfa and Forages Workgroup Web site, http://alfalfa.ucdavis.edu/symposium/2004/proceedings/Mueller_Seed%20Production20%Issues 20%fo%20GMO%Alfalfa.pdf] to support this conclusion and does not consider other studies that have shown that bees can, in fact, transfer pollen while in the hive. [Footnote 12: DeGrandi-Hoffmann et al. 1986. Influence of honey bee in-hive pollen transfer on cross-pollination and fruit set in apple. Environmental Entomology. 15:7823-735.] Thus, it is entirely possible that gene flow could occur within the hive as bees forage between GE and non-GE alfalfa.

The inadequate studies reviewed by APHIS do not provide sufficient basis for concluding that gene transfer through bee pollination is not a concern. Therefore, I urge APHIS to revisit the possibility of movement of the CP4 EPSPS gene through pollination by bees. (Comment Number: APHIS-2007-0044-10091-1)

Response: Behaviors and use of various bee species is discussed in Appendix O of the DEIS. The potential for gene flow between populations of alfalfa (seed fields, hay fields, and feral and other alfalfa) is summarized in Table 4-3 and discussed in Appendix V (Section 5.0) of the DEIS. APHIS has examined the suggested references and included an expanded evaluation of bee pollination and a discussion on beehive removal in Appendix V3.3.1, 3.3.2, 3.3.3, and Appendix O 1.3 of the FEIS.

Comment Excerpt Text:
The Biological Impossibility of Preventing Gene Flow

If deregulated, the flow of genes and traits from GE alfalfa is certain and will result in significant negative impacts on the human environment. The unintended presence of GE alfalfa cannot be prevented. Therefore, we contest the DEIS conclusion that alfalfa production practices are in place, or could be put in place, to protect against the unintended presence of GE alfalfa.
The movement of genes between GE and non-GE alfalfa plants is a certainty. Moreover, this gene movement will be widespread and result in a high level of unintended presence despite any implementation of "best practices" or stewardship agreements. The diverse use of alfalfa in agriculture across the U.S. and Canada, and the myriad risk factors, will assure the rapid movement of genes. It will be impossible to prevent the spread of GE alfalfa beyond the fields in which it is planted.
Canadian organic and conventional farmers who grow alfalfa or use alfalfa products will be negatively impacted by a decision to grant nonregulated status to GE alfalfa in the U.S., due to gene flow from GE alfalfa to non-GE alfalfa. Even if GE alfalfa is never commercialized and grown in Canada, if planted in the U.S. we would expect to see the unintended presence of GE alfalfa in conventional and organic alfalfa in Canada as a result of pollination and seed escape.
The factors outlined in the DEIS that increase the probability of gene flow are all relevant factors that together lead us to the conclusion that gene flow is certain, that the level of unintended presence will be high and widespread, and that no stewardship plan or "best practices" for management can protect against this contamination.
There is no way to prevent the sexual reproduction and seed dispersal of plants in nature. Outcrossing through pollination is an evolutionary survival strategy that promotes biodiversity and resilience in the face of environmental change. GE alfalfa plants are no different from conventional plants in this respect. They will perform their natural functions with the same promiscuity that has allowed alfalfa to thrive and spread across virtually all of the agricultural landscape of North America. As noted in the DEIS, "gene flow between alfalfa populations is a natural occurrence and bee-mediated cross-pollination among plants within a cultivar is necessary for commercial seed production." (page 32) (Comment Number: APHIS-2007-0044-10263-21)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
Pollinator Mediated Gene Flow
Alfalfa seed is pollinated by bees, primarily leafcutter bees, but also honeybees, several species of wild bees and wasps. In locations where alfalfa is produced in concentrated areas, as is the case with alfalfa seed, cross-pollination is a particular risk.
The measures stipulated in Monsanto's Stewardship Agreement are not adequate to significantly decrease the probability of gene flow. This includes the measure of isolation through distance between GE alfalfa from other alfalfa fields: "For pollination with leafcutter bees the distance must be greater than or equal to 900 feet, for Alkali bees greater than or equal to 1 mile, for honey bees greater than or equal to 3 miles." (page 103)
The stipulated distance of pollination with leafcutter bees of 900 feet is only applicable in perfect conditions where the bees have adequate food and there is no significant wind. Leafcutter bees are normally placed in nests in shelters in an alfalfa field at a minimum rate of 20,000 bees per

acre. A significant percentage of these bees do not return to their shelters. Leafcutter bees willmove several miles away in search of better bloom, within a quarter or half mile, if they are placed in a field that is not in full bloom for example. They can also be blown away in strong winds and storms. A large quantity of leafcutter bees can easily end up a mile away and a smaller number can move several miles.
The DEIS recognizes that "the movement of honey bees from crop to crop" is an additional factor that increases the probability of gene flow including the problem of farmers potentially releasing too many bees to pollinate one alfalfa field leading to the unintended and wide dispersal of bees. (pages 104-105) We argue, as above, that there are many factors relating to the movement of bees that will increase gene flow. (Comment Number: APHIS-2007-0044-10263-6)

Response: In regard to behavior of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1.

Comment Excerpt Text:
III. Blooming
There are many factors that can result in unplanned large-scale blooming of alfalfa. While alfalfa cut for hay, or for dehydrated products may be at a reduced risk of gene flow, the probability is still high. Alfalfa for hay production will often be cut after blooming starts, giving an opportunity for bees and other pollinating insects to transfer pollen from the GE crop to other alfalfa seed crops.
The Monsanto Technology Agreement for alfalfa would require GE alfalfa hay growers to harvest at or before 10 percent bloom (i.e. 10% of the blooms have opened in the alfalfa stand). The quality of alfalfa hay is optimal at the stage of first flower and Canadian management guides also suggest that alfalfa hay should be cut at 10% bloom or less, in order to optimize yields with forage quality. However, farmers are rarely able to manage their operations in exact accordance with recommended practices. Many other influences, the most significant being weather, can delay hay harvest until a later flowering stage, increasing the number of blooms available as sources of pollen with the GE trait. It is very common in areas with longer seasons to get 2 or even 3 cuts of hay, so the issue of blooming can exist more than once in a season as long as pollinators are active. By way of illustration, the U.S. National Honey Board says that alfalfa blooms throughout the summer because it is usually cut several times for hay. [Footnote x: http://www.honeylocator.com/floral _details.asp. Accessed on: March 1, 2010.]
Additionally, re-growth of alfalfa could create a contamination route. An unexpectedly long growing season can result in an unplanned second growth of alfalfa. The costs and/or timing of haying could make it too expensive or unrewarding to cut the second growth before blooming, thus creating a flush of viable seed. The alfalfa would re-grow, produce a second set of flowers and be left to set seed rather than be harvested as a second hay crop.
Many pastures are also allowed to get well into bloom before grazed off, intentionally or otherwise. This includes the scenario of abandoned pastures that may contain GE alfalfa that reaches maturity and would aid the spread of genes.
Accidental pollination from GE alfalfa hay fields that are allowed to come into bloom would contaminate fields several miles away. This contamination could affect alfalfa seed fields, and

could allow alfalfa to set seed in ditches and field margins. (Comment Number: APHIS-2007-0044-10263-7)

Response: As discussed in Appendix V of the DEIS, Roundup Ready alfalfa forage producers are required to harvest at or before 10 percent bloom (Monsanto Technology Use Guide and Monsanto Technology/Stewardship Agreement, 2008). This requirement mitigates for the pollen and pollinators in Roundup Ready alfalfa forage fields that might possibly travel to neighboring common alfalfa seed fields. Survey data regarding farmer compliance with this requirement has been added to Appendix V.1.5 of the FEIS.

Section III.E.1.b of the DEIS acknowledges that harvest schedule depends on weather. As discussed in Section IV.B.4 of the DEIS, forage harvest delays due to wet weather are unlikely to result in production of seed from the hay crop because seeds take 4-5 weeks to ripen after the 10 percent bloom stager. Wet weather delays are usually only for a period of a few days. The potential for gene flow from GT alfalfa hay fields to seed fields or feral alfalfa is summarized in Table 4-3 and discussed in Appendix V (Section 5.0) of the DEIS. In Appendix B of the DEIS, APHIS acknowledges that delayed harvesting of forage allows additional time for the alfalfa to reach sexual maturity and produce pollen.

Section III.A.1.c of the DEIS acknowledges that farmers may choose grazing for dormant-season alfalfa stubble, a substitute for early or late season cutting, and rotational grazing during the growing season. As mentioned above, practices not compatible with harvesting at or before 10 percent bloom would not be permitted with GT alfalfa under the Roundup Ready Monsanto Technology Use Guide and Monsanto Technology/Stewardship Agreement that every GT alfalfa grower signs.

The potential for gene flow from GT alfalfa hay fields to alfalfa in ditches and field margins (feral and other alfalfa) is summarized in Table 4-3 and discussed in Appendix V (Section 5.0) of the DEIS.

Comment Excerpt Text:
Bee population dying because of GMO fields
May 9, 2007
There has been a lot of talk in the recent months regarding the dying populations of honey bees. Organic consumer groups have blamed GMO while proponents of GMO have blamed the use of cellphones. All in all, a lot of confusion and blame being put forth to many different causes. However, the following article that was originally published by the Times Online and has just been brought to our attention, provides a rather interesting piece of information. Considering that 1) the original article has been removed from their site, and 2) this article dates back to September 2002. For the purpose of archival, we present you the article:
GM crop taints honey two miles away, test reveals
(The Sunday Times, UK, September 15, 2002)
Evidence that genetically modified (GM) crops can contaminate food supplies for miles around has been revealed in independent tests commissioned by The Sunday Times.

The tests found alien GM material in honey from beehives two miles from a site where GM crops were being grown under government supervision. It is believed to have been carried there by bees gathering pollen in the GM test sites.

The disclosure, showing that GM organisms can enter the food chain without consumers – or even farmers – knowing they are present, will undermine assurances by Tony Blair and ministers that such crops can be tested in Britain without contaminating the food chain. The test results come as ministers, under pressure from the American agrochemical lobby, mount a huge consultation exercise to persuade the public of the virtues of GM foods. They have previously given assurances that consumers "are not being used as guinea pigs".

The GM material was found in honey sold from farmer David Rolfe's hives at Newport-on-Tay in Fife, almost two miles from one of 18 sites holding trials of GM oil-seed rape. A test carried out by GeneScan, a respected independent laboratory in Bremen, Germany, checked for traces of an NOS terminator, one of four modified genes which make the crop resistant to pesticides. This proved positive.

A second test confirmed that GM material in the honey could have come only from oil- seed rape grown at Wester Friarton, in Newport-on-Tay, by Aventis, one of the world's biggest biotechnology firms. The fact that the GM material travelled such a distance makes a mockery of the government's 50m-200m crop-free "buffer" zones that were created around GM sites to protect neighbouring farms. Critics have claimed that the GM crop trial sites are too close to other farms. America has buffer zones of up to 400m, Canada up to 800m, and the European Union recommends a 5km (three-mile) zone for GM oilseed rape.

When Rolfe first raised his concerns, government officials said that although it was not possible to rule out cross-pollination, they did not believe it should be "a source of concern". "I'm very angry and disappointed," Rolfe said last week. "I feel I've been denied the right and freedom to eat my own GM-free produce. Now we can't eat the honey or sell it." This weekend Defra, the ministry responsible for the crop trials, said: "We have not seen the results of the study but will treat any such findings extremely seriously."

In the case of GM rape, like most GM products, there is no evidence that contamination poses a health risk. Concern centres on maintaining the integrity of traditionally produced products. Tim Lang, professor of food policy at Thames Valley University, said: "The early assurances from the industry and the government that a buffer zone would allow safety and choice for consumers are falling apart. It raises environmental health worries, and what we don't yet know is whether these warnings will translate into a risk to human health." Britain has imposed a moratorium on the widespread planting of GM crops until it has analysed the impact of GM crop trials at 18 farm-scale sites around Britain.

However, The Sunday Times's tests confirm earlier work that was carried by Friends of the Earth, the environmental group, and will increase pressure on the government to scale down its support for the GM industry. It will also come as a personal setback to Blair, who is determined that British companies will win a share of the potentially lucrative bioscience industry. In May the prime minister attacked GM protesters as part of an "anti-science fashion" in Britain. The tests will bring pressure on Aventis, which was accused of a "serious breach" of regulations earlier this year after GM trials in 12 sites were contaminated with antibiotic genes. These are controversial because of the danger of gene transfer to bacteria in animals and humans, who could become immune to common life- saving antibiotics.

While the government tends to support the GM lobby, food retailers have been more cautious. The big supermarkets insist that such products are properly labelled and refuse to take honey

from within six miles of UK test sites. In Canada, a leading cultivator of GM crops, sales of honey have plummeted by 50% amid concern that the integrity of the product has been compromised. A spokesmen for Aventis said: “We would be very interested in looking at both the origin of the honey sample and how the tests were carried out. We would like to look at this further.” (Comment Number: APHIS-2007-0044-11403-1)

Response: In regard to the potential harm to bee populations, according to the information analyzed in the DEIS, Appendix O, there is no evidence from other studies of GT crops negatively affecting non-target organisms such as honey bees. In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for Issue 5.2. In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1.

Comment Excerpt Text:
I was just shown the enclosed growers Cal/West Seeds newsletter recently mailed to its growers ,and was concerned about the reported Roundup Ready alfalfa seed contamination that is surfacing in non-roundup ready alfalfa .. It is apparent from this report that contamination of non round up alfalfa seed can occur from mature hay fields or other pollen sources. It is also interesting to note that this has occurred in non seed producing areas as well as seed producing locations in multiple states. If you read the recently published Environmental Impact Study Report, you would get the impression that this contamination can't or doesn't occur, That is apparently not the case based on the Cal/West report. (Comment Number: APHIS-2007-0044-11656-1)

Response: In regard to seed stock adventitious presence, see response to comment APHIS-2007-0044-9936-7 for Issue 3.3.

Comment Excerpt Text:
Research has shown that transgenes cannot be recalled once released into the environment. [Footnote 6 Marvier, Michelle & Rene C. Van Acker. (2005) "Can Transgenes be kept on a Leash?" Front Ecol Environ, 3, 2: 96-106. Altieri, M. A. (2005) "The Myth of Coexistence: Why Transgenic Crops are not Compatible with Agroecologically Based Systems of Production.", Bulletin of Science, Technology & Society, 25, 4: 366.] Acknowledgement of this simple yet important fact has been omitted from USDA’s draft EIS and so has an assessment of what measures, if any, can be taken to fully protect organic and conventional agriculture from contamination, market losses, and a farmer’s right to sow the crop of their choice, provided that it does not impinge upon the rights of others (Comment Number: APHIS-2007-0044-11689-4)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Monsanto's "Best Practices" Ensures Widespread GE Contamination and Puts Organic Farms at Risk
Although APHIS says it supports the "coexistence" of all types of agriculture, it refuses to even consider any future for alfalfa that would include protections from contamination for organic and conventional farmers and exporters. GE contamination is real and occurring right now.
There is evidence of widespread GE contamination of canola and corn.[Footnote 8: Knispel AL, McLachlan SM. 2010. Landscape-scale distribution and persistence of genetically modified oilseed rape (Brassica napus) in Manitoba, Canada. Environ Sci Pollut Res Int. 17(1):13-25] [Footnote 9: Jenczewski E, Ronfort J, Chèvre AM. 2003. Crop-to-wild gene flow, introgression and possible fitness effects of transgenes. Environ Biosafety Res. 2(1):9-24] [Footnote 10: Légère A. 2005. Risks and consequences of gene flow from herbicide-resistant crops: canola (Brassica napus L) as a case study. Pest Manag Sci.61(3):292-300.] farmers and advocates have legitimate concerns about GE contamination. U.S. District Judge Charles Breyer agreed in his 2007 decision [Footnote 11: Geertson Seed Farms v. Mike Johanns (2007) United States District Court For The Northern District Of California] that GE contamination is already occurring in the fields of several states, despite Monsanto's "best practices." GE alfalfa presents a unique risk to organic growers. Unlike wind pollinated crops such as corn, alfalfa is pollinated by bees. This results in higher risk of cross pollination between GE alfalfa and unmodified varieties. Bees are able to carry pollen 5-6 miles away from their hive and once in the field, can pollinate 78-81% of flowers visited.[Footnote 12: Cane, J. 2002. Pollinating Bees (Hymenoptera: Apiformes) of U.S. Alfalfa Compared for Rates of Pod and Seed Set. J. Econ. Entomol. 95(1): 22-27] It is inevitable that adjacent GE alfalfa farms and non-GE farms within 5-6 miles of each other will be pollinated by the same bees, leading to a transfer of pollen from the GE farm to the non-GE farm.
APHIS's DEIS has not adequately stated how organic and non-GE alfalfa fields are to be protected, nor have they addressed possible remedies for fields contaminated with GE materials. When pollen from GE crops make their way to other non-GE crops, in this case viabee transfer, cross pollination occurs leading to crop contamination. Cross-contamination and hybridization between GE crops, non-GE crops and wild plant species are of major concern. One example is the transfer of herbicide resistant genes from GE crops to weed species,[Footnote 13: Jack Brown, A.P.B. (1996) Gene transfer between canola (Brassica napus L. and B. campestris L.) and related weed species. Annals of Applied Biology 129, 513-522] [Footnote 14: Snow, A.A., Andersen, B., oslash, and rgensen, R.B. (1999) Costs of transgenic herbicide resistance introgressed from Brassica napus into weedy B. rapa. Molecular Ecology 8, 605-615.] leading to the growth of highly resistant "super-weeds." It is unclear and difficult to predict how the genetically engineered genes will be expressed in a related wild species. More research is therefore needed to determine the frequency, introgression rates and potential ecological impact resulting from contamination of non-GE plant species[Footnote 15: Belchera, K., Nolana, J., and Phillips, P.W.B. (2005) Genetically modified crops and agricultural landscapes: spatial patterns of contamination Ecological Economics 53 387-401. Eastham, K., and Sweet, J. (2002) Genetically modified organisms (GMOs): The significance of gene flow through pollen transfer. Assessing the Impact of GM Plants (AIGM) programme for the European Science Foundation and the European Environment Agency Environmental issue report.] before GE crops are deregulated. (Comment Number: APHIS-2007-0044-11960-6)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response). In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0. In regard to past adventitious presence cases, see the response to comment APHIS-2007-0044-9936-10 for Issue 11.15.

Comment Excerpt Text:
It is wrong to leave farmers, whether organic or conventional, vulnerable to contamination of their crops. Alfalfa is open-pollinated by bees. With bees traveling 4 to 6 miles, they can potentially spread the patented, foreign DNA to distant conventional and organic crops. The potential for biological contamination from a neighbor's field, even miles away, threatens the livelihood of organic farmers, dairies, and other livestock producers. The farmers may also be subject to harassment by Monsanto if Monsanto's investigators find DNA from GE alfalfa mixed in with the farmer's crops. (Comment Number: APHIS-2007-0044-11969-1)

Response: In regard to behavior of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1.

Comment Excerpt Text:
The DEIS relies on too few data to account for the variability in gene flow. The limited field tests by Monsanto/FGI to determine suitable isolation distances between GT and non-GT alfalfa seed production fields are inadequate to account for the variability in gene flow caused by several factors that can vary in different environments. APHIS also omits important published data that found much higher gene flow rates than Monsanto/FGI studies (Comment Number: APHIS-2007-0044-12026-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
The DEIS ignores the possibility that gene flow may be a recurrent process and that, as a result, contamination levels may increase over time. Unless the non-GT alfalfa seed grower takes actions to reduce or eliminate contamination, which may necessitate additional costs, recurrent gene flow may lead to contamination levels that could substantially exceed the 0.5 percent level (Comment Number: APHIS-2007-0044-12026-5)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
The gene pollen flow study that is provided with the RR alfalfa submission to APHIS is not a depiction of commercial production realities. Two gallons of leafcutter bees/acre (20,000 bees)

was the number used in determining the migration of genetic material (in the EIS). This is not a number commercial alfalfa seed growers would consider to produce a profitable alfalfa seed crop. Experienced and successful growers use at least 4-5 gallons (40,000-50,000 bees), some even use in excess of 8 gallons (80,000 bees) per acre. This was especially true during the time of the pollen flow study period (2000-2001-2002) when pollinators were easily available and very inexpensive. The growers will start introducing their pollinators into the field at approximately 25% bloom, adding pollinators as is warranted by the increased bloom.
The authors of the Gene Flow Study have dismissed the findings of the other gene flow studies done by other researchers (St. Amand et al.). They claimed that the studies were flawed because of the use of homogeneous alfalfa plants (plants that cannot cross pollinate among themselves) caused the findings of foreign genetic material to be greater than it could be. The experiment was designed to show the potential out-crossing distances of genetic material- it did this.
Gene escapes from commercial source fields were also well documented in the Hammon-Colorado study. These studies indicated gene flow out to 1.7 miles from the nearest source. Surely, these studies, which contradict the gene pollen flow study of the EIS, deserve to be expanded upon with more multi-year experiments. (Comment Number: APHIS-2007-0044-12038-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0. In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1.

Comment Excerpt Text:
The EIS details various studies that describe the risk and probabilities of cross-pollination from GT alfalfa to non-GT alfalfa (which can, although does not always, lead to gene flow). Table Q9 shows pollinator foraging distance for the 3 species ofbees that pollinate alfalfa: the Alfalfa Leafcutter Bee, the Honey Bee, and the Alkali Bee. The distance that each of these three species typically flies while pollinating is described in the table, along with the maximum distances recorded. While Leafcutter Bees typically fly only 300-600 feet from their hives, Honey Bees have been recorded as flying up to 6.21 miles from the hive and Alkali Bees have flown up to 45 miles. Table Q-9 and the related research demonstrate that alfalfa can be pollinated at distances that are much less than the distances commonly separating growers' fields from those oftheir neighbors. Moreover, these distances are less than what Monsanto and Forage Genetics International (FGI) recommend as minimum separation from other alfalfa fields in their "Best Practices" (they recommend a distance ofgreater than or equal to 900 feet for the Alfalfa Leafcutter, greater than or equal to 3 miles for the Honey Bee, and greater than or equal to I mile for the Alkali Bee.) Given that there are not ways to completely control the flight ofbees, it seems reasonable to conclude that cross-pollination between GT alfalfa fields and non-GT alfalfa fields will happen. (Comment Number: APHIS-2007-0044-12145-1)

Response: In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1.

Comment Excerpt Text:

Public Submission
Docket No. APHIS-2007-0044
Regulatory Analysis and Development, PPD, APHIS
Station 3A-03.8, 4700 River Road, Unit 118
Riverdale, MD 20737-1238
This comment refers to Docket No. APHlS-2007-0044
As a certified alfalfa seed grower in Montana, I am against the "Request for Non Regulated Status Of Roundup Ready Alfalfa", based on the methods used to detennine the Best Management Practices (BMP) .
The isolation distance for leaf cutter bees in the BMP (900 ft) is based on the three year study of McCaslin, using small test plots (0.03 - 3 acre) and the use of 2 gallons (20,000) of bees per acre. [Footnote 1: Pollen-mediated Gene Flow in Alfalfa: A three-year summary offield research. McCaslin, et al] [Footnote 2: USDA- Petition for Determination ofNonreguJated Status: Roundup Ready Alfalfa. Rogan and Fitzpatrick., submitted April 16, 2004. Page 398.]
Currently, the standard stocking rate for leaf cutter bees in the Pacific Northwest is 4-5 gallons (40,000- 50,000) per acre. [Footnote 3: Modeling Pollination Factors That Influence Alfalfa Seed Yield In North-Central Nevada. Breazeal, Fernandez, Narayanan.. University of Nevada, March J1,2008] The Montana state average is 3.5 gallons of bees per acre on irrigated seed production acres. [Footnote 4: Alfalfa Seed 2009. Montana Dept. OfAgriculture www.nass.usda.gov/mt] In our operation, 4 to 5 gallons per acre is the base rate, with additional bees used when conditions warrant, i.e. weather, bee drift, flower density, and poor bee flight.
Studies indicate there are over 3500 native pollinator species that contribute to pollination. [Footnote 5: Alternative Pollinators: Native Bees. Lane Greer, NCAT Agriculture Specialist ATTRA Publication #IP126. 1999]
This, along with a current study from Wisconsin, suggests more information is needed to fully understand bee species, plant density on alfalfa pollination and potential for gene flow. [Footnote 6: Impact of Bee Species and Plant Density on Alfalfa Pollination and Potential for Gene Flow. Johanne Brunet and Christy M. Stewart, University of Wisconsin 2008-2009]
Currently, there is a lack of 3-4 year studies on the pollen and gene flow of commercial alfalfa seed fields, using actual seed production practices which involve alkali andlor leaf cutter bees. This is very important, given that the seed producer is accountable for pollen flow (drift), based on Monsanto's Technical Use Guide and the BMP.
(Comment Number: APHIS-2007-0044-12195-1)

Response: In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1.

Comment Excerpt Text:
regarding gene flow and cross-pollination, I am not convinced
of the soundness of the EA's logic when it states that it considers these 'minor' risks. The assessment acknowledges that feral populations of alfalfa have grown from domestic seed, but then goes on to say that such an event is unlikely due to the environmental requirements for successful alfalfa germination. There seems to be an inconsistancy in this reasoning that the assessment did not adequately resolve. A related issue is that of pollination - the assessment states that bees can pollinate fields several miles distant, but doesn't explain how it is that bees

could be kept from polinating non-GMO varieties. Furthermore, it strikes me as frankly outrageous that the onus of ensuring that cross-pollination does not occur is to be laid on those farmers who wish to grow non-GMO crops instead of on those who do (Comment Number: APHIS-2007-0044-12319-4)

Response: In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1. In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0. In regard to the burden of control measures, see response to comment APHIS-2007-0044-11689-10 for Issue 9.0.

Comment Excerpt Text:
The EIS states that stewardship practices laid out in organic system plans and Monsanto's "best practices" are sufficient to minimize cross-fertilization between organic and GE crops (p. 103). I'm not an agronomist, but I'm not buying it. Whether with corn, soybeans, or canola, that strategy has not worked yet. Whenever GE crops are approved without restriction, contamination ofthe seed supply has resulted (more than 200 cases documented in the last decade). Again, I am no expert, but it seems contamination is considerably more probable with alfalfa because it is insect pollinated, and insects can travel long distances and radically accelerate gene flow. (Comment Number: APHIS-2007-0044-12428-2)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
The impact to agriculture and human health from GT alfalfa should be given more consideration than the cursory determinations of safety assumed as fact in this EIS. Regarding bees, the key argument in the EIS for the low potential for gene spread is that "Bees clean themselves quite thoroughly back at the hive."
Using this portion of the more extensive bee- cleaning process as a way to justify that bees won't transport pollen or cause contaminate seems dishonest and purposely so. Bees will carry nectar and pollen from one flower to another and one field to another, regardless of the type of alfalfa in the field. That's how pollination works.
The rest of the EIS clearly shows the strong relationship between bees and alfalfa, noting that bees are the only pollinator for the crop and that honey bees are often kept on alfalfa fields. Due to the nature of pollination and the large numbers of bees involved, it is impossible to say that bee pollination will not spread GT alfalfa, which would impose a significant impact on organic alfalfa. BAS (ph) has also not addressed the potential for harm to bee populations vital to the U.S. agricultural system because this could be the first GT crop solely pollinated by bees. (Comment Number: APHIS-2007-0044-12502-01-1)

Response: In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1. In regard to the potential harm to bee populations, according to the information analyzed in the DEIS, Appendix O, there is no evidence from other studies of GT crops negatively affecting non-target organisms such as honey bees.

Comment Excerpt Text:
Our family has wild trapped Leaf Cutter bees on, literally, thousands of farms in the United States. So we are quite familiar with the wild bee populations in America, whether they are leaf cutter bees, honey bees, or the alkali bees, or one of the most aggressive bees, extensively traveled, and hard to control ,the bumble bee. Some of these bees range several miles. The alkali, in particular, has a very large range. To say that these bees are not going to cross pollinate is just wrong. We have spent a large part of our lives growing, breeding, and selling this wonderful old plant, conventional alfalfa. We feel it would be a travesty and an insult to the last 30 years of our efforts to allow anyone to destroy conventional alfalfa. (Comment Number: APHIS-2007-0044-1773-4)

Response: In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1.

Comment Excerpt Text:
This EIS shows USDA's lack of real world knowledge of growing alfalfa. The agency claims that alfalfa is "typically" harvested before 10% of plants reach full flower. As an alfalfa grower, I can tell you that this is not true. In climates where there is only the opportunity for one cutting or stands are left to gather snow, many plants go to full flower. Furthermore, for many farmers, the alfalfa is also used as a cover and grazing crop. In this case, even if it is hayed once or twice in a season, the later plants have the opportunity to flower to full bloom. When this happens the pollination will happen and contamination is impossible to prevent.
The USDA shows even further ignorance when it claims that I can prevent contamination by changing planting and harvesting schedules to "avoid simultaneous flowering" with RR alfalfa. Weather conditions allowing for haying are out of my control. Furthermore, the best way to use grazing of alfalfa may change from year to year, depending on weather conditions and plant growth. The pollination of honey bees and other pollinating insects is also out of my control. I cannot control where my neighbors choose to put hives or how far those bees travel to cross pollinate. (Comment Number: APHIS-2007-0044-1840-2)

Response: In regard to timing of alfalfa forage harvest, see the response to comment APHIS-2007-0044-10263-7 for Issue 3.1.

Comment Excerpt Text:
This would be the first perennial crop to be approved for genetic modification and release. Alfalfa is open-pollinated by bees. With bees traveling 4-6 miles, they can potentially spread the patented, foreign DNA to distant conventional and organic crops. The potential for biological contamination from a neighbor's field, even miles away, threatens the livelihood of organic farmers, dairies and other livestock producers. U.S. organic standards prohibit genetic engineering. Buffer strips and other devices required with other GE crops are essentially useless. (Comment Number: APHIS-2007-0044-1976-1)

Response: In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Alfalfa is a primary feed for livestock, and I am aware that GMO alfalfa can contaminate organic seed stocks through the movement of pollin from one field to the next (Comment Number: APHIS-2007-0044-2209-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I support the approval and implementation of genetically modified alfalfa for use throughout the US. While the concerns of pollen movement and cross contamination of alfalfa hay inventories are real and can cause economic and environmental harm, the science and regulatory framework in which this tool of crop production is surrounded with give me the confidence that the benefits of the technology outweigh the risks by considerable margin. (Comment Number: APHIS-2007-0044-2240-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
I AM NOT AGAINST RRA IF THE ISSUE OF CROSS CONTAMINATION HAS BEEN ADDRESSED. I WOULD BE INTERESTED IN LONG TERM STUDIES OF GMO MODIFIED ALFALFA ON LIVESTOCK PHYSIOLOGY. (Comment Number: APHIS-2007-0044-2246-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response). In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for Issue 5.2.

Comment Excerpt Text:
I am very concerned about the approval of another GE crop in our country. Research has shown that GE crops cross polinate with standard varities and have even contaminated Mexican Land Race crops which are vital to the world food supply security. GE cross polination also allows Monsanto to allege patent infringement on farmers whose standard crops become contaminated unintentionally. In many past cases regarding GE corn, these lawsuits have led to the farmer going out of business in order to settle or pay legal fees. GE crops are also an untested biological

phenomenon. Rising numbers of people experience food allergies and sensitivities, and GE crops may be partially to blame.
Finally, GE crops are unnecessary. The number of organic farms is growing nation wide. The world wide demand for organic, non GE crops is huge. Other countries are not interested in importing GE crops and Americans are demanding more and more organic foods. Now is the time to stand with the people and say no to GE alfalfa. Don't let Monsanto further contaminate our earth's food supply. (Comment Number: APHIS-2007-0044-2251-1)

Response: In regard to lawsuits from Monsanto, see the response to comment APHIS-2007-0044-6376-1 for Issue 5.1. In regard to impact on organic markets see the response to APHIS-2007-0044-2251-1 for Issue 5. In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for Issue 5.2. In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
Regarding bees, in Section 4 part B, Plant Genetics and Gene Flow, the key argument for the low potential for gene spread is that "bees clean themselves quite thoroughly back at the hive." The action noted about them cleaning themselves when they return to the hive is part of a greater process, in which while out in the field they clean themselves of the pollen sticking to their bodies, and then deposit that pollen into pollen "baskets" on their legs for transport to the hive. Using this cleaning process as a way to justify that bees won't transport pollen or cross-contaminate seems dishonest, and purposely so because bees will carry nectar and pollen from one flower to another and one field to another regardless of the type of alfalfa in the field, and back to the hive, that's how pollination works. Furthermore, the source of that statement, a key argument for the low potential for gene flow, is listed as "unknown/lost" in the reference appendix of the EIS. The reference is available by request from Forage Genetics, a genetics marketing firm and Monsanto's partner. This is clearly a conflict of interest and not a credible source for a legitimate analysis. The rest of the EIS clearly shows the strong relationship between bees and alfalfa, noting that bees are the only pollinator for the crop, and that honey bee colonies are often kept on alfalfa fields. The same section of the EIS acknowledges that "movement of honey bees from crop to crop could increase the chance of transferring pollen from one field to another." Due to the nature of pollination, and the large numbers of bees involved whether wild, used solely for pollination, or in honey production, it is impossible to say that bee pollination will not spread GT alfalfa which would impose a significant impact to organic alfalfa. The potential for harm to bee populations vital to the US agricultural system has also not been addressed, as this is the first GT crop to be solely pollinated by bees. (Comment Number: APHIS-2007-0044-2325-3)

Response: In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1. A more suitable reference has been added to sections IV.B.1 and V.3.3.3 of the FEIS.

Comment Excerpt Text:

If glyphosate tolerant alfalfa is grown commercially in the United States it will inevitably cross-pollinate with non-genetically engineered alfalfa which is grown on conventional and organic farms, as well as with feral alfalfa which grows wild in ditches, wilderness areas and abandoned fields. Alfalfa is insect-pollinated by both domestic pollinators (leaf-cutter bees, honeybees) and wild pollinators. Cross pollination will occur as a result of foraging activities of pollinators. Seed produced as a result of cross pollination will carry the DNA of glyphosate tolerant alfalfa, and will confer the trait on its progeny. (Comment Number: APHIS-2007-0044-2380-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
Managing herbicide tolerance in crop plants is not unique to Roundup Ready alfalfa or to bioengineered plants more broadly. For decades, herbicide tolerance has been bred into dozens of crop species by a number of non-biotech methods, and farmers and plant breeders have developed common sense practices for keeping the herbicide resistant trait from crossing into other crops or weeds. In addition, several state agricultural departments and university extension services have developed co-existence programs and guidelines that farmers can adopt to eliminate or reduce the cross-pollination of biotech alfalfa with conventional and organic varieties and vice-versa.
APHIS has also carefully studied the possibility of cross-pollination from bioengineered to non-bioengineered crops and found that it would happen less than once in every one-hundred-thousand plants. Roundup Ready alfalfa is being sold primarily to growers intending to harvest cut hay for feed, not for forage purposes. Because the feed quality of alfalfa drops rapidly after blooms appear, nearly all Roundup Ready alfalfa would be harvested before flowering. That alone makes the possibility of cross pollination extraordinarily unlikely. Although some Roundup Ready alfalfa plants will inevitably flower, alfalfa pollen is not dispersed in the wind, but must be carried by pollinating insects. And typical pollinators of alfalfa are not attracted to forage fields. Even then, the biotech and non- bioengineered fields would have to flower at the same time for viable pollen to be spread and for fertilization to occur. These factors make it highly unlikely that there would be more than minimal cross-pollination of non-bioengineered crops by Roundup Ready alfalfa. (Comment Number: APHIS-2007-0044-2711-1)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment, as discussed in Appendix V of the DEIS.

Comment Excerpt Text:
If glyphosate tolerant alfalfa is grown commercially in the United States it will inevitably cross-pollinate with non-genetically engineered alfalfa which is grown on conventional and organic farms, as well as with feral alfalfa which grows wild in ditches, wilderness areas and abandoned fields. Alfalfa is insect-pollinated by both domestic pollinators (leaf-cutter bees, honeybees) and wild pollinators. Cross pollination will occur as a result of foraging activities of pollinators. Seed produced as a result of cross pollination will carry the DNA of glyphosate tolerant alfalfa, and will confer the trait on its progeny. (Comment Number: APHIS-2007-0044-2741-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
I am opposed to Round up Ready Alfalfa because it threatens organic agriculture and family farms.
Since alfalfa is a bee pollinated perennial the modified genes could travel far and wide. I understand that this EIS puts the onus of avoiding contamination on the farmer by requiring a change in planting time and use of commercial bees. This puts an unbearable burden on farmers who wish to be free of foreign genes, regardless if they are organic or conventional. (Comment Number: APHIS-2007-0044-3228-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
Please reconsider allowing "roundup ready" alfalfa onto the market. Consumers nationwide do care about these issues; please consider the negative impacts GE and GM plants and foods are having, and will have, for the years to come. You may think that you are doing good by allowing GE alfalfa onto the market; please look more closely and in greater depth and detail to the effects of your decision. For example, look at how GE corn has effected the farmers of Iowa, who can no longer keep their seeds for planting the following year, even if they didn't use Monsanto's GE corn, but because their corn may have been uncontrollably pollinated by some of theirs (Food, Inc.). (Comment Number: APHIS-2007-0044-3255-4)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
The risk of cross contamination is also HUGE! I do not believe Monsanto is really able to contain the pollens from their mutant seeds! Look at corn! You must stop this outrage! (Comment Number: APHIS-2007-0044-3257-2)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
The EIS reports that because there is not sufficient data on the impacts of planting GM Alfalfa, there are no harmful results. This is a faulty assumption. We know that it has been impossible to contain GM crops in other sectors. There is no reason to believe contamination in alfalfa would

not spread just as rampantly. There is actually reason to believe it would spread and contaminate even more rampantly than the GM crops that
have previously been deregulated. Have you ever seen a pollen cloud on a windy day in southwest North Dakota, it is pretty awesome and scary when you think about GM crops and what moves on the air. You see—those crops are all annuals—alfalfa is a perennial. (Comment Number: APHIS-2007-0044-3314-2)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
This perennial crop is cross pollinated by bees and other insects and is mixed with native grasses and sweet clover. I do not have bee hives on my land, but my neighbors do. These bees have no boundaries and cannot be controlled in nature. Furthermore, I have not authority over where my neighbor places bees on his private land (Comment Number: APHIS-2007-0044-3314-3)

Response: In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1.

Comment Excerpt Text:
The deregulation of GM alfalfa, a wind pollinated perennial crop carrying high risk of seed and forage contamination, would further add to our economic and testing burden. Contamination could eventually make it impossible for the farmers producing our inputs to produce non-GMO organic products. This is not just an issue for animal farming, but as alfalfa is also a popular and necessary legume rotation crop for organic crop farmers (ensuring fertility of organic fields), it could contaminate any organic cropland with GM. (Comment Number: APHIS-2007-0044-3528-2)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Commercial alfalfa is an insect pollinated crop, for which alfalfa farmers utilize both managed pollinators, such as leaf cutter bees, and wild bee species. While leaf cutter bees are used for targeted pollination of crops, wild bee species are by their nature uncontrollable and some species are efficient pollinators of alfalfa (Brunet and Stewart 2010). There is the potential for wild bee species to create alfalfa gene flow and GT alfalfa transgene escapes (Brunet and Stewart 2010). Because we cannot prevent wild bee pollinators from creating transgene escapes of GT alfalfa, we must regulate all facets of GT alfalfa to prevent such outcomes, and to remove an undue burden and risk to farmers. (Comment Number: APHIS-2007-0044-3576-1)

Response: In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1.

Comment Excerpt Text:
As we have seen in the corn market, even if a farmer has planted an independent, non-GE seed and the resulting plant becomes cross-pollinated by a GE plant, that new seed now carries the GE gene. The company that originally produced the GE seed can then command a royalty payment for the altered seed. Worst yet, for an organic farmer, the crop cannot command the organic price premium.
A core element to the definition of the USDA Organic label is the use of no genetically engineered ingredients. Yet, we know based on experience of cross-contamination of GE corn seed, that genetically engineered alfalfa is certain to contaminate non-GE and organic alfalfa. This situation has resulted in reducing the organic domestic corn supply, forcing organic livestock producers to source organic corn from outside of the country, and thereby increasing the cost of the organic meat that will be available in the marketplace. This situation results in a disadvantage not for the organic livestock producer, but for the consumer as well. Applegate believes that the USDA must take steps to preserve non-genetically modified alfalfa from being contaminated, and thus losing its credibility as an organic source.
Because of the potential cross-pollination of non-GE fields by GE components, farmers raising organic feed for livestock will incur additional burden in proving that neighboring seeds are not contaminating their organic alfalfa. This will not only cause an economic disadvantage to organic farmers who are near others using GE alfalfa, it will also increase their potential for losing organic certification, thus threatening their livelihood. (Comment Number: APHIS-2007-0044-3597-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0. In regard to impacts of cross-pollination on organic markets see response APHIS-2007-0044-9882-1

Comment Excerpt Text:
I challenge Monsanto and the USDA to demonstrate that bee pollination will not have a long term effect on the existing organic crops of alfalfa. (Comment Number: APHIS-2007-0044-3781-1)

Response: In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1. In regard to impacts of cross-pollination on organic markets see response APHIS-2007-0044-9882-1

Comment Excerpt Text:
Also there is a problem with GM crops cross pollinating with non-GM crops and contaminating them making them unmarketable as organic or non-GM. (Comment Number: APHIS-2007-0044-4102-3)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
I have been an organic farmer for over 40 years. I also eat Organic meat. What that means is that I do not want ANY of my food to be genetically engineered. There are fewer vitamins and minerals in GE food. It wouldn't surprise me if some of our current obesity were to be linked with GE food. (Comment Number: APHIS-2007-0044-4202-2)

Response: In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for Issue 5.2.

Comment Excerpt Text:
There is NO way to contain GE alfalfa pollen; therefore, IT SHOULD NOT BE PLANTED.

We continue to give Monsanto power over ALL of our grown food. They are a "for profit" corporation and they do NOT care about the health of those they affect.
PLEASE look closely at ALL types of GE and decide to STOP this now, before it is too late. (Comment Number: APHIS-2007-0044-4202-2)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response). In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for Issue 5.2.

Comment Excerpt Text:
The traditional stance on genetically altered foods needs to be changed. These are not things which closely resemble products already available. They are different in the most fundamental way immaginable. To allow these organisms out of laboritories, because of the likelyhood of wind born pollination, is to ensure that our entire food supply is contaminated. This is done even though no long term impact studies exist for these products. It is an outrageous practice. It is time for the FDA to stand up against corporate pressures and to protect the American people, as their directives demand. (Comment Number: APHIS-2007-0044-4208-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
VERY concerned about yet ANOTHER genetically altered product being introduced into the US. Europe has already refused to allow this "round up" crop into their countries. If such a product continues to be produced and supported in the US, we will lose any chance of

sustainable organic farms many of which are located here in your state. PLEASE protest against BIG company infiltration and take over of US produce! Thank you for your concern.
Check out what Monsanto has done with their corn. Any airborn cross pollination protects Monsanto's interests, not the local small farm/family farm/organic farms. WOW. (Comment Number: APHIS-2007-0044-4210-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Please do not approve Monsanto's genetically modified alfalfa for nonregulated status.
Because of the natural pollination process, GM alfalfa would inevitably contaminate organically grown alfalfa, as has happened with corn. About 75% of the corn grown in the U.S. today is genetically modified (which means it cannot reproduced). Crops as distant as 20 miles have been contaminated by GM corn, rendering those crops also dead and unable to reproduce. It is reasonable to expect that a similar contamination would occur with alfalfa. Aside from the negative dependency on seed producers and the potential health effects of GM foods themselves, this would render the raising of organic meat almost impossible. (Comment Number: APHIS-2007-0044-4221-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
Because of the natural pollination process, GM alfalfa would inevitably contaminate organically grown alfalfa, as has happened with corn. About 75% of the corn grown in the U.S. today is genetically modified (which means it cannot reproduce; we are dependent upon seed makers to provide this "dead" seed). Crops as distant as 20 miles have been contaminated by GM corn, rendering those crops also dead and unable to reproduce. It is reasonable to expect that a similar contamination would occur with alfalfa. (Comment Number: APHIS-2007-0044-4233-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
It is wrong to leave myself and other farmers, whether organic or conventional, vulnerable to contamination of our crops. Alfalfa is open-pollinated by bees. With bees traveling 4 to 6 miles, they can potentially spread the patented, foreign DNA to distant conventional and organic crops. The potential for biological contamination from a neighbor's field, even miles away, threatens the livelihood of organic farmers, dairies, and other livestock producers. The farmers may also be subject to harassment by Monsanto if Monsanto's investigators find DNA from GE alfalfa mixed in with the farmer's crops. (Comment Number: APHIS-2007-0044-4347-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0. In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1.

Comment Excerpt Text:
As a certified alfalfa seed grower in Montana, I am against the Request for Non Regulated Status of Roundup Ready Alfalfa, based on the methods used to determine the Best Management Practices (BMP) .
The isolation distance for leaf cutter bees in the BMP (900 ft) is based on the three year study of McCaslin, using small test plots (0.03 - 3 acre) and the use of 2 gallons (20,000) of bees per acre. [1,2]
Currently, the standard stocking rate for leaf cutter bees in the Pacific Northwest is 4-5 gallons (40,000- 50,000) per acre. [3] The Montana state average is 3.5 gallons of bees per acre on irrigated seed production acres. [4] In our operation, 4 to 5 gallons per acre is the base rate, with additional bees used when conditions warrant, i.e. weather, bee drift, flower density, and poor bee flight.
Studies indicate there are over 3500 native pollinator species that contribute to pollination.[5] This, along with a current study from Wisconsin, suggests more information is needed to fully understand bee species, plant density on alfalfa pollination and potential for gene flow. [6] Currently, there is a lack of 3-4 year studies on the pollen and gene flow of commercial alfalfa seed fields, using actual seed production practices which involve alkali and/or leaf cutter bees. This is very important, given that the seed producer is accountable for pollen flow (drift), based on Monsantos Technical Use Guide and the BMP. (Comment Number: APHIS-2007-0044-4373-1)

Response: In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1.

Comment Excerpt Text:
The DEIS acknowledges that GE alfalfa may contaminate organic and conventional alfalfa, but claims that Monsanto's seed contracts require measures sufficient to prevent such contamination, and that there is no evidence to suggest that these measures are not sufficient. In the lawsuit requiring the EIS, however, the Court found that GE contamination had already occurred in the fields of several Western states.
It appears that these sloppy analyses were designed only to reach the foregone conclusion of GE alfalfa deregulation, and since GE alfalfa is a perennial, its deregulation can contaminate organic and conventional alfalfa in a very short period of time.
In fact, contamination of organic and conventional seeds and crops is widespread and has been documented around the world. For example, in Japan, GE canola which is imported from Canada and the United States grows wild in many places, especially at ports where GE canola is unloaded and along the roadsides between those ports and oil crushers. In November 2009, a scientist in Mie Prefecture found a sample of GE broccoli which may have been cross-pollinated with GE canola. (Comment Number: APHIS-2007-0044-4904-2)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.
In regard to gene flow and seed purity comparisons with alfalfa and canola please see the response to APHIS-2007-0044-10263-9 for Issue 3.

Comment Excerpt Text:
I want to emphasize that the most important issues raised during this EIS: 1) The possibility that gene flow would permanently damage or eliminate organic, export or other GE-sensitive alfalfa farmers or markets, and 2) that Roundup-resistant weeds (due to the presence of GT alfalfa) would present an extreme danger to the environment, I took seriously and considered to be legitimate issues that are worthy of scientific scrutiny. If indeed these two results were to assuredly occur, the release of this technology should be highly questioned.
However, there is no evidence to date that either of these outcomes have occurred or would be very likely to occur with the introduction of this technology. This technology was implemented by farmers starting in 2005, when the first commercial plantings occurred, and since that time, acreage of organic hay have increased, and export hay has followed market trends (in fact exports of seed has increased, and exports of hay to additional countries has expanded).
All technologies have risks. In this case, however, there are simple measures to minimize the risks of gene flow that might affect GE-sensitive farmers, and to prevent roundup-resistant weeds so that they do not result in the putative outcome described above. These are risks which are of the same order of magnitude as those of other farming practices. On the contrary there are a range of positive environmental benefits and benefits to farmers that must be weighed against the risks that APHIS has examined. (Comment Number: APHIS-2007-0044-4913-1)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment.

Comment Excerpt Text:
Many organic farmers oppose the approval of GMO alfalfa based on the possibility of cross pollination and the genetic contamination of their organic alfalfa with GMO pollen. This is certainly biologically likely; alfalfa is an insect-pollinated crop and bees can travel long distances, making no distinction between conventional and organic flowers. Alfalfa is also a perennial crop, meaning that any seeds resulting from cross pollination would fall to the ground and grow into plants containing the unwanted recombinant DNA. Certainly Monsanto could not possibly hold us organic farmers responsible for 'harboring their patented genes' if bees, innocently doing their usual biological work, carry the errant genes into our fields and into our plants - against our will! (Comment Number: APHIS-2007-0044-4924-3)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
Docket No. APHIS-2007-0044
Regulatory Analysis and Development, PPD, APHIS, Station 3A-03.8

4700 River Road Unit 118
Riverdale, MD 20737-1238
Please reconsider. There are those of us who care greatly if our food is genetically modified. I am assuming that it is possible for this new alfalfa to cross pollenate. Small farms and individuals would not have the resources to protect their crops and perhaps their livestock from contamination (Comment Number: APHIS-2007-0044-5205-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I am writing in regard to the proposal to allow genetically modified alfalfa to be introduced into American crop production. This is yet another attempt by Monsanto to control more of the seed industry and Ii wish to voice my opposition. It is totally unnecessary to have alfalfa in a Roundup Ready form. It will not help production since alfalfa can be grown with the use of chemical sprays and once established it is usually harvested 3 or 4 times in a season, and it out-competes all weeds. The larger concern is how it will impact alfalfa that is grown organically or by farmers who simply do not want it in their feed supply. Alfalfa blossoms and bees pollinate the blossoms, carrying pollen for long distances. This will invariably lead to cross pollination of Genetically modified (GMO) alfalfa with other non-GMO alfalfa, and the losers will be the farmers who get polluted by the GMO alfalfa. We can't prevent this cross-pollination from occurring and Monsanto knows this fact. However the regulations put no responsibility for the unwanted spread of GMO alfalfa upon the farmer who plants it, but rather puts this responsibility on the farmer who is using conventional alfalfa. This is wrong and unfair - the farmer who causes the problem should be responsible for the unwanted spread of GMO crops, not the other way around. This whole situation can be avoided by not allowing the introduction of GMO alfalfa in any shape or form in this country. There are way too many unanswered questions and incomplete science surrounding this technology. We don't need it and don't want it. Thank You. (Comment Number: APHIS-2007-0044-5343-1)

Response: In regard to the effects of deregulation of GT alfalfa on alfalfa seed markets, see the response to comment APHIS-2007-0044-2225-3 for Issue 5.0. In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
If the USDA lets Monsanto sell its new alfalfa, it will inevitably overtake organic alfalfa crops through the natural pollination process.As a result organic farmers may be feeding their cows genetically modified food which goes against it's regulation of organic certification requirements. (Comment Number: APHIS-2007-0044-6207-1)

Response: In regard to the National Organic Program, see the response to comment APHIS-2007-0044-10866-5 for Issue 3.3.

Comment Excerpt Text:
On April 26, 2007, the Board of Directors of NAFA signed a document promotin the acceptance of biotechnology traits in alfalfa hay and alfalfa seed (You will see my name appearing on that document).
In January 2008, the NAFA board approved the first co-existence document, or Best Management Practices. I abstained from voting for this proposal. I did not openly oppose this action. In June 2008, other co-existence documents were approved, which I voted in favor of. Several of the concepts of the Best Management Practices included:
1. Seed field isolation "pinning" maps,
2. Isolation of 900 feet between seed fields under commercial conditions,
3. Establishment of GE free alfalfa seed production zones, designated as such by a consensus of local seed producers.
A representative of Forage Genetics Int. stood in our Montana Association meeting in Billings, Montana in early February 2010, and stated that the BMP is nothing more than what the company has been doing since the original plantings of commercially produced RR alfalfa seed. Those fields having been produced for some five or six years.
So, there's the background. Let's talk about "pinning" maps and how they've been used in Montana. The company said they were using "pinning" maps as early as 2004 or 2005. In preparation of our annual meeting for early February 2009, I asked Ron Larson (Director of the Montana Seed Grower's Association) what has been done in Montana with "pinning" and how we can maintain proper isolation distances. He replied that raising RR alfalfa seed in Montana wasn't much of an issue anymore because most of the RR fields had been plowed out. I asked him to check some of the production records and call me back. When he called me, he replied that a lot of the RR fields were still being produced in Montana. In the meeting that was held in Billings in February 2009, no attempt was made by the company to establish a statewide "pinning" map. I would propose that every measure was taken to prevent "pinning" from happening.
At every annual meeting, Ron Larson has reported on how the seed certification process is working. Ron was concerned that contamination issues didn't end up in the courts with neighbor sueing neighbor. So, in preparation for the February 2010 meeting, we came up with the idea of having a panel discussion to work out what we could do in the future concerning "pinning". Ron called Rod L. from the company. Rod replied that he could not comment until after the EIS was released and other court cases were settled. So, in Ron's report to the seed growers, nothing concerning the "pinning" process was mentioned.
In no way am I saying that Ron is not doing his job. The Montana Seed Grower's Association is not a regulatory organization. I am saying that the company has in no way, to the best of my knowledge, promoted this co-existance strategy. I was under the impression that the "pinning" process was going to be facilitated by the company. Several days after the February 2010 meeting, Jim Larson (a field man for the Dairyland Seed Company) called and asked me what was decided concerning "pinning" at our annual meeting. I replied that all attempts were made to get something started, but we were stopped at the brick wall, as we have been in the past.
In summary concerning "pinning" we have followed this since 2004, but really nothing has been done. The BMP has been pushed as something that has been practiced since 2004. How hard would this have been to get accomplished? At least two of the other genetic suppliers wanted this to be done. It could have been done, if the company had made a good faith attempt to implement the process.

Next issue: 900 feet islation distances between seed fields under commercial conditions. The Bob Hammon report states "the gene was found at 83% of the collection sites out to a distance of 1.7 miles from the pollen source." When Bob was asked to what distance he would feel comfortable in saying that no contamination would take place, he replied with the answer of five miles.

Pages 397 and 398 of a document entitled Petition for Determination of Nonregulated Status: RR Alfalfa Events J101 and J163 allude to the 900 feet isolation distances needed in commercial production. Forage Genetics' McCaslin and Fitzpatrick are quoted. The high density of intentionally introduced leaf cutter bees (ca. 2 gallons of loose cells pupae/acre) is referred to as "Recommended Practices For Commercial Seed Production." What would have been the results if the common practice of using 5-6 gallons of loose cell pupae/acre had been analized in these studies?

From the USDA ARS document "Keeping Transgeni Pollen in Its Place": Leafcutter bees, used in commercial seed production, flew from their hives for a distance of two-thirds of a mile and back home. According to St. Amand, the bees would likely have moved pollen even greater distances, but the test ended at 3,280 feet. He and Skinner used statistical models to estimate that a minimum isolation distance of 5,109 feet from the hive to any other alfalfa field may be required to prevent gene flow.

The researchers recommend that producers consider changing their seed-production practices. They suggest placing bee colonies in the center of the alfalfa field instead of along the side and surrounding the field with flowering crops like birdsfoot trefoil or sainfoin so that bees would become covered with other pollen and no longer tranmit alfalfa pollen if they leave the field. These practices are expected to limit pollen dispersal, but Skinner cautions that more testing will have to be done.

What we need is a three year independent study to determine what is best, the 900 feet, the 5109 feet, or the 1.7 mile isolation distance and the commercial seed production rate of using 5-6 gallons/acre as compard to the 2 gallons used in the McCaslin study.

The first BMP recognizes that greater isolation distances are needed when honeybees are used for production. On the edge of one of my 20 acre seed fields lies a honeybee colony that has been there for at least 50 years. Am I deserving of this greater isolation because of the presence of this honeybee colony?

Will the 900 feet isolation be on my property, or the neighbor's property? The 900 feet taken off of a mile square piece of land (640 acres) is a loss of 362 acres, leaving 278 acres of my square farm that I can raise seed on. Have the rights on the 362 acrese been taken away because of these isolation distances? Maybe we need a three year independent study on certain legal rights that are impacted because of the BMP.

Next issue: GE free alfalfa seed production zones. When the concept of GE free zones was first brought up at our Montana meetings, the company representatives treated the subject with contempt. Once the BMP was adopted by the NAFA organization, the company said that it couln't be done. In the February 2010 meeting in Billings, they told us that it was attempted in Idaho, but to no avail. They did say that one such zone was established in California. I really wonder why this part of the BMP was ever written into the document, when the company so adamantly opposes its existence and implementation. Perhaps the company would consider looking into the legal implementation of these zones rather than fighting against the issue.

Finally, the issue of pollenation contamination from a RR hay field should be addressed. I know that the hay producers have contracted to cut or harvest the RR fields before bloom. In practice,

this cannot happen in Northern Montana when rains come when the fields are ready to harvest. What happens during this time while the fields are drying and the bees are beginning to fly again after the rainy season? Perhaps this issue needs to be studied during the next three year period. (Comment Number: APHIS-2007-0044-6227-1)

Response: The Isolation/Geographic Restrictions alternative incorporates both areas where GT alfalfa cannot be grown and isolation distances. Under this alternative these measures would be enforceable. According to the BMP and the NAFA documents pinning or some other form of identification is desirable. Monsanto currently requires hay fields to be registered, but it is unclear if that would continue once APHIS makes a decision. The seed certifiers are ensuring that the required distances are met for those growing seed.

Comment Excerpt Text:
In the DEIS, APHIS states that cross-contamination of non-genetically modified alfalfa crops by glyphosate tolerant alfalfa crops is possible because alfalfa is pollinated by bees that can transfer genetically modified pollen grains to other non-genetically modified alfalfa plants, including organic alfalfa crops, up to 5-miles away. From the perspective of an organic grower, the glyphosate tolerant pollen is genetic pollution that threatens the ability to grow a pure stand of organic alfalfa. No reasonable buffer zone is large enough to stop a pollinator foraging 5-miles from its hive. With deregulation, crosscontamination of organic alfalfa crops is inevitable (Comment Number: APHIS-2007-0044-6769-4)

Response: In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1. In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
This is a very bad idea. This crop will affect any crops planted within a ten-mile radius. Genetic drift has already proven to be a serious problem with previous crops of this sort. Once this product is allowed, it will be impossible to eliminate its effects on other crops (Comment Number: APHIS-2007-0044-7007-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
Because of the natural pollination process, GM alfalfa would inevitably contaminate organically grown alfalfa, as has happened with corn. About 75% of the corn grown in the U.S. today is genetically modified (which means it cannot reproduce; we are dependent upon seed makers to provide this "dead" seed). Crops as distant as 20 miles have been contaminated by GM corn, rendering those crops also dead and unable to reproduce. It is reasonable to expect that a similar contamination would occur with alfalfa. Aside from the negative dependency on seed producers

and the potential health effects of GM foods themselves, this would render the raising of organic meat almost impossible.
Please do NOT approve Monsanto's genetically modified alfalfa for non-regulated status (Comment Number: APHIS-2007-0044-7060-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
I am an organic consumer and I do not support the use of transgenic plants, especially as a food source. Cross-contamination from these plants could have serious undesired consequences. The selective advantage of 'super plants' could eliminate native plants from the ecosystem which will decrease the variability in the plant population. Minimizing the gene pool will affect the ability to adapt to changing conditions. The use of these plants is extremely short sighted. (Comment Number: APHIS-2007-0044-7254-1)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6.

Comment Excerpt Text:
GE contamination of non-GE and organic crops would be inevitable (Comment Number: APHIS-2007-0044-7266-2)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I'm a small farmer who raises both organic and conventional crops. I am concerned about having a RR product that is open-pollinated as it would be next to impossible to insure that there is not any cross pollination between an organic field and a conventional field. (Comment Number: APHIS-2007-0044-7294-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Given the widespread global utilization of roundup ready technology in corn, soy, and cotton, the long history of safe useage, the negligible risk of "gene flow" (a risk which has been deemed a risk in the public eye despite there being no clear reason why gene flow of a transgenic gene of this nature would have any bearing whatsoever on environmental matters particularly as gene flow from conventional non-GM crops must be at least as possible and has absolutely no bearing on whether or not a crop is released) and the massive economic benefits this technology

promises to alfalfa farmers I urge the USDA to go ahead and deregulate the events under consideration (Comment Number: APHIS-2007-0044-7298-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
Cross-pollination and contamination of non-GM alfalfa is demonstrable and could rapidly contaminate other alfalfa stocks. Although in the executive summary it is confidently stated that most alfalfa in the United States is managed to limit growth to the juvenile (vegetative) state so that forage production (yield) and nutritional quality of the hay are optimized. It is clearly impossible to eliminate flowering. In fact, current common practice is to allow up to 25% flowering before taking secondary harvests [see, for example, http://ipm.ncsu.edu/alfalfa/Scouting_Alfalfa/ alfalfa_management.html].
One study [Hammon et al. 2006] showed that bees are demonstrably capable of moving the RR gene from GM alfalfa fields almost two miles. This was only after two seasons, and the fields were unusually well monitored and harvested as soon as flowers appeared. The study also found that "...the farthest distance [bees] can move pollen cannot be determined [our emphasis] because we found the RR gene at our most distant site from the pollen source."
There would have to be an intensively monitored buffer zone many miles wide between any GM alfalfa and other cultivated fields to ensure no cross contamination.
In view of what has happened to the North American rapeseed harvest (it is now very difficult to find a non-GMO contaminated batch of rapeseed oil), No Spray Zone feels that permitting widespread use of RR alfalfa will risk an agricultural catastrophe. (Comment Number: APHIS-2007-0044-7408-2)

Response: In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1.

Comment Excerpt Text:
The potential of gene flow from Roundup Ready alfalfa to conventional alfalfa is limited to alfalfa grown for seed, which accounts for less than 1% of total acreage. The vast majority of the crop is grown for forage and is harvested before the production of viable seed. Growers who produce alfalfa seed can manage the potential of gene flow by following science-based stewardship practices designed to minimize the potential of gene flow. (Comment Number: APHIS-2007-0044-7944-3)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment.

Comment Excerpt Text:
There is documentation of GE pollen drift around the world, where ever GE crops are grown. There is evidence of contamination and co-mingling of product and seed, and no confidence that

family farmers who dont wish to use GE seeds can protect their crops from contamination, nor will there be any recourse for their losses. There are many people who want the choice to purchase and consume food free from Genetic modification. This is about choice and freedom from corporate ownership of the food we feed our livestock and ultimately eat ourselves. (Comment Number: APHIS-2007-0044-7955-5)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
I am writing to urge you NOT to approve genetically engineered alfalfa. As a professional in the seed industry I am fully aware that genetically engineered crops contaminate conventional and organic seed and food crops, particularly crops like alfalfa, corn, canola, flax, and sugar beets, which are outcrossers. (Comment Number: APHIS-2007-0044-8167-1)

Response: In regard to past adventitious presence episodes, see the response to comment APHIS-2007-0044-9936-10 for Issue 11.15.

Comment Excerpt Text:
If planted, fragments of GE alfalfa will eventually escape and contaminate nearby fields with pollen, spawning a host of new GE alfalfa plants all over the place where they should not be. Since alfalfa is open-pollinated by bees, which can travel upwards of six miles from their home, widespread biological contamination is sure to take place.
Controlling the growth, pollination, and proliferation patterns of GE crops is simply impossible; there is no way to protect non-GE plants and fields from being contaminated with patented DNA by natural forces and insect life. (Comment Number: APHIS-2007-0044-8176-2)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
USDA's claim that contamination of hay fields is not an issue, because alfalfa is "typically" harvested before 10% of plants reach full flower (EIS, p. 100) is naïve at best and a demonstration of acute ignorance about the realities of farming at worst.
The USDA's assumption may hold true for farmers selling their hay to dairy farmers, but it does not hold true for farmers growing hay for horses and other livestock (it should be noted that USDA made no effort at any sort of nuanced assessment about the percent of alfalfa farmers who grow exclusively for horses versus cattle). In fact, for farmers growing hay for horses, cutting alfalfa after it has flowered makes sense: seed production lowers alfalfa's protein content, ensuring that the resulting hay is not too "hot" for horses. Even in the case of farmers growing hay for dairy cows, there is no way to guarantee that no plants go to seed. Alfalfa hay harvesting is an art, not a science. Farmers are at the mercy of weather patterns that, thanks to climate change, are becoming increasingly unpredictable. In order to avoid freshly cut hay moldering in

the field, farmers may wait for a week in which rain is predicted to pass only to be confronted with another week of rain and an alfalfa crop going to full flower. Soggy terrain and wet soil may delay harvesting even longer. Often there will be areas along fencelines or other obstacles (telephone poles, power lines, hand lines that haven't been moved, areas close to a pivot) that swathers can't get to and subsequently go to seed. Terrain itself may pose an obstacle to a 100% harvest: portions of a field may have eroded or been impacted by rodent boring and sunk beneath the level of the swather.
If USDA does not find these text-based arguments persuasive, I would urge you to put off a final decision on this matter until after the upcoming growing season: Ask farmers to document the conditions in and around their fields and regions this summer and submit photos so that the agency can judge for itself. I, for one, would be more than willing to do so. (Comment Number: APHIS-2007-0044-8397-6)

Response: In regard to timing of alfalfa forage harvest, see the response to comment APHIS-2007-0044-10263-7 for Issue 3.1.

Sections III.E and Appendix V.5.2 of the FEIS acknowledge that alfalfa is harvested at different stages depending on end use.

An expanded discussion on the effect of unharvested plants on gene flow has been added to Section IV.B.4 of the FEIS.

Comment Excerpt Text:
We support the preferred alternative stated in the Draft Environmental Impact Statement (DEIS) of non-regulated status for Glyphosate-Tolerant Alfalfa Events J101 and J163 (GT alfalfa). We believe all alfalfa growers should have choice, and believe that those growers who wish to grow GT alfalfa should be able to do so. Wyoming has an increasing amount of alfalfa seed grown in the state, and we believe that the stewardship agreement with these alfalfa seed growers, and their observance of the agreement, is more than adequate to prevent gene flow from GT to non-GT alfalfa. In Wyoming alfalfa seed production, cultured leafcutter bees Megachile rotundata F. are the primary, if not sole, means of pollination of the alfalfa seed crop. Even with non-GT alfalfa seed crops, these bees are kept with the same seed crop throughout a single growing season, lessening the chance of gene flow. These leafcutter bees also represent an important revenue source for Wyoming alfalfa seed growers, as Wyoming is the only state with an enforced leafcutter bee law (see Wyoming Statutes Annotated, §11-7-401 through §11-4-407, and Wyoming department of agriculture rules, Chapter 50). Routinely 2.5 -3 gallons of leafcutter bees are required for each acre of alfalfa seed production, with prices typically ranging from $80 - $110 per gallon of bees. The annual increase in bee production is routinely exported to other alfalfa seed producing states; the only other source of disease free leafcutter bees is from Canada. (Comment Number: APHIS-2007-0044-8508-1)

Response: In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1.

Comment Excerpt Text:

Cross Pollination Would Be Very Rare: USDA has carefully studied the possibility of cross-pollination from biotech to non-biotech crops and found that it would happen less than once in every one-hundred-thousand plants. Because the feed quality of alfalfa drops rapidly after flower blooms appear, nearly all RR alfalfa would be harvested before flowering. That alone makes the possibility of cross pollination extraordinarily unlikely. Although some RR alfalfa plants will inevitably flower, alfalfa pollen is not dispersed in the wind, but must be carried by pollinating insects. Even then, the biotech and non-biotech fields would have to flower at the same time for viable pollen to be spread and for fertilization to occur. (Comment Number: APHIS-2007-0044-9025-2)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment.

Comment Excerpt Text:
GMOs cause irreversible genetic pollution
GMOs cross pollinate and spread into the environment. A total recall is impossible.
The self-propagating genetic pollution already released will outlast the effects of global warming and nuclear waste. (Comment Number: APHIS-2007-0044-9298-12)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
Coexistence principles have been practiced and developed in the seed and hay industries for over 50 years. They are the basis of the seed industry and they have served the industry well on a global scale. Alfalfa farmers work with Seed Associations to ensure they can deliver high quality products.
The basis of coexistence across production systems is process-driven, as are the National Organic
Program and seed certification programs. Although there are many details, it comes down to good communication with neighbors and good seed. It requires an understanding of gene flow and how to maintain seed and hay purity. A seed generation is required for gene flow, i.e. for gene flow to occur, pollen must fertilize a flower, make a viable seed, that in-turn must germinate and produce a viable plant that produces a viable seed (Putnam, 2006). This has large implications for potential gene flow in alfalfa.
Gene flow
Seed-to-seed gene flow studies are well documented in alfalfa (Van Deynze et al., 2008; Van Deynze et al., 2004b). Basically gene flow decreases exponentially with distance and is a function of the pollinator. A summary of studies to date can be seen in Figure 1. Leafcutter bees are the primary pollinator in the Pacific Northwest and honeybees in California, with a very small number of seed fields using alkali bees. These studies have been validated by sampling 300 commercial seed lots across the Western United States in 2006-2007 with three bee pollinators (Fitzpatrick et al., 2007). For all three pollinator species and pollinator species blends for all samples in the surveys, the observed commercial gene flow (adventitious presence, AP) was four to five times lower than that predicted in the smaller-field research experiments. The majority of

these samples were also taken using Best Management Practices being developed by the alfalfa industry (Fitzpatrick et al., 2007). Percent AP was 0.00 to 0.18%, well below seed industry standards for seed off-types. While the potential for seed-mediated gene flow exists, Best Management Practices in the cleaning and management of seed harvesting and processing equipment are effective in managing admixtures between GE and conventional alfalfa seed. Coupled with cultural and rotational practices to manage volunteer seedlings, it is likely that seed-mediated gene flow will be very low (<1.0%) (Comment Number: APHIS-2007-0044-9304-5)

Response: APHIS acknowledges the comment. The DEIS and FEIS include these references and concepts.

Comment Excerpt Text:
The EIS assumes that pollinating insects, like bees can be controlled in nature. These insects travel many miles to collect and deposit pollen and the idea that farmers can control their neighbor's beehive locations or natural movement of insects is short sighted.

The EIS also failed to analyze the impact of introduction and widespread use of GM alfalfa (and the associated increase in the use of Roundup on alfalfa fields) on bees and on both conventional and organic honey producers. (Comment Number: APHIS-2007-0044-9882-13)

Response: In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1.

Comment Excerpt Text:
The finding in the EIS on the economic impacts to conventional and organic farmers is deficient. First, it assumes that the responsibility for preventing contamination of conventional and organic production falls on the organic or conventional producer, rather than on the manufacturer of this alfalfa variety or the farmers who grow it. Second, it fails to make any provisions for segregation of GM alfalfa from conventional alfalfa. APHIS failed to evaluate, require or describe steps that Monsanto or those who buy and plant its Roundup Ready alfalfa seed could take to minimize or eliminate contamination of neighboring crops or to limit the spread of volunteers.

In our January 2005 comments on the Environmental Assessment and our February 2008 comments on the scope of the EIS, WORC said USDA should prepare a full EIS, and made this suggestion about the scope of the EIS:

The EIS should examine whether, how, and at what cost Roundup Ready alfalfa can be kept separate from conventional, organic, and other alfalfas and hays containing alfalfa. The EIS should analyze the economic costs of contamination to producers of organic, natural, and conventional alfalfa seed, grass, hay, honey, livestock, meat, milk, and other foods. (Comment Number: APHIS-2007-0044-9882-3)

Response: In regard to the burden of control measures, see response to comment APHIS-2007-0044-11689-10 for Issue 9.0. In regard to further examination and analysis, see the response to comment APHIS-2007-0044-11741-4 for Issue 1.0.

Comment Excerpt Text:
The last question in topic area, #10, in the list of questions to address in the EIS is:

To what extent can organic or conventional alfalfa farmers prevent their crops from being commingled with unwanted, unintended, or unexpected glyphosatetolerant alfalfa?

While this question should have been expanded so that the EIS addressed the extent to which the owners (Monsanto, Forage Genetics, and associated seed companies) and growers of GM alfalfa can prevent their product from unwanted, unintended, and unexpected commingling and contamination of non-GM alfalfa, the draft EIS did not even address the question the agency itself posed.

Similarly, the EIS did not analyze any realistic measures organic or conventional alfalfa farmers would have to take to prevent their crops from being commingled with unwanted, unintended, or unexpected glyphosate tolerant alfalfa; or the cost of commingling and contamination, to the extent that is not or can not be prevented. By refusing to provide workable solutions to prevent contamination, the EIS falsely implies that there will be no contamination and ignores the costs of that contamination.

The EIS maintains that avoiding contamination is the conventional or organic farmers' responsibility. According to the draft EIS "Growers who wish to avoid gene flow (e.g., those who produce hay for markets that reject GM crops) should pay attention to flowering habits (avoiding simultaneous flowering) and harvest schedules, and disallow or remove commercial beekeepers' hives. Although the hay harvest date can be delayed a week or more by wet weather or equipment failure, harvesting before the ripe seed stage is possible in all but the most extreme circumstances."

This absurd assertion on the part of the EIS because it fails to recognize that an alfalfa producer cannot require set backs of bee colonies from their fields and cannot prohibit the placement of hives and apiaries on others' private property. Furthermore, producers have no way of controlling wild pollinators, wind, water and other natural forces that move seed and pollen from field to field. (Comment Number: APHIS-2007-0044-9882-4)

Response: In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1. In regard to timing of alfalfa forage harvest, see the response to comment APHIS-2007-0044-10263-7 for Issue 3.1. In regard to impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the effectiveness of Best Management Practices in reducing gene flow, see updated Sections IV.B.3, IV.B.4, IV.H.2.a and Appendix V of the FEIS. In regard to compliance of farmers to Best Management Practices, see Appendix V 5.1

Comment Excerpt Text:
The U.S. Fish and Wildlife Service, in a recent draft of a Biological Opinion on the effects of Roundup Ready creeping bentgrass, prepared pursuant to the Endangered Species Act, noted: "Recent escape of GM sugar beets into compost sold to homeowners illustrates the potential for products to move outside of their intended market. Sugar beets are . . . wind pollinated and were thought to be well controlled by the growers using the product. Despite best management practices, escape of the transgenes occurred.") [Footnote 34 FWS Draft Biological Opinion, Roundup Ready Bentgrass, July 2009.]

In the Union of Concerned Scientist ("UCS") report, "Gone to Seed," UCS found that about 50% or more of the certified non-GE corn, canola, and soybean seed has been contaminated with transgenes. [Footnote 35 M. Mellon and J. Rissler, Gone to Seed: Transgenic Contaminants in the Traditional Seed Supply, Union of Concerned Scientists, 2004.] The level of contamination was typically 0.05%-1.0%, far greater than the minimum levels that can be detected. "Gone to Seed" demonstrated that the frequency and levels of contamination of soybean seed was found to be about as high as for corn. Soybeans are largely self-pollinating (do not pollinate other soybean flowers very often), while corn is highly out-crossing. Therefore, the contamination of soybean seed is likely to be largely from causes other than cross-pollination. Such causes could include seed mixing or human error, and suggests that these sources may be at least as important as cross-pollination.

Another report, "A Growing Concern: Protecting the Food Supply in an Era of Pharmaceutical and Industrial Crops," UCS enlisted the assistance of several academic experts in agricultural sciences to determine whether GE pharmaceutical-producing crops could be kept out of food. This report demonstrates how difficult this is, even for pharmaceutical crops that would be grown on small acreage and under stringent confinement, to avoid contaminating food. The authors of this report examined confinement methods, such as field separation, cleaning of farm equipment, segregation of seed, and others, and found that it would still be difficult to ensure the absence of contamination. [Footnote 36 David Andow, et al., A Growing Concern: Protecting the Food Supply in an Era of Pharmaceutical and Industrial Crops Union of Concerned Scientists, December 2004.] The experts felt that contamination might be prevented by taking heroic means, such as geographical isolation from food crops. Union of Concerned Scientists concluded that even though it may be theoretically possible to prevent contamination, it would not be economically feasible.

Another route of contamination that is unpredictable, but likely over time, is human error. Two academic ecologists address this in a peer-reviewed paper, and conclude that contamination by GE crops due to human error or other means has occurred numerous times, and is likely to continue to occur. This paper documents many instances where GE crops are known to have contaminated non-GE crops or food. [Footnote 37 M. Marvier and R. Van Acker, "Can crop transgenes be kept on a leash?" Front. Ecol. Environ., 2005, vol.3, p.95-100.] Thus, biological contamination through human error and human behavior, such as composting and exchanging seeds, must be addressed in an EIS. (Comment Number: APHIS-2007-0044-9936-9)

Response: As discussed in appendix V (Sections 5.5 to 5.10) of the DEIS, mitigation strategies (e.g. equipment sanitation, harvest management, pollinator management, field separation, management of feral alfalfa, and contractual practices) can limit the occurrence of transgenes from non-GT alfalfa to levels below seed certification thresholds. The 2010 Monsanto TUG is available at Monsanto's website (http://www.monsanto.com/Documents/2010_technology_use_guide.pdf,) and a summary of its provisions is in appendix V-2 in the FEIS.

The National Alfalfa and Forage Alliance (NAFA) Coexistence for Alfalfa Hay Export Markets adopted June 2008 includes best management practices (BMPs) that GT alfalfa seed producers are required to follow. The NAFA 2008-09 annual report states:

In accordance with the Best Management Practices (BMP) for Roundup Ready® Alfalfa Seed Production adopted by NAFA in 2008, a team of state certification agency managers conducted a review of trait stewardship to determine if the NAFA BMP can work on a commercial scale (this review did not represent the Association of Official Seed Certifying Agencies). A summary of the review indicated the NAFA BMP seem to be working on a commercial scale. Should RRA be deregulated, it is recommended that the third party review process be continued. In the future this review may lead to the ability to certify a GMO Sensitive Market Protocol. (http://alfalfa.org/pdf/annualreport0809.pdf)

Section IV.B.3 and Appendix V of the FEIS have been updated to include discussion of NAFA BMPs.

Additionally, the Association of Official Seed Certifying Agencies (AOSCA) has recently announced a voluntary Alfalfa Seed Stewardship Program designed for farmers, such as organic farmers, who work in GE sensitive markets. More information on this program can be found in appendix V 5. 1. More information on the effectiveness of other alfalfa BMPs in preventing gene flow can be found in appendix V, 3.4.2. More information on compliance with these programs can be found in appendix V 6.7 and appendix V-2.
APHIS acknowledges that human errors may be avenues for unintended escape of GT alfalfa. These avenues for escape are now discussed in an expanded Section IV.B.4.

3.2 Issue 3.2 – Gene Flow Due to Secondary Seedlings

Comment Excerpt Text:
A considerable amount of hard seed is produced by alfalfa plants. Hard seed is generally viable seed that is impermeable to water. Hard seed will not take on water and swell when planted or tested in a germination test. In our alfalfa seed production studies in 2001, 2002, and 2003 hard seed comprised 8 to more than 20 percent of the seed produced. The proportion of hard seed varies by variety, environmental conditions of seed production, and seed treatment among other factors. In a field designated for alfalfa seed production, hard seed will remain in the field for many years after the final year of harvest. If you have a field with conventional alfalfa, there will be conventional alfalfa emerging in the field from hard seed for many subsequent years. Likewise, a field with GT alfalfa will result in residual GT alfalfa seed within that field. Since hard seed comprises a very significant portion of the total seed that is produced in a field, alfalfa

will emerge from hard seed long after the seed crop has been removed. It is simply unfeasible to use a field that has had GT alfalfa grown as a seed crop in the recent past to grow completely uncontaminated conventional alfalfa (Comment Number: APHIS-2007-0044-10157-4)

Response: Section IV.B of the DEIS acknowledges that hard seed is a factor that can increase the probability of volunteer alfalfa and therefore gene flow. Section IV.B.4 in the FEIS has an expanded discussion on hard seed.

Comment Excerpt Text:
In agriculture, uncontrollable events such as windstorms, irrigation ditch breaks, thunderstorms, animal consumption and defecation of seed, and human error spilling and scattering the small seed are inevitable. For example, several years ago, there was a ditch break on a canal. The water in the irrigation ditch poured out across the fields. Soil and seed was moved in this irrigation ditch break, following the course of the water, into fields, drains and roadsides, regardless of human intent. There was no stopping it. The same would be true in the case of a big thunderstorm. Water carries materials from one field to another. These kinds of things happen in the course of nature and are unavoidable. Since alfalfa always produces a significant portion of hard seed, in the event of a storm or irrigation ditch break, residual seed from previous years can move and contaminate other nearby fields, ditches, and roadsides. For this reason, it may be difficult to grow GT alfalfa in a conventional alfalfa seed production region and still maintain the integrity of conventional alfalfa seed grown in the same area (Comment Number: APHIS-2007-0044-10157-9)

Response: In regard to gene flow due to unintentional mixing and distribution of seed, see the response to comment APHIS-2007-0044-10263-5 for Issue 3.2.

Comment Excerpt Text:
Monsanto's stipulation that GE alfalfa seed producers may not save or sell patented seed is a wellknown
restriction that is built into Monsanto's contracts with seed purchasers.
However there are many ways in which accidental seed mixing can occur and lead to contamination including the following:
- Failure to clean out hoppers and bins between crops
- Spillage while hauling (failure to tarp, leaky gates, etc.)
- Volunteer growth due to seed shattering
- Tornados and high winds blowing swaths during harvest
- Flooding resulting in floating swaths during harvest
- Birds and rodents spreading seed from storage bins
- Manure (undigested seed from hay consumed by livestock)

The DEIS includes reference to Forage Genetics International Best Practices for cleaning equipment (page 103) but even the best and most careful cleaning requirements can fail and are subject to human error.
The transport of seed is also a well-known potential source of contamination, something observed

many times over with GE canola. [Footnote ix: Friesen, Lyle, et al. "Evidence of contamination of pedigreed canola (B. napus) seedlots in
Western Canada with genetically engineered herbicide restistance traits," Agronomy Journal (95),
2003.]
Canada imports some hay and alfalfa seed from the U.S.. In addition to cross-border biological contamination through pollination, GE alfalfa may be introduced to Canada through contaminated
seed crossing the border in the context of this trade. (Comment Number: APHIS-2007-0044-10263-5)

Response: APHIS acknowledges that pathways for unintentional mixing and distribution of seed include:
- Failure to clean out hoppers and bins between crops
- Spillage during transportation (failure to tarp, leaky gates, etc.)
- Volunteer growth due to seed shattering and scattering
- Tornados and high winds blowing swaths during harvest
- Flooding resulting in floating swaths during harvest
- Runoff into irrigation ditches, including ditch overflow due to storms
- Birds and rodents spreading seed from storage bins
- Manure (undigested seed from hay consumed by livestock or wildlife)

An expanded discussion of these possible pathways has been included in Section IV.B.2 of the FEIS.

Comment Excerpt Text:
APHIS's analysis of gene flow potential is wrought with contradictions and circular reasoning. Although APHIS admits the possibility of gene flow, it claims that mitigation is possible through unenforceable practices, effectively failing to provide the necessary to analysis to support a no significant impact conclusion. In the Executive Summary, APHIS acknowledges that the probability of gene flow exists, though it may be low.[Footnote 20: DEIS at xvi-vii.] APHIS claims that the impact of this gene transfer will not be significant because it is possible for "contractual 'best practices'" to produce seed with high levels of purity. This conclusory statement does not follow from the discussion of gene flow in Section IV. B. This discussion lacks several key analyses that would support that conclusion.
APHIS's analysis offers no discussion of possibility of shatter/scatter from transport of overripe hay, non-intentional seed production, and the potential for this to create feral or unintentional populations, which then pose unidentified cross-pollination risks not subject to farmers' intentions to comply with "best practices." This exact scenario has unfolded with alarming frequency in GE canola cultivation, leading to numerous unintended gene flow, or contamination events. No data is presented as to the frequency with which viable alfalfa seed might escape in this manner, or the potential distribution and gene flow that might result from such a scenario. Given the frequency with which this has played out in canola production, the possibility for similar circumstances to arise with alfalfa warrant significant research and discussion lacking here. APHIS's analysis of this potential is limited to Table 4-3[Footnote 21: DEIS at 101.] where

it is stated repeatedly that gene flow risks into hay field populations pose the "lowest risk of gene flow because hay is cut before seed is produced." In agriculture, there are far too many factors in play to make a conclusion that all alfalfa hay populations in the country will be harvested before seed is produced. Widespread practices of land leasing, and contract hay farming routinely result in the harvest and transport of significantly overripe hay crops. (Comment Number: APHIS-2007-0044-11741-5)

Response: In regard to gene flow due to unintentional mixing and distribution of seed, see the response to comment APHIS-2007-0044-10263-5 for Issue 3.2. In regard to timing of alfalfa forage harvest, see the response to comment APHIS-2007-0044-10263-7 for Issue 3.1.

Comment Excerpt Text:
First we need to recognize the important role alfalfa has in organic
farming and feed. Alfalfa is excellent fodder for high producing cows. Cattle effectively use the high levels of protein, calcium and high , quality fiber in alfalfa for producing milk. [Footnote 1: University of Arkansas; Division of Agriculture http://www. uaex.edu/Other Areas/publications/PDF/FSA-4000. pdf)]. Since alfalfa is crucial to the farmer, protecting the integrity of the alfalfa seed in its natural state should be paramount. As it has been well documented, it is impossible to confine seeds to certain areas due to winds, birds and insects and therefore puts the organic and non-GE crops at high risk of becoming contaminated with the GE seed [Footnote 2: United States Department of Agriculture. Glyphosate-Tolerant Alfalfa Events J101 and J163: Request for Nonregulated Status. Draft . Environmental Impact Statement-November 2009. P.9S.]. (Comment Number: APHIS-2007-0044-12261-1)

Response: In regard to gene flow due to unintentional mixing and distribution of seed, see the response to comment APHIS-2007-0044-10263-5 for issue 3.2.

Comment Excerpt Text:
Cleaning of equipment. As an organic producer we have to do equipment cleaning. It's very difficult to achieve. Combines have hiding places for big seeds like cereal grain where it is even more likely for small seeds to hide. Unless you have a custom operator who does only organic crops you will have contamination. The EIS takes a very naïve stance on this subject. (Comment Number: APHIS-2007-0044-2308-8)

Response: In regard to gene flow due to unintentional mixing and distribution of seed, see the response to comment APHIS-2007-0044-10263-5 for Issue 3.2.

Comment Excerpt Text:
3) Transportation of GE alfalfa is not regulated in our state, imposing an obvious risk of spreading GE traits, widely, to growers who do not want GE alfalfa, as well as to the wild. (Comment Number: APHIS-2007-0044-6353-10)

Response: In regard to gene flow due to unintentional mixing and distribution of seed, see the response to comment APHIS-2007-0044-10263-5 for Issue 3.2.

Comment Excerpt Text:
Mr. Phillips stresses we follow the stewardship program that is required by all growers. But yet he planted his RR fields 125 feet from my conventional Alfalfa production and the same distance from a grass and alfalfa mixed pasture. There are always a few alfalfa plants around the edge of a field that do not get cut and go to seed. These Feral RR contaminated alfalfa seeds are eaten by birds and spread for miles in all directions. This Grass and alfalfa mix pasture is used for winter cow feed so the alfalfa, contaminated with RR Alfalfa Pollen, goes to seed every year and then is eaten and spread over 3,000 acres by my cattle. The RR Gene is Already out of the bottle and may not be able to contain it!
Currently it is believed that there is no Non GMO Canola left in the entire world, Please do not follow that mistake with GMO Alfalfa. (Comment Number: APHIS-2007-0044-8166-4)

Response: In regard to gene flow due to feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0. In regard to gene flow due to unintentional mixing and distribution of seed, see the response to comment APHIS-2007-0044-10263-5 for Issue 3.2.

Comment Excerpt Text:
Alfalfa is also widely harvested, baled and transported on open trailers for livestock feed. The potential vectors of contamination are huge, with seed or pollen being shaken and blown out down the highways and roadways. Animals which consume this alfalfa could no longer be classified as organic, and organic dairy production would become very difficult, if not impossible, with the inevitable contamination of feed stocks.
The USDA also places the burden of preventing contamination unfairly on those farmers who do not grow GM alfalfa. The onus is on non-GM alfalfa farmers to change their planting and harvest schedules to avoid simultaneous flowering with GM alfalfa in neighbouring fields. Non-GM alfalfa farmers are also required to be responsible for removing commercial beekeepers hives from the vicinity of the non-GM alfalfa field. Given the fact that honey bees forage at distances over 10 kilometers (6 miles), the task of controlling this method of contamination is nothing short of herculean. (Comment Number: APHIS-2007-0044-8978-7)

Response: In regard to gene flow due to unintentional mixing and distribution of seed, see the response to comment APHIS-2007-0044-10263-5 for Issue 3.2. In regard to the burden of control measures, see response to comment APHIS-2007-0044-11689-10 for Issue 9.0. In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1.

Comment Excerpt Text:
The EIS makes no mention of analysis of the impact of the Roundup Ready alfalfa already planted. It would seem logical for APHIS to collect data and conduct tests on the location and extent of GM alfalfa planted before and after deregulation (and before the court-ordered

injunction), and the extent to which nearby non-GM alfalfa seed and hay fields and the conventional seed supply contains GM traits. (Comment Number: APHIS-2007-0044-9882-16)

Response:

In regard to the comment on analysis of the impact GT alfalfa already planted, please see appendix V 6.7 and V-2 regarding compliance with the Monsanto BMPs and Appendix V 4.0 regarding gene flow from GT alfalfa fields.

APHIS has conducted its analyses using the best available information. Under NEPA, agencies are required only to use the best available information when conducting their analyses.

During the NOI public comment period, many RR alfalfa farmers sent in information regarding acreage planted, herbicides used, and amount of applications. These data were used to develop information on the use of glyphosate by RR alfalfa farmers and document the shift of herbicides from more toxic to more environmentally friendly herbicides. The NOI also requested data from growers of non-RR alfalfa; no data were received.

Comment Excerpt Text:
The EIS also failed to analyze the economic costs of contamination to producers' conventional and organic alfalfa and the foods derived from them. Roundup Ready alfalfa may also spread by crossing with feral alfalfa, through the spread of volunteer plants, through wind and water erosion, and by the transport, feeding and digestion of feed.

The EIS should have analyzed whether and to what extent segregation of GM from conventional alfalfa is possible. The questions outlined by APHIS for its proposed scope of the EIS appear to get at this under items #16 and #17, but the EIS still did not evaluate whether any of the potential negative environmental and economic impacts resulting from the deregulation of glyphosate-tolerant alfalfa can be mitigated and the likelihood that mitigation measures will be successful – that is, whether "coexistence" (see #17) is practical or possible. The EIS simply ignores the possibility, thus the problems comingling creates. (Comment Number: APHIS-2007-0044-9882-7)

Response: In regard to economic impacts on organic farmers and downstream markets (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for Issue 5.0. In regard to gene flow due to feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0. In regard to gene flow due to unintentional mixing and distribution of seed, see the response to comment APHIS-2007-0044-10263-5 for Issue 3.2. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

3.3 Issue 3.3 – Seed Purity

Comment Excerpt Text:

Because of the factors stated above, in conventional alfalfa seed production areas I believe that the traits of GT alfalfa will not be confined, but will eventually be passed to conventional alfalfa seed produced in these areas (Comment Number: APHIS-2007-0044-10157-12)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
The draft EIS states that the supply of organic alfalfa hay and seeds would not be directly affected by the adoption of GE alfalfa by non-organic producers of GE alfalfa (Chapter IV, page 133). In addition, the EIS on page 60 states that there is no policy regarding the unintended presence of GE material in organic products or food. The draft EIS assumes that the alfalfa industry is segregated into two separate subparts – forage growers and seed growers. As such, it is assumed that genetic contamination would be limited. The reality is that a majority of alfalfa growers grow both forage and seed. In addition, the report assumes that borders and area boundaries will be sufficient to prevent genetic contamination of organic alfalfa. These statements overlook the fact that when GE canola was introduced to Canada that the organic canola market disappeared. The transgenic contamination of crop plants causes market rejection in the organic food industry. (Comment Number: APHIS-2007-0044-10172-2)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

In regard to past adventitious presence episodes, see the response to comment APHIS-2007-0044-9936-10 for Issue 11.15.

In regard to changes in supply of organic alfalfa seeds, see the response to comment APHIS-2007-0044-2225-3 for Issue 5.0.

Comment Excerpt Text:
The Vulnerability of Certified Seed: Case Studies in the Failure of Coexistence Strategies
Our experience with GE canola and GE flax clearly demonstrates that all coexistence strategies will fail at some point. These lessons are further supported by repeated contamination incidents with various GE crops, and even animals, around the world, including the U.S., with various causes including human error. The lessons learned in Canada from GE canola and GE flax contamination are relevant to examining the questions of gene flow between GE alfalfa and non-GE alfalfa as well as the significant impacts of such unintended presence on agricultural production systems and consumer markets. In particular, we would like to draw your attention to the repeated problem of contamination in certified seed stocks.
I. Canola Contamination
Unintended presence from GE canola reached such a point in Canada that most, if not all, pedigreed seed growers in Saskatchewan would not warrant their canola seed to be GE-free and most, if not all, grain farmers in Saskatchewan could not warrant their canola crop, even if planted with GE-free seeds, to be free of GE contamination. [Footnote xv: Saskatchewan

Organic Directorate. Statement of Claim. paragraph 27. Online at: http://www.saskorganic.com/oapf/pdf/stmt-of-claim.pdf. Accessed March 1, 2010.] This indicates that it is erroneous to assume that certified or pedigreed seed can be protected from unintended presence and instead illustrates that certified seed is in fact highly vulnerable to contamination. The case of canola indicates that, even with the pedigreed seed sector's strict varietal purity management control systems and the economic incentive to ensure that these controls work, the seed industry has not been able to prevent unwanted presence of GE traits in non-GE seed varieties. If professional seed growers cannot avoid the unintended presence of GE in their seed, it is not reasonable to expect the general population of farmers to succeed in doing so. Friesen et al (2003) tested certified canola seed stocks for the presence of unintended transgenes. [Footnote xvi: Friesen, Lyle, et al. "Evidence of contamination of pedigreed canola (B. napus) seedlots in Western Canada with genetically engineered herbicide restistance traits," Agronomy Journal (95), 2003.] Of the 27 unique, commercial certified canola seedlot samples, 14 had contamination levels above 0.25% and therefore failed the 99.75% cultivar purity guideline for certified canola seed. Three seedlots had glyphosate resistance contamination levels in excess of 2.0%. Some lots were tolerant to both glyphosate and glufosinate. The objective of this study was to survey pedigreed canola seedlots for contaminating herbicide resistance traits because of complaints from farmers regarding glyphosate-resistant canola volunteers occurring unexpectedly in their fields at densities and in patterns that suggested that pollen-mediated gene flow from neighboring fields in previous years was not the source of contamination.

Friesen et al concluded that, unexpected contamination (even at 0.25%) can cause problems for producers that practice direct seeding and depend on glyphosate for nonselective, broad-spectrum weed control.xvii They stated that, "To avoid unexpected problems and costs, it is important that farmers are cognizant of the high probability that pedigreed canola seedlots are crosscontaminated with the various herbicide resistance traits." [Footnote xviii: Ibid.]

A year prior to the study by Friesen et al. Drs. Downie and Beckie from the federal government department Agriculture and Agri-Food Canada, collected 70 certified canola seed lots in Saskatchewan and examined them using a laboratory Petri dish assay. [Footnote xix: Downey, R. K. and Beckie, H.. 2002. "Isolation Effectiveness in Canola Pedigree Seed Production." Internal Research Report, Agriculture and Agri-Food Canada, Saskatoon Research Centre, Saskatoon, Saskatchewan, S7N 0X2, Canada, 2002, 14 pp.] They found 59% of the seed lots had unintended transgene contamination and that 25% of the seedlots had contamination levels exceeding the maximum acceptable standard for certified seeds. The Canadian Food Inspection Agency requires a distance of 200 meters separation between fields growing certified seeds from any other Brassica, and a distance of 50 meters from weedy relatives. However Canadian producers of hybrid canola seed have required a separation of 2 kilometers from a Brassica crop, in recognition that pollen from a Brassica crop may travel as far as a kilometer or more and that government-determined isolation distances are not adequate. The inability of Canadian government agencies to predict sufficient isolation distances was also observed in the matter of government field-testing for GE wheat where buffer zones were repeatedly increased in response to new understandings of risk. [Footnote xx: Raine, Michael, "GM wheat buffer zone wider, moved from breeder seed area," Western Producer, March 28, 2003.]

II. Flax Contamination

The current GE flax contamination crisis in Canada offers similar warnings relevant to the question

of GE alfalfa. The GE flax "CDC Triffid" (tolerant to "Glean" herbicide residues in soil) was developed at the Crop Development Centre (CDC) at the University of Saskatchewan. The CDC Triffid was approved for environmental release and human consumption, and the variety was registered by the Canadian government (1998). The Flax Council of Canada and the Saskatchewan Flax Development Commission however were deeply concerned that GE flax would contaminate flax bound for the European market, making it impossible to sell there. They convinced the government agency responsible to de-register the GE flax variety in 2001, making it illegal to sell the flax seeds. None had yet been sold commercially but about 40 seed growers had multiplied around 200,000 bushels of the GE flax seed for future use. These stocks were ordered crushed when the flax was taken off the market that year. Despite this far-reaching measure, in September 2009 the GE flax CDC Triffid was discovered in Canadian flax exports, impacting 35 countries.

The source of GE flax contamination has not yet been established and may never be identified. Tests of the 2009 crop thus far reveal that the contamination is widespread. About 3.5 per cent of the farmer and elevator flax samples tested have been positive for CDC Triffid at or above 0.01 per cent (one seed in 10,000). Ten to 15 per cent of the rail shipments tested positive and seven per cent of the vessel holds.

Just as in the case with GE canola, certified seed stocks of flax (two varieties) were found contaminated. This occurred in a stringently controlled, small breeding center where the flax breeders were well aware of the negative consequences of GE contamination. Even in these circumstances contamination was not avoided and the certified seed issuing from these programs actually added to the contamination problem. (Comment Number: APHIS-2007-0044-10263-9)

Response: In regard to past adventitious presence episodes, see the response to comment APHIS-2007-0044-9936-10 for Issue 11.15.

In regard to the comments on canola and flax, both canola and flax are harvested primarily as seed crops and have several differences in the biology, harvest, and processing from alfalfa which may have contributed to the observed genetic adventitious presence. For example, both canola (Brassica napus L.) and flax (Linum usitatissimum L.) are annual crop species primarily cultivated for seed production with the downstream application being for isolation of oils (though markets for tuber-bearing B. napus and fiber markets for L. usitatissimum exist). As a result of cultivation for seeds, both canola and flax are grown throughout flowering, potentially increasing the likelihood of unintended gene flow to feral plants or compatible weedy relatives. Alfalfa, however, is a perennial species grown primarily for forage (with seed production primarily in a few Western states). Additionally, crop rotational practices are different between canola/flax, which are grown for no more than a year, and alfalfa, which can be maintained within a field for several years. Given the differences stated above, it is not possible to make direct comparisons between issues of gene flow and/or seed purity comparisons with canola and flax with those of alfalfa. APHIS acknowledges that improper cleaning or storage of different types of alfalfa seeds at processing locations could contribute to adventitious presence of certified seeds. However, there is no inherent factor associated with GE alfalfa (e.g. differences in seed size) that would contribute to higher levels of adventitious presence over the adventitious presence between conventional or organic seed sources.

In regard to seed stock adventitious presence, see response to comment APHIS-2007-0044-9936-7 for Issue 3.3. Additionally, the FEIS contains a new alternative to address this issue. For more information, please see the response to comment APHIS-2007-0044-11741-4 for Issue 1.0.

Comment Excerpt Text:
Consumer Preferences and Marketing Standards
While gene flow and associated mitigation measures are discussed in the DEIS, the Agency has chosen to not include an alternative that would attempt to restrict gene flow. Such an alternative would not be a realistic or practical alternative for operations in a farmer's field or any other biological system. In other words, gene flow from cultivated crops is a natural phenomenon that does not have a significant environmental impact and a "zero tolerance" standard can not be supported legally or scientifically—whether plants being grown are conventional, organic or genetically engineered. While it may be appropriate to discuss consumer preferences and marketing standards in an EIS, it would not be appropriate to include an option to address these issues. In fact, such a fully developed alternative would be inconsistent with the Agency's preliminary determination of non-regulated status for alfalfa genetically engineered for tolerance to glyphosate.
The Federal Seed Act and state laws govern seed purity standards in the U.S. and are intended to assure purchasers that the seed they buy will meet designated levels of purity. Recognizing the reality of growing crops in a biological system, none of these standards attempt to guarantee absolute purity. The decision to market seed according to a standard more stringent than federal and state law is a purely economic, market based choice, not one required by statute or based on environmental impact. Those growers who believe it will be in their economic interests to maintain a more stringent standard will take the necessary steps to meet the demands of their alternate markets. This is not an environmental impact and once a genetically engineered plant has successfully completed the necessary federal regulatory requirements, there is no environment, health or other safety basis for restrictions for the movement of these plants. The preference that some have for crops produced without the use of modern biotechnology may arise from a personal choice or perceived unrealized risks to human health or the environment. Notwithstanding years of intensive governmental, academic and commercial oversight, there is no evidence to suggest that such risks have been realized. Accordingly, such risks are wholly speculative. The fact that a market exists for personal choice or for those who are concerned about such risks does not bring those risks within the realm of the physical environment that NEPA was intended to address. (Comment Number: APHIS-2007-0044-10725-3)

Response:

APHIS acknowledges the comment. See response to comment APHIS-2007-0044-10866-7

Comment Excerpt Text:
The Federal Seed Act and state laws govern seed purity standards in this country. All recognize the realities of growing crops in a biological system and none are based on a "zero tolerance" standard. Long-standing seed certification programs administered at the state level address the production of certified seed throughout the U.S. [Footnote 25: See generally Association of Official Seed Certifying Agencies, http://www.app.org/.] Private seed certification programs and

individual grower choice may impose more stringent seed purity standards, but the decision to market seed, food or other agricultural products according to a more stringent standard is a purely economic choice. While celiain seed producers may choose to implement a more stringent standard with regard to the presence of an herbicide-tolerant crop, this is a private economic, market-based choice, not one required by statute. Those growers who believe it will be in their economic interests to maintain a more stringent standard will take the necessary steps to meet the demands of their alternate markets. This is purely an economic and market-based decision, not an environmental impact. Once a GE plant such as GT alfalfa has satisfactorily completed the federal review process, there is no health, safety or environmental basis for restricting the movement of genetic material from those GE plants.
One marketing standard followed by a small but growing minority of farmers was codified in the Organic Food Production Act of 1990 (OFPA). Although the OFPA itself is silent regarding the use of genetic engineering in crop production, the regulations implementing the OFPA, known as the National Organic Program (NOP) prohibit the use of genetic engineering in organic production. [Footnote 26: 7 C.F.R. §§ 205.105(e); 205.2.] This would prohibit a grower from, for example, planting a GE crop that has been engineered to produce its own pesticide, and selling it as organic because the grower does not have to use chemical pesticides on it. In implementing the NOP, however, USDA has specifically recognized that some level of genetic material from GE plants may be present in organic crops without affecting the organic nature ofthe crop or the farm: This regulation prohibits the use of excluded methods [genetic engineering] in organic operations. The presence of a detectable residue of a product of excluded methods alone does not necessarily constitute a violation of this regulation. As long as an organic operation has not used excluded methods and takes reasonable steps to avoid contact with the products of excluded methods as detailed in their approved organic system plan, the unintentional presence of the products of excluded methods should not affect the status of an organic product or operation. [Footnote 27: 65 Fed. Reg. 80548, 80556 (Dec. 21, 2000) (finalizing NOP).] In short, the NOP provides no guarantee of "zero tolerance" for the presence of genetic material from GE plants. (Comment Number: APHIS-2007-0044-10866-5)

Response: Detection of GT alfalfa DNA or gene product does not necessarily constitute a violation of the National Organic Program. The National Organic Program Final Rule states:

When we are considering [genetic] drift issues, it is particularly important to remember that organic standards are process based. Certifying agents attest to the ability of organic operations to follow a set of production standards and practices that meet the requirements of the Act and the regulations. This regulation prohibits the use of excluded methods in organic operations. The presence of a detectable residue of a product of excluded methods alone does not necessarily constitute a violation of this regulation. As long as an organic operation has not used excluded methods and takes reasonable steps to avoid contact with the products of excluded methods as detailed in their approved organic system plan, the unintentional presence of the products of excluded methods should not affect the status of an organic product or operation. (NOP final Rule 7 CFR Part 205; Federal Register Volume 65 page 80556)

…these regulations do not establish a ‘‘zero tolerance’’ standard. As with other substances not approve for use in organic production systems, a positive detection of a product of excluded methods would trigger an investigation by the certifying agent to determine if a violation of

organic production or handling standards occurred. The presence of a detectable residue alone does not necessarily indicate use of a product of excluded methods that would constitute a violation of the standards. (NOP final Rule 7 CFR Part 205; Federal Register Volume 65 page 80632)

Appendices T, V, G, J, and Section III of the FEIS have been updated to clarify the specific language in the National Organic Program Rule.

Comment Excerpt Text:
In another instance, the alfalfa seed fields of Dairyland Seed Company, Inc., a major alfalfa seed producer, were contaminated at eleven out of sixteen sites at distances up to 1.5 miles. This contamination occurred despite the required 900 foot isolation distance. The seed fields of Cal/West Seeds, a farmer (seed grower) owned cooperative and major alfalfa seed exporter, were contaminated in a California foundation seed field and in a Wyoming seed field. [Footnote 13 Letter from Steven A. Strachota, President, Dairyland Seed Co., Inc. to Gregory H. Lowry, Executive Vice President, Idaho Crop Improvement Association, Inc., November 1, 2006.] (Comment Number: APHIS-2007-0044-11689-8)

Response: In regard to seed stock adventitious presence, see response to comment APHIS-2007-0044-9936-7 for Issue 3.3.

Comment Excerpt Text:
The extent to which conventional and organic seed has been contaminated by GE material is unknown because it has not been comprehensively examined. Even so, studies indicate that GE contaminated conventional seeds, which at times are used by organic producers (i.e., corn, soybeans, canola) are pervasively contaminated with GE material. A 2008 US Government Accountability Office (GAO) Report documents six events of GE crops contaminating the food and feed supply:

- 2000 StarLink Corn incident, causing $26 to $288 million in economic damages;
- 2002 Prodigene Corn incident where a GE corn designed to create a pig vaccine protein contaminated non-GE corn;
- 2004 Syngenta Bt Corn never approved for commercial use was illegally sold for several years and planted on 37,000 acres;
- 2006 Event 32 Corn incident where 72,000 acres were planted with an unapproved GE pesticidal corn; and
- 2006 Liberty Link Rice 601 and 604 episodes where unapproved GE rice contaminated export rice stocks.

These contamination events are not isolated incidents as many biotechnology proponents argue. Instead, as the GAO explains, "the ease with which genetic material from crops can be spread makes future releases likely," [Footnote 14 Id.] contaminating the seed supply and supplanting all forms of non-GE agriculture. (Comment Number: APHIS-2007-0044-11689-9)

Response: In regard to past adventitious presence episodes, see the response to comment APHIS-2007-0044-9936-10 for Issue 11.15.

Comment Excerpt Text:
USDA concludes that GE alfalfa will cause production to shift to larger farms (that can afford built-in isolation distances) and conventional growers who are not threatened by GE contamination, but it erroneously concludes that these economic shifts are not significant. This is simply not the case. For example, Cropp Cooperative is comprised of 1404 organic farmers located in 36 states, 1084 of which are organic dairies and 220 of which are organic meat or pork producers. They market nationally and internationally under the brand names Organic Valley and Organic Prairie. With annual sales of $523 million, they are the number one selling organic brand in the Natural Food Retail Channel. In a court declaration on the economic impacts of GE alfalfa, Organic Valley's CEO, George Siemon states: "If Roundup Ready alfalfa is permitted to be sold commercially, and this causes contamination of certified organic alfalfa stands, or seed stock, this will devastate the organic farmers who market their milk through CROPP Cooperative." The same situation holds true for all other organic dairies across the country. [Footnote 5 Id. p. 3.]

Small and family farms are the backbone and future of American agriculture and must be protected. In many communities, they provide the freshest food available to local residents. Such farms also serve as the gateway for new generations of farmers to grow our nation's food and offer opportunities for young people to remain in rural communities, actively contributing to local economies and the cultural fabric of rural America. Moreover, organic farms provide multiple benefit to the communities in which they are located including: healthy food, economic opportunities for family farmers and urban and rural communities, and a farming system that improves the quality of the environment for present and future generations.

Contamination events occur frequently. The USDA has not protected companies and farmers sufficiently. Co-existence is not an option.
Examples of contamination include the following events: * 2000 StarLink Corn incident, causing $26 to $288 million in economic damages;
* 2002 Prodigene Corn incident where a GE corn designed to create a pig vaccine protein contaminated non-GE corn;
* 2004 Syngenta Bt Corn never approved for commercial use was illegally sold for several years and planted on 37,000 acres;
* 2006 Event 32 Corn incident where 72,000 acres were planted with an unapproved GE pesticidal corn; and
* 2006 Liberty Link Rice 601 and 604 episodes where unapproved GE rice contaminated export rice stocks.

These contamination events are not isolated incidents, as many biotechnology proponents argue. Rather, as the GAO explains, "the ease with which genetic material from crops can be spread

makes future releases likely," [Footnote 6 Id.] contaminating the seed supply and supplanting all forms of non-GE agriculture. (Comment Number: APHIS-2007-0044-11788-6)

Response: In regard to impacts on organic markets see response to comment APHIS-2007-0044-11788-6 for Issue 11.15. In regard to past adventitious presence episodes, see the response to comment APHIS-2007-0044-9936-10 for Issue 11.15.

Comment Excerpt Text:
APHIS claims that Monsanto's "best practices" can produce non-GE alfalfa seed with >99.5 percent purity. The agency rationalizes that there are "realistic measures that non-GE alfalfa farmers can employ that will effectively reduce or prevent gene flow from neighboring GE alfalfa crops," which include paying attention to flowering habits, harvest schedules and bee hives. This is arbitrary and does not explain how a farmer is to prevent bees (domestic or wild) from pollinating his field and contaminating it with GE pollen. This is especially acute for small famers and family farms that may not have the resources to proactively protect their farms from possible contamination. The agency however relies on GE farmers to adhere to these "best practices" as dictated by Monsanto. These "best practices" outline that there should be an isolation distance ranging from 900ft to 3 miles (depending on the type of bee used),[Footnote 16: National Alfalfa & Forage Alliance (NAFA). 2009. Best Management Practices for Roundup Ready® Alfalfa Seed Production. Available at http://www.alfalfa.org/pdf/CSBMPForRRA.pdf] which is less than the distance bees can travel in the real world. (Comment Number: APHIS-2007-0044-11960-2)

Response: Section IV H of the FEIS discusses mitigation measures. Mitigation measures can reduce the likelihood of cross-pollination. The FGI-BMP are designed to meet a threshold of no more than 0.5% gene flow between local alfalfa seed fields. They are not intended to reduce gene flow to below measurable levels.

Comment Excerpt Text:
The DEIS relies on insufficient data from commercial alfalfa seed-producing fields. These data are key to validating the limited field tests used to set the isolation distances between fields that are adopted by the proposed stewardship practices. The validation studies are wholly inadequate at the most important isolation distances between alfalfa fields—from one to three times the minimum allowed—where most gene flow would be expected. APHIS also does not supply validation data from commercial fields for gene flow from GT alfalfa hay to non-GT alfalfa seed production fields (Comment Number: APHIS-2007-0044-12026-2)

Response:
In response to the comment that APHIS did not supply validation data from commercial fields for gene flow from GT alfalfa hay to non-GT alfalfa seed production fields, APHIS was not able to acquire such data. The only data that APHIS collected was from Dairyland and the Cal Quarterly news letter which are included in appendix V 2.2 of the FEIS.

In regard to the comment on analysis of the impact GT alfalfa already planted, please see appendix V 6.7 of the FEIS regarding compliance with the Monsanto BMPs, and appendix V 4.0 of the FEIS regarding gene flow from GT alfalfa fields.

In terms of gene flow of alfalfa crops planted before the injunction, please see response APHIS-2007-0044-9882-16 for issue 3.0

Comment Excerpt Text:
While the EIS suggests that minimal "adventitious presence" (AP) ofGT alfalfa lines is unavoidable and does not merit a significant enough impact on the human environment to ban GT alfalfa, I believe that any unwanted gene flow into a "genetically-modified sensitive area" is cause for continuing the ban on the GT alfalfa. The EIS calls the FGI isolation guidelines for GT alfalfa "science-based and highly precautionary" (V-77). I do not think that guidelines that allow for half a percent ofAP, as Monsanto and FGI claim as their goal, are at all "highlyprecautionary." For a grower that makes his or her livelihood growing conventional or organic alfalfa that does not want Monsanto's patented genes on their land, that "adventitious presence" amounts to genetic contamination, which can lead not only to product purity issues with their buyers, but also legal issues with Monsanto. (Comment Number: APHIS-2007-0044-12145-2)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response). In regard to legal issues with Monsanto see the response to comment APHIS-2007-0044-6376-1 in Issue 5.1. As detailed in section IV.B.3 and appendix V, the seed purity limits on adventitious presence of “off-types”, which includes any unintended cultivar type, GT or conventional, for foundation seeds and certified seeds are 0.5 percent and 1.0 percent respectively. Best management practices described in appendix V 5.1 and V-2, demonstrate that this level of purity can be attained. The current methods employed by conventional and organic farmers to maintain foundation and certified seed can also contribute to the reduction of GT presence.

Comment Excerpt Text:
Studies such as the one by Bob Hammon in 2006 at Fruita, CO weren't included in the E.I.S. He found bees can move RR genes at least 1.7 miles. Will Hammon's data be considered in the petition for RR release. (Comment Number: APHIS-2007-0044-12219-6)

Response: The reference was included in Section III.A.1, Section IV.B.1, and Appendices G, O, , and V of the DEIS.
Hammon, B., Rinderle, C., and Franklin, M. (2007), Pollen Movement from Alfalfa Seed Production Fields, Technical report, Colorado State University Cooperative Extension. www.colostate.edu/Depts/CoopExt/TRA/Agronomy/Alfalfa/Hammon.RRpollenflow.pdf

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Comment Excerpt Text:
APHIS says USDA organic certification would not be affected given that organic certification does not require testing for GE content and focuses on the process used to grow the product

rather than on the content ofthe product (p133). That is very true. However, when I purchase organic seed, as I am expected to do, I expect it to be free of all GE material, as GE traits are specifically excluded from the USDA National Organic Program (JSDA NOP 7 CFR 205.105(e(and 205.204). Furthermore, even though I am not required to test to maintain my certification, I am required to test to satisfy my customers and to insure that I am not selling an organic product that fails to meet the standards set forth by the organic industry. The NOP does not require GE free precisely because it is impossible to guarantee GE free given that GE traits have been allowed in the past. Obviously, standards can always be met ifthey are sufficiently watered down. The answer is not to dilute the standards, but to eliminate the threat to them. Consumers have the right to know what's in their food and to use their purchasing power to support the production and processing of food free of GE contamination. If the unrestricted use of GE alfalfa is allowed, that will soon be impossible in the case of ruminant animals and their products. USDA has an obligation and a responsibility to protect farmers and consumers. I don't think they should abandon that responsibility in favor ofprotecting Monsanto's bottom line. I urge USDA to reject the deregulation of GE alfalfa, protect the integrity of organic farming, and fortify the ability of consumers to choose what they want for dinner. (Comment Number: APHIS-2007-0044-12428-4)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I do not want Organic crops to be contaminated by Genetically Engineered crops. I question whether or not we should be eating GE crops. Seed purity and variety is crucial to food security. If there is only one strain and it fails the results are catastrophic. (Comment Number: APHIS-2007-0044-1365-1)

Response: In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for Issue 5.2.

Comment Excerpt Text:
First, the buyers and customers that USDA certified organic farmers serve demand food that is free of contamination with genetically engineered (GMO) ingredients. In addition, the USDA National Organic Program requires that food marketed as organic be free from GMO ingredients. Thus, accidental cross-fertilization of organic crops with genetic material from GMO varieties of the same crop, which leads to the presence of transgenic material in the organically managed crop, can make that crop unacceptable to organic consumers. Organic producers have had their crops rejected by both domestic and export markets because the crops contained detectable traces of transgenic (GMO) material, from contamination that was beyond the farmers' control. Thus, APHIS errs when it states on page 135 of its EIS regarding GMO alfalfa, that "there is no evidence that organic consumers demand products free from the unintended presence of GE traits." This erroneous belief leads to the incorrect conclusion that such accidental cross-pollination does not have a significant economic impact on organic producers. The impacts are

potentially serious, and can spell economic ruin for the producer. (Comment Number: APHIS-2007-0044-1687-1)

Response: In regard to the National Organic Program, see the response to comment APHIS-2007-0044-10866-5 for Issue 3.3. In regard to economic impacts, see the response to comment APHIS-2007-0044-1687-1 for Issues 5.4 and 5.6.

Comment Excerpt Text:
Education – The seed industry needs to continue to produce science based programs that educate seed growers and hay growers in the best management practices to achieve the goal. This is the stewardship side of the equation and is already in place. Non-GMO producers need to adopt stewardship programs also. Use of the seed certification system and third party audits will allow for better communication and education.
Current research needs to be implemented into standards such as has been done in some state seed certification programs. The industry could also benefit from working with the new AOSCA plan for expanded services.
Seed production schemes are well run and due to buyer seller arrangements in the trade seed production can be monitored to fit the market you intend to sell into. (Comment Number: APHIS-2007-0044-1699-2)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment.

Comment Excerpt Text:
We feel that there is no way that the genetic gene pool would be able to avoid eventually being completely contaminated, which would render organic hay completely unavailable. (Comment Number: APHIS-2007-0044-1773-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
In the EIS, USDA refused to even consider any options that might protect conventional and organic agriculture from contamination. Partial approval could include geographic limitations or planting isolation distances. Because USDA refused any protections for farmers that do not want to plant GM Alfalfa, they are refusing to protect me and only protecting Monsanto's contracted farmers who plant its patented crops. (Comment Number: APHIS-2007-0044-1840-1)

Response: In regard to consideration of other options, see the response to comment APHIS-2007-0044-11741-4 for Issue 1.0.

Comment Excerpt Text:
The Skagit Valley Co-op has had grave concerns about GE crops for many years, in part because biological contamination of non-GE crops is highly likely if not inevitable. Alfalfa farmers may

speak more intelligently to the specific concerns of contamination issues, but I have talked with a few conventional farmers about their alfalfa farming practices, and they tell me that they plant alfalfa within a buffer zone because the potential for cross-contamination with this particular crop is high. Relying on farmers to follow strict planting schedules is not a reasonable way to safeguard the future of organic and non-GE conventional alfalfa. A recent 2008 US Government Accountability Office (GAO) Report documents six events of GE crops contaminating the food and feed supply (Comment Number: APHIS-2007-0044-2421-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
I am strongly opposed to releasing alfalfa varieties that are genetically modified. There has been no long term testing of the affects that this could have on the environment and subsequent safety of our food long term. There have been numerous situations in corn and other species that have affected the breeding capability of plants miles away. Not to mention lawsuits against innocent farmers. Please do not approve these requests for release of these alfalfa varieties. (Comment Number: APHIS-2007-0044-3277-1)

Response: In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for Issue 5.2. In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0. In regard to lawsuits from Monsanto, see the response to comment APHIS-2007-0044-6376-1 for Issue 5.1.

Comment Excerpt Text:
Monsanto's business practices do NOT protect farmers from contamination. USDA claims that Monsanto's seed contracts require measures sufficient to prevent GE contamination. But USDA is ignoring the evidence of widespread GE contamination of canola, soy, and corn. (Comment Number: APHIS-2007-0044-4347-3)

Response: In regard to past adventitious presence episodes, see the response to comment APHIS-2007-0044-9936-10 for Issue 11.15.

Comment Excerpt Text:
I would like to encourage APHIS to " go back to the drawing board" and come up with a plan that addresses the genetic contamination issue. I would prefer to see no GE alfalfa on the market at all, but I am willing to compromise if your agency can establish a plan that will guarantee seed purity for organic alfalfa growers. Please reconsider the environmental impacts of a totally uncontrolled GE alfalfa seed industry. (Comment Number: APHIS-2007-0044-7231-2)

Response: In regard to additional analysis, see the response to comment APHIS-2007-0044-11741-4 for Issue 1.0.

Comment Excerpt Text:
As the Draft EIS explains, there are three alfalfa populations considered when analyzing the impacts that might result from deregulating RRA – (i) hay fields, or fields intentionally planted with alfalfa and harvested for hay (forage); (ii) seed fields, or fields intentionally planted with alfalfa and harvested as seed stock; and (iii) feral and other alfalfa, such as alfalfa intentionally planted for erosion control or on rangeland but not otherwise intentionally sown. See Draft EIS at 99. As discussed in greater detail below, the Draft EIS provides detailed analyses of the probability that gene flow might occur between these populations, taking into account factors that might minimize or contribute to gene flow. See, e.g., Draft EIS at 100-101 (noting that, generally speaking, gene flow between seed fields is more likely than that between hay fields, given that the latter are typically harvested before plants reach full flower and can be pollinated); id. at Ap. Q-19 to -65 and Ap. V-49 to -71.

A. Measures to be used by RRA seed growers.

RRA growers of both seed and hay will be bound by certain growing requirements to ensure continued coexistence of GE alfalfa and non-GE alfalfa. For RRA seed growers, FGI is the exclusive licensed seed producer of RRA, and any grower wishing to produce seed of RRA varieties must do so under contract and license with FGI. See, e.g., Draft EIS at Ap. O-9 (FGI is the sole seed-producing licensee of GT alfalfa, as such FGI "contractually specifies which seed growers, field sites and under what protocols the GT alfalfa seed crop can be produced."). As part of those license agreements, FGI has implemented strict policies and best management practices for the production of RRA seed, including grower training requirements, field isolation requirements, pollinator management, stand termination verification, and seed field reporting to and inspection by state seed certification organizations.

FGI initially developed these best practices based on years of testing and data to determine the most appropriate measures to address gene flow. The Draft EIS presents extensive field study data – for instance, the document discusses FGI's 2000 and 2002 field studies, "which assayed 30,000 non-GT alfalfa seedlings" and "detected 0.000 percent gene flow [when isolation was equal to or greater than 0.75 mile] with a 99.9 percent confidence interval. This means there could be a 0.01 percent cross-fertilization between non-GT alfalfa and a GT variety, which is one seed in 10,000 …" Draft EIS at 97-98, Ap. Q-41. FGI similarly conducted seed production gene flow experiments in 2003 and 2006, using both worst-case conditions that maximized possible gene flow and more true-to-life conditions, and the gene flow results of these experiments also validated FGI's recommended best practices. See Draft EIS at Ap. Q-51 to -52 (range of gene flow from the experiments was 0.00 to 0.18 percent); see also id. at Ap. Q-53 to -54 (discussing hay to seed gene flow field studies); id. at Ap. Q-54 to -61 (discussing studies performed by others of gene flow involving feral alfalfa); id. at Ap. V-51 to -88 (discussing pollen-mediated gene flow studies and other assessments used to develop isolation standards and other best practices for alfalfa growers).

Among FGI's best practices are required isolation distances, defined based on bee pollinator type, which go above and beyond what is required by AOSCA standards. See, e.g., Draft EIS at 97-98; id. at Ap. V-63 and -77 (FGI's isolation requirements are "extraordinary" and "highly

precautionary," given that they are "pollinator species specific" and "five to 95 times the current isolation requirement for conventional certified seed production"). [Footnote 18: The Draft EIS notes that if a grower stocks a blend of pollinators, the grower's isolation minimum is based on the pollinator with the longest projected foraging range. Draft EIS at V-26.] Additionally, seed producers may not sell RRA seed to any party other than FGI, and RRA seed may not be saved. Bee hives cannot be moved out of RRA seed fields until pollination is finished for the year, and growers must specify the type of bee pollinator to be used in the FGI Seed Grower Contract. RRA seed field locations and planting dates are reported to seed certifying organizations by FGI in order for all growers in the area to confirm appropriate isolation distances and schedule harvest times. FGI requires sufficient stand removal and volunteer management to minimize the likelihood of volunteer alfalfa facilitating gene flow, and growers must abide by equipment cleaning requirements.

In the past several years, FGI has also been an integral participant in the creation of comprehensive best management practices that are binding on all RRA seed growers, a stakeholder-driven process that was initiated by both the University of California ("UC") and the National Alfalfa & Forage Alliance ("NAFA") in response to concerns in the agricultural community regarding coexistence issues. [Footnote 19: See Comment Appendix 1, Section C for additional detail on the NAFA efforts.] In particular, on January 27, 2005 (prior to the initial deregulation action), the UC Seed Biotech Center hosted a meeting of California alfalfa seed and hay production stakeholders to develop seed-to-seed isolation distances sufficient to meet non-detect low level presence ("AP ") standards to enable export markets and non-RR variety production. The stakeholder group adopted consensus isolation distances for seed fields, based on gene flow experiments conducted by UC scientists. [Footnote 20: See NAFA, Coexistence for Organic Alfalfa Seed & Hay Markets (June 2008), available at http://www.alfalfa.org/pdf/CSOrganic.pdf.]

Then, on October 10, 2007, NAFA sponsored a national forum open to all alfalfa industry stakeholders to participate in the process of developing a coexistence plan. Five documents were created from the forum to guide a coexistence strategy, including a peer-reviewed publication describing the biology of alfalfa and alfalfa production in the U.S, an overview of gene flow in alfalfa, and a set of procedures to mitigate gene flow for GE-sensitive markets. Then in 2008, NAFA developed a comprehensive suite of best management practices for alfalfa seed production. See NAFA, Best Management Practices for Roundup Ready Alfalfa Seed Production (Jan. 2008), available at http://www.alfalfa.org/pdf/CSBMPForRRA.pdf.

All genetic supplier members of NAFA have adopted the set of best management practices for RRA seed production in the U.S. Compliance is required under a binding agreement of the companies to each other, and FGI is requiring that all RRA seed production sub-licensees become parties to that agreement. The best management practices are intended to establish uniform, transparent policies that exceed industry standards for certified alfalfa seed production. RRA seed growers are required to attend stewardship training, and they must agree to follow the best management practices. Building on the existing FGI best practices required of all FGI's sub-licensees, RRA seed growers must follow prescribed isolation distances depending on bee-pollinator type, and they must report field locations to local state seed certification officials as early as possible for establishing state pinning maps and confirming minimum isolation

distances. Pursuant to the NAFA agreement, RRA seed production contracts are limited to 11 western states, and RRA seed will not be grown in any GE-free alfalfa seed production zone that might be designated by individual states. Additionally, the best management practices dictate the use of integrated weed control methods – or the use of conventional practices along with the proper use of Roundup agricultural herbicide formulations – and require sufficient alfalfa stand take-out. RRA seed fields must be destroyed at the end of the seed contract, before the first flower in the subsequent year, and this must be verified by third-party seed certification inspectors. Finally, NAFA best management practices include feral plant management and equipment sanitation requirements to further minimize the likelihood of gene flow.

These best management practices are required and intentionally designed to be adaptive. In other words, annual testing for potential adventitious presence of GE traits in non-GE alfalfa seed crops will be performed every year to monitor the effectiveness of identified mitigation measures to address gene flow, and those practices will be adjusted accordingly based on testing results. See NAFA, Best Management Practices for Roundup Ready Alfalfa Seed Production (Jan. 2008), available at http://www.alfalfa.org/pdf/CSBMPForRRA.pdf.

To date, testing and independent review have confirmed that the best management practices are effective in preventing and significantly minimizing gene flow. As NAFA explained in 2008,

The NAFA best practices have been validated in two years of commercial seed production (Fitzpatrick et al., 2007). For seed fields with greater isolation distances than NAFA minimums, conventional variety seed was successfully produced to a 'non-detect' purity status. For example, zero of 45 seed lot samples tested positive for Roundup Ready trait when using 1 mile or 3 miles of isolation under leafcutter or alkali and honeybee pollinated conditions, respectively. A 3,000-seed sample, the industry standard for other GE testing in crops, was verified to be without GE using commercially verified protein test strips (Strategic Diagnostics, Inc.). Each lot was tested in five 600-seed sublots giving a sensitivity to detect AP at 0.04% with 95% confidence (Remund et al., 2001). Furthermore, in all 111 cases, at a given isolation distance for each pollination system, the scientific models for estimating gene flow developed using 'worst-case' scenarios based on small-fields (<5 acres) overestimated the amount of actual commercial-practice pollen-mediated gene flow.

NAFA, Coexistence for Organic Alfalfa Seed & Hay Markets (June 2008), available at http://www.alfalfa.org/pdf/CSOrganic.pdf.; see also Draft EIS at Ap. V-81 to -87 (discussing results of pollen-mediated gene flow studies, which support the efficacy of isolation distances). Moreover, data suggests that grower compliance with these BMPs is high. See, e.g., Lowry, Proceedings of the 2010 Western Alfalfa Seed Growers Association (Jan. 18-20, 2010) (concluding that industry measures to promote coexistence are working on a commercial scale); [Footnote 21: A copy of this presentation is included as an attachment to Comment Appendix 1.] Comment Appendix 1, Section C (discussing effectiveness of best management practices).

As the Draft EIS notes, studies of bee pollinator foraging distances have observed rare instances of bees traveling farther than the required isolation distances outlined in NAFA and FGI best management practices. See Draft EIS at 95. [Footnote 22: See also Draft EIS at V-26 ("It is possible that wind storms could blow bees carrying GM pollen long distances; however, due to

factors of scale and dilution, the risk of resultant subsequent transgene flow to other alfalfa would be extremely small or zero," further justifying APHIS' conclusions regarding the lack of potentially significant environmental impacts as a result of a decision to deregulate RRA).] These instances of longer foraging distances, however, are rarely observed and should be regarded as outliers. See id. (summarizing typical foraging distances); id. at Ap. O-5 (discussing typical foraging distances and noting infrequent instances of honeybees traveling three miles of more, which can be mitigated with isolation distances and prudent bee management strategies). Moreover, as the Draft EIS explains, the pollinating bee species that might tend to travel the furthest distance – the honeybee – is the least effective alfalfa pollinator and, as a result, the least used. See Draft EIS at 94 (leafcutter bees are used more frequently for alfalfa pollination, given that they are more effective pollinators than the honeybee); id. at Ap. O-4 to -5 (explaining the pollination process, which involves "tripping" a flower's stigma surface for pollen deposit, and describing honeybees' "strong behavioral aversion" to the "violent tripping process," which they learn to avoid, thereby collecting their nectar target resource without inadvertently collecting pollen or transferring pollen between flowers); id. at Ap. O-5, Ap. Q-43, Ap. V-25 (honeybees are estimated to pollinate only about 22 percent of the alfalfa flowers they visit, in contrast to leafcutter and alkali bees, which trip 81 and 78 percent of flowers visited, respectively). [Footnote 23: See also Draft EIS at Ap. Q-45 (table outlining the many factors that influence bee activity, highlighting that pollination has to take place under certain optimal conditions). It should also be noted that "not all pollen dispersal results in gene flow. Gene flow is defined as the successful transfer of genetic material. Because pollen-mediated gene flow only can occur between individual plants of the same or sexually compatible species, gene flow from pollen occurs only when pollen (the male gamete) is deposited on the stigma of a plant, fertilizes the ovule (female gamete) of that plant, and viable seed is produced." RRA Petition at 287; see also id. at 396 ("pollen flow may occur any time a pollinating insect carries pollen away from source plants," but "gene flow cannot occur without the simultaneous occurrence of all of the following conditions: 1) presence of source blooms, 2) active and appropriate insect pollinators, 3) receptive blooms outside the cultivated area and within the flight radius of the insect and, 4) pollinated blooms must be allowed four to six weeks to ripen seed.").] Finally, pollinating bees in alfalfa fields are highly managed, with steps taken to encourage close foraging, further minimizing the potential for pollinator-mediated gene flow. See Draft EIS at Ap. Q-43 to -45 (pollinating bees are only used in seed farms; their release is heavily managed using controlled incubation temperatures and careful scheduling of release times; and FGI best management practices do not permit hives to be moved from GT alfalfa to non-GT alfalfa within a growing season); id. at Ap. V-26 ("bees are a necessary and costly input for professional seed growers," and there are "routine pollinator management adjustments that help ensure that a grower's valuable bees pollinate and remain largely near their home domicile.").

In sum, "[c]ommercial seed lot data validate that implementation of the Best Practices is a very effective industry tool in the management of conventional seed lot genetic quality. A low level presence of the Roundup Ready trait in conventional seed lots has been infrequent and in all cases well below the 0.5% industry consensus AP tolerance for domestic alfalfa and below values predicted using worst-case research models. The large-scale commercial validation also helps put in perspective the minimum incremental risk associated with potential real-world concerns about pollination from wild pollinators, extraordinary pollen flow by wind-driven pollinator movement, and contamination from physical mixtures of seed in harvesting and/or

seed processing." Draft EIS at V-59 (internal citations omitted). [Footnote 24: As a reference, the 0.5 percent industry consensus AP tolerance in the U.S. for domestic alfalfa is still lower than any country's GMO-labeling requirement thresholds. See, e.g., Draft EIS at Ap. R-9 (noting European Union labeling requirement of 0.9 percent); see also Comment Appendix 1, Section D (discussing export market). A maximum of 0.5 percent off-type in an individual lot is also in alignment with the most stringent of state seed certification standards for certified generation seed. See Draft EIS at 97 (listing seed purity standards by state);] (Comment Number: APHIS-2007-0044-7620-19)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comments and the updated 2008 NAFA reference has been included.

Comment Excerpt Text:
Commercial Seed Standardization

By the early 20th century, agronomists learned how to develop specific plant varieties with desirable traits. In the U.S., state agricultural experiment stations developed many seed varieties which were distributed to farmers for use. As seeds were saved by farmers and later sold to neighbors, however, the desirable traits of the varieties often were lost through random genetic changes and contamination with other crop and weed seeds (Sundstrom et al. 2002). The value of seed quality (including genetic purity, vigor, presence of weed seeds, seed borne diseases and inert materials, such as dirt) was quickly identified as a major factor in crop yields. States developed seed laws and certification agencies to ensure that purchasers who received certified seed could be assured that the seed met established seed quality standards (Bradford 2006). The federal government passed the U.S. Federal Seed Act of 1939 to recognize seed certification and official certifying agencies. Regulations first adopted in 1969 under the Federal Seed Act recognize land history, field isolation and varietal purity standards for foundation, registered and certified seed. Under international agreements such as with the Organization for Economic Co-Operation and Development (OECD), the U.S. and other countries mutually recognize minimum seed quality standards (Bradford 2006). The Association of Official Seed Certifying Agencies (AOSCA) represents state and private seed certification in the U.S., and includes international member countries in North and South America, as well as Australia and New Zealand.

Seed certification is based on varietal lineage, as well as quality production and processing standards. Seeds produced for sale to a crop grower (certified seeds) are a limited number of generations from a verified seed stock of the specified variety (Bradford 2006). Breeder seed is generally produced under the strictest standards and under the supervision of the breeder. Breeder seed is used to produce foundation seed, which is used to produce registered seed, which is then used to produce certified seed that is sold for commercial planting (Bradford 2006). In addition to documenting the pedigree of the seed, certification programs also monitor crop rotations, previous crops and weeds in the field, as well as isolation of the field from other varieties of the same genus or species (Bradford 2006). Inspectors walk the fields to note the occurrence of off-type plants, other crop plants, weeds, or disease. After seed harvesting and cleaning, the seed is later tested for germination capacity, and analyzed for the presence of seed

of other varieties or other crops, weed seeds and inert matter (e.g., dirt or stones) to assure high quality before the seed bags are tagged as “certified” (Bradford 2006).

Within a seed crop, the main sources of off-types, or seed from another plant, result from “volunteers,” or seed from crops grown in the field at an earlier date, pollen transfer and mixing that occurs during harvesting and handling (Bradford 2006). Seed producers can and do take steps, such as cleaning equipment, appropriate crop rotation and other stewardship measures, to control for these factors.

Seed producers also learned over the years to account for pollen flow between nearby fields, and seed certifying agencies adopted spatial isolation requirements (codified in federal regulations for certain crops) that must be followed to produce certified seed that will guarantee the purchaser receives the intended seed variety. The isolation required for a particular crop depends on its flowering characteristics (including timing), sexual compatibility with neighboring crops, pollen quantity and viability, and the mode of pollen dissemination (Sundstrom et al. 2002).

Developers producing seed in the same areas have long agreed to cooperate and coordinate planting locations and dates to allow for both spatial and temporal isolation. Seed-certifying agencies in some seed-growing regions, such as the Willamette Valley Specialty Seeds Association in Oregon and the Columbia Basin Vegetable Seed Field Representatives Association in Washington, employ various mapping and pinning systems to assist growers in these coordination efforts. These associations may assist growers in developing consensus standards for certain plant varieties that may go beyond typical variety protection standards.

The standards put in place in the first half of the 20th century were based on physical appearance and performance determined by field inspections. Those standards are still in place today for the vast majority of crops produced. These standards have never required 100% varietal purity. For example, AOSCA stated that the maximum limits for seed of other varieties or off-types in foundation seed lots range from 0 to 0.2% among different species, while the limits for certified seed range from 0.1 to 2% by weight. This also can be demonstrated by stating that the maximum number of seeds of other varieties of the same crop permitted in one pound of certified seed is one seed for cotton and wheat, two for watermelons, four for rice, and six for sunflowers (Bradford 2006, AOSCA 2004, CCIA 2005).

The standards that have served society well for at least half a century were adopted to reflect a balance between the level of purity required to meet market needs and prevent consumer fraud and the cost of achieving that purity standard. While it is possible to achieve higher levels of purity, this involves higher production costs, often prohibitively higher. A recent study found that relative to standard corn seed production practices, the costs to achieve higher levels of genetic purity (in this case, a 0.3% biotech threshold) would be approximately 35% higher (Bradford 2006, Kalaitzabdonakes and Magnier 2004).

Specialty Markets: Identity Preservation, Channeling, and Contract Standards

While seed certification itself is a type of identity preservation (IP), other crop varieties use these IP systems to maintain their premium qualities and distinguish themselves from commodity

crops (Elbehri, 2007). Specialty crops, such as high oleic sunflowers, low linolenic canola, or high oil corn, employ IP systems to maintain their distinctive and valuable qualities so that their value can be recognized by higher prices in the marketplace relative to commodity prices (Sundstrom 2002). The National Organic Program, discussed below, is an example of an IP system.

IP involves not only segregation, but a complete system of standards, records, and auditing throughout the crop production, harvesting, handling, and marketing processes (Sundstrom 2002). Isolation protocols are required, which are typically based on AOSCA seed certification standards but which may be altered for particular markets. Equipment used in production, field maintenance, and harvest must be cleaned and inspected before and after each use. Dryers, millers, storage facilities and processing equipment also must be cleaned and inspected between product lots. Certification standards for the handling of IP products have been established (AOSCA 2004, Bradford 2006).

In many cases, an IP system may require samples of a product to be tested at various stages to confirm product identification, purity and quality. Statistical procedures must be applied to accurately determine the number of samples and the number of seeds or grains required to generate a test result with an acceptable confidence level (Sundstrom 2002, Remund 2001). USDA's Grain Inspection, Packers and Stockyards Administration (GIPSA) established guidelines on selecting a sampling protocol and collecting bulk samples. Sampling of seed stock, production field, and post-harvest each require different considerations, but all must be representative of the total quantity of material to be tested (Sundstrom 2002). Today, testing may involve genetic analysis in addition to traditional visual inspection. For example, testing for the presence of genetic material from biotechnology-derived plants must be done by genetic testing because, as a general rule, the varieties with biotechnology traits are phenotypically indistinguishable from conventional varieties.

Channeling, in contrast to IP, is focused primarily on the segregation of large volumes of commodities. This process involves a plan to produce certain crops, the approval of that plan by a third-party certifying agency, the auditing of the production and handling of the commodity by that certifying agency, an audit report, and final certification (Sundstrom 2002). The emphasis in channeling is on the integrity of the process, and the final product may or may not be tested specifically for the quality traits of interest. Channeling crops for specific markets is a long tradition in agriculture because different varieties, grades, and types of products are directed to specific uses. Long-, medium-, and short-grain rice, white and yellow corn, and differing fiber quality grades in cotton are all the products of channeling programs (Sundstrom 2002).

The discussion above regarding the economic impacts of increased purity standards applies similarly to IP and channeling systems. There is a direct correlation between increased product purity standards and higher costs (Sundstrom 2002). Standards for the final product determine the complexity of the production, handling, processing, testing and labeling procedures required, and the associated costs of the program (Sundstrom 2002). Channeling is a substantially less expensive production method, costing 5 to 10 times less than a true IP program, due to less sampling and testing costs (Sundstrom 2002).

Any individual contract a grower enters into with a crop purchaser may contain contract requirements for certain quality, size or other standards. These requirements may reference existing standards, such as "Grade A" pears or "juice quality" apples. Such contractual requirements need not be process-based, but may be determined based on formal or informal testing methodologies agreed to by the parties to the contract. Such contracts are subject to the same general rules as any other freely bargained contract. (Comment Number: APHIS-2007-0044-7620-39)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment. The additional details provided by this comment were not added to the FEIS because the discussion on commercial seed standardization was adequate. This comment didn't add substantive information.

Comment Excerpt Text:
II. THE RECORD SUPPORTS A DETERMINATION THAT FULL DEREGULATION OF RRA WILL NOT JEOPARDIZE COEXISTENCE

As discussed above, a central component of APHIS' mission is to ensure the coexistence of all types of crops – conventional, organic, and genetically engineered. The Draft EIS presents an extensive analysis of the growing practices used by alfalfa farmers to promote coexistence and demonstrates that full deregulation of RRA will not jeopardize the continued existence of other alfalfa varieties or alfalfa production systems. See, e.g., infra Section V.

APHIS might consider emphasizing in the Final EIS that neither coexistence of different crop varieties nor weed resistance to herbicides is a new concept in agriculture. As discussed at length in Comment Appendix 2, attached hereto, growers have been identifying and developing strategies to address these issues for decades and continue to do so. See, e.g., Comment Appendix 2 at 6-8 (discussing long history of seed certification process to preserve seed variety).

For instance, the separation of different alfalfa cultivars is already an established practice for alfalfa seed producers, who are required by seed certification agencies to maintain certain isolation distances between alfalfa fields. See Draft EIS at 32 (discussing Association of Official Seed Certifying Agencies' ("AOSCA") recommended isolation distances, which are adopted as is, or made more stringent, by state certification organizations); id. at 94-96, Ap. O-2 to -12, Ap. Q-42 to -44, and Ap. V-25 to -27 (discussing alfalfa pollination, exclusively by bees, which are therefore highly managed and whose likely travel distances provide a basis for recommended isolation distances); see also Comment Appendix 2 at 21 (standards developed by the alfalfa industry to assure the production of high quality seed have been in place for well over 20 years). The seed certification process requires applying "standards for field history, known genetic origin of the stock seed, and in-crop volunteer control" to maintain varieties of alfalfa that are "true to type." Draft EIS at 33; see also id. at 96 ("Seed farmers are concerned with the purity of their seed stock, and follow state and federal-mandated standards in order to produce seed of certified purity," such as maintaining isolation distances, following crop rotation requirements, and eradicating volunteer plants and noxious weeds). This process will be similarly applied to maintain RRA as a variety of alfalfa that is distinct from other varieties. See National Alfalfa &

Forage Alliance ("NAFA"), Coexistence for Organic Alfalfa Seed & Hay Markets (June 2008), available at http://www.alfalfa.org/pdf/CSOrganic.pdf ("It will be in the individual and collective best interests of companies and producers to work with each other to assure each company can produce seed of the required seed quality appropriate for various markets. This has been the basis for Certified seed production since the early 1900's."). Indeed, recently, AOSCA approved a new process-based certification program that will assist U.S. alfalfa seed growers in producing organic, export, or conventional non-GT alfalfa seeds using inspection of enhanced isolation, field history, and testing of the planting seed stock. See Comment Appendix 1, Section B; Comment Appendix 2 at 23. (Comment Number: APHIS-2007-0044-7620-8)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).
The AOSCA and NAFA references have been added to section III.E and appendix V of the FEIS.

Comment Excerpt Text:
Just as organic agriculture is poised for rapid growth, approval of GE alfalfa will send the message that the USDA wants to curtail the fastest growing sector of the agricultural economy by making co-existence physically impossible. Isolated seed production areas are becoming harder and harder to find. Allowing the release of outcrossing genetically engineered alfalfa (and other GE crops) will inevitably contaminate the organic and non-GE seed crops essential to plant the sustainable agriculture of the future. The impossibility of preventing contamination ('adventitious presence of transgenic events') has long been recognized by ASTA, the American Seed Trade Association. And anyone who has actually grown alfalfa knows that dormant alfalfa seed can sprout 3-5 years after the original planting, often becoming a weed in later rotations. Alfalfa is a crop that is critical for America's transition to a more sustainable agriculture. As one of the worlds most efficient nitrogen fixers and soil improvement cover crops, alfalfa is one of farmings best and most efficient means of maintaining soil fertility. And, unlike most other cover crops, a farmer can harvest and earn income off of the alfalfa crop without sacrificing the soil improvement benefits. The beneficial effects of alfalfa are, however, diminished by herbicide applications, which are in any case unnecessary with this crop. (Comment Number: APHIS-2007-0044-8167-3)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response). In regard to hard seed in alfalfa, see the response to comment APHIS-2007-0044-10157-4 for Issue 3.2.

Comment Excerpt Text:
While stated in the DEIS, the points made in this document regarding
organic production are worth repeating: "Organic certification under the NOP place the responsibility of managing the potential contact of organic products with other substances not approved for use in organic production systems, whether from the non-organic portion of a split operation or from neighboring farms, on the organic producer. The organic system plan,

developed individually by a grower, must outline the steps taken to avoid contact or mixing, and it is the organic producers who are ultimately obligated to manage their operations so as to avoid unintentional contact with non-organic material" (p. 136, DEIS). With the restrictions placed in the contract between FGI and seed growers, and the stewardship agreement signed by commercial growers of GT alfalfa, no undue burden is placed on organic, or conventional alfalfa producers. (Comment Number: APHIS-2007-0044-8508-5)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment. In regard to the National Organic Program, see the response to comment APHIS-2007-0044-10866-5 for issue 3.3.

Comment Excerpt Text:
p. 52. The main reason reported by organic certifiers to accept farmers' claims
that organic seeds were not available was that organic seeds are not
"equivalent" to non-organic available seeds in quality (Baker, 2008)

Comments: This really needs to be clarified in terms of the lack of equivalency. Do the authors mean seed viability or genetic potential for disease resistance and yield? Based on my survey of the availability of seed I think the latter not the former. (Comment Number: APHIS-2007-0044-9164-4)

Response:
APHIS acknowledges the comment. Further review of Baker 2008 provides no details on the description of equivalency in this context. From Baker 2008 "However, equivalency is not well defined and has
been subject to dispute".

Comment Excerpt Text:
The basis of coexistence in agriculture and the Best Management Practices are practical thresholds based
on scientific data. Zero impurities or 100% purity is very difficult to impossible to achieve in commodity
or even specialty biological systems, although thresholds near 1% are routinely achieved and used in
agriculture. As a result, organic and seed certification programs do not require zero impurities as thresholds. The most relevant analogy is the certified seed system which has been effective in delivering
high quality products for a century worldwide. As an example, the scientific data show that to achieve hay
that is 99% pure (<1% GE), one should use crop rotation, plant certified seed, control feral alfalfa and
harvest prior to viable seed formation. In fact gene flow between hay fields is rare with less than 0.001%

gene flow expected (Putnam, 2006). To achieve <1% GE in a seed field, adjacent seed fields are a
5
concern. To address this, growers perform at least a 2- year crop rotation, control feral alfalfa blooming
around the field, begin with certified seed and ensure at least a 900-ft isolation when using leafcutter bees
as pollinators and a minimum of 1-mile isolation with honeybees as pollinators (Van Deynze et al., 2008).
The NAFA Best Management Practices are required for all Roundup Ready Seed production including a
900-ft isolation with leafcutters and a 3-mile isolation with honeybees. Experimental data show that this a
sufficient distance to mitigate possible gene flow to near-zero levels (see Figure 1). Conventional seed
growers who are concerned about AP can consult with their local seed certification agency to help them
plan field isolation and they can utilize the AOSCA program to produce conventional varieties.
(Comment Number: APHIS-2007-0044-9304-7)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment, as discussed in Section V 5.12.

Comment Excerpt Text:
The DEIS inadequately addresses the risk for transgenic contamination of non-GT Alfalfa and erroneously concludes that this harm is not significant.

Contamination Is Likely

As the outpouring of comments to this docket will show, transgenic contamination is likely and will happen by a variety of means if APHIS deregulates GT alfalfa.

Transgenic contamination occurs through a variety of pathways. Pollination of non-genetically engineered plants by genetically engineered plants, mixing of genetically engineered seed with non-genetically engineered seed, improper seed cleaning, weather events and human error all lead to biological contamination. For example, widespread practices of land leasing, and contract hay farming routinely result in the harvest and transport of significantly overripe hay crops. Table 4-3 also acknowledges that gene transfer between feral populations is likely.

Evidence submitted during the Geertson lawsuit demonstrated that not only is contamination through gene transfer possible, but that even after the alfalfa industry had only converted 1% of the industry to GE, contamination had already begun. Foundation Seed fields of Dairyland in Idaho, Montana, and Wyoming were found to be contaminated, and Cal/West seed fields in California were similarly found to be contaminated. Recent evidence submitted in this docket demonstrates that over two years later, the contamination is getting worse. For example, in

Cal/West Seeds Winter 2010 newsletter, Dr. Jonathan Reich, Cal/West Executive Director for R &D published the following data:

- 12% of over 200 lots of non-GE alfalfa seed tested positive for RR alfalfa gene, compared to 3% in 2008
- During 2008, 100% of 6 research seed stock lots produced at Cal/West's Woodland, CA research farm tested positive for GE contamination - attributed to hay-to-seed gene transmission
- Preliminary 2009 has revealed 30% of 10 seed stock lots have tested positive for GE contamination.
- Conclusion: "It is becoming clear that this gene or any gene can easily spread and that we are going to have to take extraordinary measures when producing foundation seed and commercial seed for GMO sensitive markets."

While APHIS disregards the potential for contamination of seed stocks as unlikely and inconsequential, industry data such as that from Cal/West seed demonstrates that this is simply false. Therefore such conclusions are arbitrary and capricious.

APHIS analysis offers no discussion of the possibility of shatter/scatter from transport of overripe hay, non-intentional seed production, and the potential for this to create feral or unintentional populations, which then pose unidentified sinks of cross-pollination risks not subject to farmers' intentions to comply with "best practices." This exact scenario has unfolded with alarming frequency in GE canola cultivation. No data is presented as to the frequency with which viable alfalfa seed might escape in this manner or the potential distribution and gene flow that might result from such a scenario. (Comment Number: APHIS-2007-0044-9936-7)

Response: APHIS has updated the FEIS (Appendix V 3.3.2 and 5.2.2) to include all available data from seed companies, including Cal/West and Dairyland, regarding seed lot adventitious presence. In regard to the shatter and scatter of alfalfa seeds, APHIS has updated Appendix V to acknowledge the potential for unintended populations of alfalfa.

3.4 Issue 3.4 – Gene Flow to Other Alfalfa (non-seed) Crops and Wild Relatives

Comment Excerpt Text:
At its peak, over 40 million acres (16 million hectares) of US cropland was enrolled in the Conservation Reserve Program (CRP). The primary purpose of this program was to remove more erodible land from crop production and thereby promote soil conservation values. Mixtures of perennial grass species and alfalfa have been widely used for CRP plantings. The most sustainable way to convert these lands to crop production when CRP contracts end is through glyphosate-enabled no-tillage. However, the prospect of any widespread RR alfalfa release threatens to increase the use of tillage on these lands, which were put into the CRP in the first place largely because of their vulnerability to soil erosion. (Comment Number: APHIS-2007-0044-10138-9)

Response: In regard to alfalfa used in the Conservation Reserve Program, see response to comment APHIS-2007-0044-9882-12 for Issue 3.4.

Comment Excerpt Text:
Many pollinators beyond leafcutter and honey bees such as bumblebees exist in alfalfa fields. Different species can travel different distances. Thus it could be very difficult to limit the spread of GT alfalfa pollen, as neither the pollinator species distribution nor their distance of travel has been fully documented in alfalfa seed production areas to my knowledge (Comment Number: APHIS-2007-0044-10157-10)

Response: In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for Issue 3.1.

Comment Excerpt Text:
Almost all the plant attributes that favor gene flow from feral populations are at play with GT alfalfa, both the attributes listed in the non-regulation status document (see pages 22-23) and in several of the leading journal articles on this topic. A thorough scientific review of gene flow in glyphosate tolerant crops has been written by Mallory-Smith and Zapiola (Mallory-Smith, C. & Zapiola, M. (2008) Gene flow from glyphosate-resistant crops, Pest Management Science, 64(4) pp. 428-440.) the review by Mallory-Smith and Zapiola is only mentioned in the non-regulated status document in passing, and the points made about the inevitability of gene flow from GT alfalfa are not referenced in the non-regulated status document. The review is cited incorrectly on page Q-80 (Comment Number: APHIS-2007-0044-10157-8)

Response:. Mallory-Smith, C. & Zapiola, M. (2008) has been added to Section IV.B.2 of the FEIS.

Comment Excerpt Text:
Feral Alfalfa
Feral (wild growing) alfalfa is ubiquitous in alfalfa production regions. It will act as a bridge for moving genes from one field to another, typically in a fashion that is difficult to predict. Escaped alfalfa occurs in ditches and on roadsides and commonly flowers synchronously with nearby hay and seed fields [Footnote xi: Bagavanthiannan M. 2009. Feral nature of alfalfa: Implications for novel trait confinement. Ph.D. Thesis, University of Manitoba.], and this can be a significant sink and source for stray genes. Alfalfa is a very hardy species that is highly adapted to resource-poor environments such as road verges. [Footnote xii: Bagavathiannan, M. V. and Van Acker, R. C. "The Biology and Ecology of Feral Alfalfa (Medicago sativa L.) and Its Implications for Novel Trait Confinement in North America." Crit. Rev. Plant Sci. 28: 69-87. 2009.] In broad field studies, Bagavanthiannan and Van Acker have investigated the nature and dynamics of feral alfalfa populations in western Canada and their role in long distance pollen mediated gene flow. Their conclusion is that feral alfalfa produces persistent and hardy feral populations that can act as a barrier to successful co-existence. [Footnote xiii: Ibid.] In this respect, they conclude that the biology and ecology of alfalfa favors its persistence in unmanaged habitats and that these populations will facilitate long-distance gene flow among cropped and non-cropped alfalfa populations within farming regions. Knispel et al (2008) also found that escaped roadside populations of canola were found to accumulate transgenes and could act as a source and sink for

unintended transgenes. [Footnote xiv: A. L. Knispel, S. M. McLachlan, R. C. Van Acker, L. F. Friesen. "Genetically engineered multiple herbicide resistance in escaped canola populations." Weed Sci. 56: 72-80. 2008.]
VI. Animal Vectors
Livestock manure or wild animal droppings as well as hoof action could also spread GE alfalfa seed. Alfalfa, like many legumes, has a proportion of "hard seeds" which pass right through the ruminant gut. If an animal therefore ingests hay that includes seed heads with viable seeds, some of the seed will pass through and be present in the manure where it may germinate sooner or later. The possibility of cattle grazing on fields adjoining alfalfa fields also raises the scenario of cattle spreading seeds from GE alfalfa volunteers. (Comment Number: APHIS-2007-0044-10263-22)

Response: APHIS acknowledges the comment and has reviewed the suggested reference and incorporated them in the FEIS where appropriate. In regard to gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.
In regard to hard seed in alfalfa, see the response to comment APHIS-2007-0044-10157-4 for Issue 3.2.
In regard to gene flow due to unintentional mixing and distribution of seed, see the response to comment APHIS-2007-0044-10263-5 for Issue 3.2.

In regard to gene flow or seed purity comparisons with canola and, see the response to APHIS-2007-0044-10263-9 for Issue 3.

Comment Excerpt Text:
Volunteer GE Alfalfa
Volunteer GE alfalfa (either produced from roots or plants that have gone to seed during seed production, or in hay fields, pastures, wasteland or ditches) will be a source of contamination for several years after destruction of any GE alfalfa field. This is particularly the case because, as noted in the DEIS, alfalfa seed crops produce a percentage of "hard seed" that can germinate several years after the field has been ploughed up. This would mean that a GE alfalfa seed crop would have the potential of contaminating non-GE alfalfa crops planted even a few years later. For organic farmers, volunteer GE alfalfa would result in a long-term cleanup challenge particular to the biology of alfalfa. Hand-removal of volunteer alfalfa plants would be unrealistic because the alfalfa plants could not be fully pulled up from their roots. Organic standards demand that farmers shall not knowingly grow any crop with the presence of GE volunteers. The scenario of volunteer GE alfalfa plants in a crop such as sweet clover, for example, would also pose a serious challenge as farmers would not be able to separate clover seed from alfalfa seed at harvest because the tiny alfalfa seeds are not much bigger than the clover seeds.
The issue of volunteer alfalfa in hay and pasture fields is not straightforward as, generally speaking, farmers are unconcerned if alfalfa plants are volunteering in hay or pasture fields and are in fact happy to leave the plants because of the resultant soil advantage. Pasture fields are much less intensively managed than hay fields and thus alfalfa seeds and volunteers would persist. (Comment Number: APHIS-2007-0044-10263-8)

Response: The weediness potential of GT alfalfa is discussed in Section IV.B.5, IV.B.4, and Appendices G, H, J, Q, V, and W. Section IV.B.4 of the FEIS has been updated to include discussion on volunteers in hay fields, pastures, wasteland or ditches for many years due to hard seed. APHIS acknowledges that GT alfalfa is different from sugar beets, corn and soybean. Without care, cultivation, and planting provided by humans, sugar beet, corn, and soybean plants have short survival times. Alfalfa, on the other hand, when left unattended, can thrive unmanaged.

In regard to the National Organic Program standards, see the response to comment APHIS-2007-0044-10866-5 for Issue 3.3.

Comment Excerpt Text:
Table 4-3 also acknowledges that gene transfer between feral populations is likely. However, the impacts of this in terms of feral GT alfalfa conveying its traits to non-GT feral alfalfa are unquantified. The resulting latent population of GT feral alfalfa may act as a significant ongoing source population for additional gene transfers into subsequent year's alfalfa crops.
Finally, APHIS suggests that Monsanto's voluntary "best management" practices will mitigate the potential for gene flow between populations. However, these best management practices are not mandatory, and leave the job of preventing gene flow to the entities least affected by unintended gene flow—namely, GT alfalfa users. A full analysis of the likelihood that such practices will actually be used is lacking.
APHIS acknowledges that gene flow does occur naturally in alfalfa population, [Footnote 22: DEIS at 98.] but dismisses the significance of this gene flow to organic alfalfa populations and others. This gene flow is the catalyst for a series of potentially significant market impacts discussed below and absent from APHIS analysis. (Comment Number: APHIS-2007-0044-11741-6)

Response: In regard to Monsanto's TUG, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response). In regard to gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

In response to your comment on the quantification of gene flow between feral GT alfalfa and non-GT feral alfalfa, as discussed in Appendix V.5.2.3, GE feral alfalfa can arise from two sources: seed movement from GE fields and pollination of feral plants. APHIS concedes that feral populations of alfalfa that carry GT alleles could serve as source populations for gene flow. Quantification of the impact of gene flow from feral GT alfalfa to non-GT alfalfa is problematic as the processes that can contribute to or limit gene flow rates are stochastic and depend on numerous factors. Appendix V.5 has been updated to include further discussion of feral alfalfa.

In terms of quantifying how many growers follow Monsanto's best management practices, it is a contractual agreement so the consequences of not following are determined by Monsanto. Note that the FEIS has an additional alternative that describes a mandatory stewardship program. .
For more information, see the response to comment APHIS-2007-0044-11741-4 for Issue 1.0.
V.5.2.3

Comment Excerpt Text:
Intraspecific gene flow is possible among all members of the Medicago sativa complex (specifically, M. sativa spp. sativa, M. sativa ssp. falcata, M. sativa spp. glutinosa). Hybridization of alfalfa to Medicago species outside of the Medicago sativa complex (M. prostrata and M. glomerata) has proven to be difficult. There are no confirmed examples of cross pollination hybridization between perennial and annual Medicago species. In fact all successful interspecific hybrids between alfalfa (the M. sativa complex) and other Medicago species have involved chromosome or ploidy level manipulations or in vitro manipulations such as ovule/embryo culture, protoplast fusion etc.
Given there is no credible evidence supporting the putative threat that RRA will be capable of hybridizing with other Medicago species {or species of other genera} resulting in a new and aggressive weedy population, this justification for not allowing release must not be considered. Regarding claims that RRA will contaminate non-GM alfalfa I feel the policies put in place for isolation are more than adequate to prevent contamination. Credible studies analyzing pollen drift across spatial distances have demonstrated the isolation distances for RRA from conventional alfalfa fields are more than adequate to prevent significant contamination. I feel this is also true for gene flow concerns from RRA into rangeland type alfalfas or feral alfalfa populations. Where yellow flowered rangeland varieties are grown observations would show little if any movement of genes from purple flowered commercial varieties or from feral alfalfa populations since the yellow flowered populations remain pure. Seed producers are aware of the possibility that RRA alfalfa varieties could cross pollinate with other alfalfa plants of the M. sativa complex and appropriate precautions to prevent such hybridizations are addressed by the protocols for producing RRA varieties. The United States has witnessed widespread acceptance of GM corn, soybeans and other crops and this is due to the fact that the benefits far outweigh any risk from growing these crops. It is time to approve the commercial release and sale of RRA the first GM alfalfa variety. Claimed risks associated with growing RRA are not substantiated. (Comment Number: APHIS-2007-0044-11887-2)

Response: APHIS acknowledges your comment. The DEIS and FEIS support the comment. An extensive discussion regarding the potential for hybridization with the M. sativa hybridization complex and also hybridization attempts to other more distant species is detailed in Appendix I of the DEIS.

Comment Excerpt Text:
The agency does not adequately evaluate gene flow from GT alfalfa fields to pasture or rangeland containing alfalfa or a subspecies of alfalfa (Medicago sativa subsp. falcata) nor does it evaluate the effect of self-seeding in pasture or rangeland that may contribute to contamination after initial gene flow events. (Comment Number: APHIS-2007-0044-12026-4)

Response: An expanded section examining gene flow in alfalfa, including gene flow to and from feral alfalfa has been included in the FEIS, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
As you know, in the west, some of these one and two dormant alfalfas like ranger, or ladak can survive in areas like Montana and the high valleys of Idaho. They can survive when they are just growing wild and are not cut. When an alfalfa is not cut for hay, it is able to store all of its carbohydrates for winter survival. These plants could live 10, 20, 30, 40, possibly even as high as 50 years. It has been stated that we should spray the ditch banks to control wild alfalfa. This is utter nonsense. You cannot spray mountain valleys, the prairies, and the valleys throughout Montana to Missoula to great falls to Glasgow or the Dakotas where the alfalfa grows wild. You cannot possibly spray these areas where this hay grows wild across America and so if genetically modified alfalfa were allowed to be intermingled in these regions across the country then it would completely contaminate the genetic pool. (Comment Number: APHIS-2007-0044-1773-2)

Response: In regard to general information about gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.
APHIS has added a discussion regarding the occurrence of unmanaged feral GT alfalfa populations to Appendix V.5.2.3 of the FEIS

Comment Excerpt Text:
gene transfer among genetically engineered agricultural crops and surrounding native species has given rise to highly resistant species deemed superweeds. (Milius 2003; Haygood, et al, 2003; Desplanque, et al, 2002; Spencer and Snow 2001) (Comment Number: APHIS-2007-0044-6620-2)

Response: APHIS acknowledges the comment. Gene gene flow among agricultural crops and native or naturalized relatives can occur and may be a potential avenue for weed evolution. However no occurrence of increased weediness has been demonstrated as a result of gene flow from transgenic plants to native or naturalized relatives. .

Comment Excerpt Text:
The final aspect of organic farming systems and alfalfa that the DEIS fails to seriously discuss and to account for is the use of alfalfa by organic farmers as a green manure cover crop. The DEIS briefly comments on the risk of gene flow into non-glyphosate tolerant alfalfa that is planted as habitat/rehabilitation/erosion control and defines this practice as an intentional sowing that is not managed after planting. A green manure cover crop of alfalfa does not exactly fit this category but is largely left unmanaged during the alfalfa growing cycle and would be more susceptible to gene flow from nearby genetically modified alfalfa stands.
A green manure cover crop is any crop that is planted with the intention of using it to increase the soil quality, fertility, or organic matter of the field where it is planted. In an organic farming system, a green manure cover crop is often planted in a field or orchard as part of a crop rotation designed to enhance the soil quality. Because it is a leguminous perennial and can fix as much as 200 lbs of Nitrogen from the atmosphere per acre planted per year, alfalfa is an important tool for organic farmers. It is often described as the king of cover crops. A well established stand of alfalfa will fix tons of nitrogen, shade out weeds, and has long tap roots that help break up

compacted soil, and pull up trace minerals. Alfalfa cover crops are an important tool for the organic farmer who, per NOP regulation, must build quality soil over time and who is prohibited by NOP rules from using chemical fertilizers.
In an organic crop rotation, it would not be unlikely for this type of alfalfa cover crop to be left to flower to attract beneficial insects (alfalfa is an excellent insectary crop) and it would not be uncommon for the farmer to try and collect seeds from his crop for reseeding other fields on the organic farm. The DEIS fails to discuss how deregulation of genetically modified alfalfa will impact the organic grower using alfalfa as part of a longterm soil building program. It fails to acknowledge how deregulation will affect the ability of an organic farmer to save back organic alfalfa seed for use as a green manure cover crop. Remember, if the organic grower knowingly plants seed that has been contaminated with genetically modified DNA, regardless if the seed is saved from his own plantings, he can not use that contaminated seed and also be in compliance with §205.105(e) that prohibits organic production using genetically modified seed. If an organic farmer's fields are adjacent to a field of genetically modified alfalfa, how can she save her own seed and use it knowing that it might be contaminated? Again, this would violate the farmer's integrity and violate the law. (Comment Number: APHIS-2007-0044-6769-5)

Response: APHIS acknowledges that alternative use of crop products (e.g., composting, organic alfalfa meal fertilizer, green manure cover crop, intentional sowing that is not managed after planting, as part of a long term soil building program, cover crop left to flower to attract beneficial insects) may be avenues for unintended escape of GT alfalfa. These avenues for escape are now discussed in an expanded Appendix G, V 1.2 and 5.1of the FEIS.

Comment Excerpt Text:
Correction Regarding Commercial Alfalfa Genetics and Implications for Gene Flow with Medicago Sativa Subspecies Falcata

At several places in the DEIS, APHIS discusses Medicago sativa subspecies falcata (yellow-flowered or Siberian alfalfa) and the potential for gene flow between GT alfalfa and falcata as well as the effect of hybridization between GT alfalfa and the falcata subspecies. See, e.g., DEIS at 23, 30, 99, 101-02, 182-83, App. H at H-2, H-7 to H-8, H-10, App. Q at Q-55, Q-65.

In particular, APHIS makes the following statement with respect to the falcata subspecies:

Spread of Subspecies "falcata"

Future spreading of the Medicago sativa subspecies falcata, which is naturalized in the northern and western United States, and is being promoted as a rangeland enhancer for grazing, could result in increased hybridization of falcata with GT alfalfa. As discussed in chapter 4.B.4, hybrids with mostly sativa parentage are predicted to be hardier than the original GT alfalfa but have less rangeland hardiness than the falcata parent. The falcata hybrid possessing the GT trait may potentially become established in rangeland habitats and serve as a reservoir for the GT trait. As the future use of falcata increases in rangelands, GT alfalfa seed farmers may have to protect their seed crop from cross contamination with neighboring rangelands. Also, the risk of

gene flow from GT fields to organic beef and dairy farmland may increase with the spread of falcata. Future spreading of falcata may also affect the feral alfalfa populations.

DEIS at 182-83.

APHIS additionally states:

Seed farmers will need to be aware of seeding practices in neighboring rangelands because falcata (yellow-flowered alfalfa) may become increasingly adopted for rangeland forage improvement and the falcata seed is available commercially.

DEIS at 101, Table 4-3.

FGI disagrees that falcata alfalfa poses a special concern for gene flow from GT alfalfa to either conventional or organic alfalfa seed or hay. The falcata germplasm was introduced into the northern Plains in the early 1900's as a potential source of novel alfalfa germplasm with potential adaptation for dryland range usage [Footnote 21: See Wayne Adams, Reflections About N. E. Hansen and His Contributions to Alfalfa, available at http://www.medicago-reports.org/pdfs/volume_01/01_16_NE_Hansen_contributions.pdf.]. This material has become naturalized in some local areas, tracing either to these initial introductions or to interseeding of improved varieties tracing to this introduced germplasm. The promotion of this germplasm for rangeland improvement spans several decades. It is unlikely that recent government "promotions" of this use will result in a major shift to alfalfa plantings on rangelands unless new financial incentives are available to ranchers. Furthermore, rangeland landscapes are only remotely likely to be sprayed with any herbicide—especially a broad spectrum herbicide like glyphosate—so it is unlikely that there would be any selection pressure toward the GT trait or adverse impact on the environment. The fact that the naturalized falcata populations continue, after decades of naturalization, to be almost exclusively yellow flowered, suggests there has been negligible gene inflow from cultivated alfalfa (which is predominantly purple flowered), and there is no reason to expect a different result with GT alfalfa. The limited number of acres of naturalized falcata and the barriers for gene outflow from cultivated hay field sources described by Van Deynze et al. (2008) [Footnote 1: Van Deynze, A.E., S. Fitzpatrick, B. Hammon, M.H. McCaslin, D.H. Putnam, L.R. Teuber and D.J. Undersander. 2008. Gene Flow in Alfalfa: Biology, Mitigation, and Potential Impact on Production. Special Publication 28. Council for Agricultural Science and Technology (CAST), Ames, Iowa. 30 pp. (cited at DEIS, App. Q at Q-88 and App. V at V-96).] will limit the likelihood and extent of effective gene flow from GT hay production to falcata plants naturalized in rangeland.

The original falcata introductions and sativa x falcata populations developed therefrom have been widely used as a source of winterhardy germplasm by alfalfa breeders since the 1940's.

Today most modern varieties, including the commercial GT cultivars, have some falcata germplasm introgressed in their genetic background as demonstrated by the fact that they commonly express some yellow flowers and they are classified as very or extremely winterhardy similar to the improved falcata x sativa "very winterhardy" and "extremely winterhardy" check varieties [Footnote 22: "Very winterhardy" is identified as Class 2. Class 1 is "extremely

winterhardy", with the classes decreasing in winterhardiness to Class 6, which is "non-winterhardy." See Winter Survival Rating, NAAIC Standard Tests to Characterize Alfalfa, available at http://www.naaic.org/stdtests/wintersurvivalnew.htm. The official variety registration descriptions for GT alfalfa cultivars are available at http://www.naaic.org/varietyaps/lists/var&cultivar.html.].

Seed producers in proximity to rangeland or feral alfalfa populations who are concerned with the genetic purity or integrity of their seed crop (e.g., certified seed growers) are likely already aware of the biological principles of pollination and the AOSCA seed certification standards that could be used to isolate their crop from other or unknown varieties such as unmanaged (rangeland) or feral alfalfa pollen sources. Therefore, core practices would not change for current producers of genetically pure seeds. Additionally, the potential effective gene flow from a GT falcata x sativa plant in a rangeland environment to a neighboring non-GT seed production field would be limited by the expected very low frequency of GT plants in the rangeland and the array of gene flow barriers described by Van Deynze et al. (2008).

The limited number of acres of naturalized falcata and the barriers to "hay to hay" and "hay to feral" gene flow described by Van Deynze et al. (2008) will limit the likelihood and extent of effective gene flow from falcata plants naturalized in rangeland to neighboring conventional or organic alfalfa hay or pasture.

In the DEIS, APHIS also states that "[t]he potential for gene flow between GT alfalfa and falcata, as well as the effect of hybridization between GT alfalfa and the falcata subspecies is unstudied." DEIS at 102.

FGI notes, however, that cultivated alfalfa (M. sativa, M. sativa x M. falcata and M. falcata), including GT alfalfa [Footnote 23: Note that APHIS states, "The parent plant in this petition, Medicago sativa L. . . ." DEIS, App. W at W-4. This is correct. The GT plants evaluated were bred to encompass M. sativa L., including both the sativa and falcata subspecies germplasm sources.] (M. sativa L.), is fully cross fertile with all members of the M. sativa L. complex, including M. sativa ssp. falcata. As discussed in the DEIS, "However, natural cross-pollination to the scattered naturalized (feral) populations of M. sativa [Footnote 24: Note that APHIS uses the term, "Medicago sativa L.", i.e., the taxonomic species. This statement is therefore inclusive of all forms and subspecies; it does not exclude M. sativa spp. falcata.] is possible." DEIS, App. V at V-2; see also DEIS at 30-32. There is no reason to believe that the potential or consequences for gene flow between GT alfalfa and the subspecies falcata should be any different to that described for alfalfa (M. sativa L.) in general in Van Deynze et al. (2008).

Additionally, the effect of sativa x falcata hybridization has been extensively studied over several decades, primarily as a breeding tool to introduce genetic variation into cultivated alfalfa from its more winterhardy relative, M. sativa subsp. falcata. In the 2004 Petition for Determination of Nonregulated Status (Rogan and Fitzpatrick, 2004) a controlled, comparative, phenotypic assessment study directly compared GT alfalfa against winterhardy and very winterhardy control and reference varieties, including "Ranger" (WS Class 3) and "Vernal" (WS Class 2), which have falcata germplasm in their parentage [Footnote 25: On page H-8 of appendix H, APHIS notes: "A few examples of alfalfa cultivars that have falcata germplasm in their parentage

include: Drylander, Roamer, Swift Current S3703L, Travois, South Dakota T25SYN2, Spredor 2 [WS Class 2], Alaska Synthetic A, Mandan MAL34, Alaska Synthetic B, Alaska Falcata Strain, Colorado C-3, and Mandan MAL 33 (Berdahl et al., 1989). Gimm and Ranger [WS Class 3] are also known to have falcata in their parentage (Rumbaugh, 1982).”]. Based on these studies, varieties with mixed falcata-sativa parentage plus the GT trait are not significantly different from conventional varieties with mixed falcata-sativa parentage with respect to pest potential.

For the reasons discussed above, FGI disagrees with the characterization in the DEIS of Medicago sativa subsp. falcata as either a special or “unstudied” concern for intra-specific gene flow. (Comment Number: APHIS-2007-0044-7620-33)

Response: APHIS acknowledges the comment. In regard to gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0. Appendix V 5.2.3 has been updated to further discuss that sativa x falcata has been studied and used for alfalfa crop improvement. However, hybridization between falcata and alfalfa J101 and J163 is unstudied. Language that implied falcata is “special” or different from other feral alfalfa has been removed.

Comment Excerpt Text:
Once established, alfalfa is a difficult plant to get rid of—much more difficult than corn or soy or any other existing GE crop—yet USDA failed to take this important fact into consideration in the EIS. At my house there’s a patch of wild alfalfa growing on a hillside near the road and across the road on my neighbor’s property. The only water that alfalfa has ever gotten has been rainwater, and we’ve tried on a few occasions to plow it under, but it crops up on schedule every year. Luckily for us, that wild alfalfa only benefits our cultivated alfalfa field—our crop is hardier for the genetic exchange—but if it were Monsanto GE alfalfa, germinated and grown through no effort or attempt of our own, it would be disastrous for us. (Comment Number: APHIS-2007-0044-8397-8)

Response: In regard to alfalfa volunteer weeds, see the response to comment APHIS-2007-0044-10263-8 for Issue 3.4.

Comment Excerpt Text:
USDA’s claims that buffer zones are unnecessary for RR alfalfa, seed or hay are simply wrong. The claim that Monsanto’s seed contracts require measures sufficient to prevent GE contamination and that there is no evidence to the contrary flies in the face of evidence presented in the lawsuit requiring the EIS in the first place, where the Court found that GE contamination had already occurred in the fields of several Western states with these same business-as-usual practices in place! It also flies in the face of practical experience (see above).

USDA’s dismissal of the potential for RR alfalfa to cross-pollinate feral alfalfa, or RR alfalfa volunteers to escape and establish feral populations is completely lacking a scientific basis (EIS, p. 98-99). Monsanto may be able to determine how the first generation of its patented seed will behave, but it cannot control or engineer mother nature to ensure that those crops will continue to behave that way for years to come. Alfalfa, unlike corn or soy, is a perennial crop. Monsanto has

much more control over single-generation crops like corn and soy than it does over perennial crops like alfalfa. Perennial crops have a much greater potential to evolve: Feral RR alfalfa can easily serve as a bridge for transferring the RR trait back to conventional alfalfa in later years.

The EIS states that if such feral RR alfalfa does arise, it can be controlled with non-glyphosate herbicide—but what about farmers, like my husband, who don't want to use herbicides on or near their crops? The market for organic hay is growing, and farmers get far better returns for organic hay sold to horse owners and organic livestock growers than they do selling convential hay: callously requiring organic farmers to just deal with GE alfalfa by spraying has a two-fold economic impact—it requires them to spend more money on inputs that they would otherwise, and it forces them to sell their product at a lower price. The USDA may not think that's a big deal, but it is: it amounts to an unfair taking of a farmer's ability to exercise his property rights.

Throughout the EIS, USDA assumes that all conventional alfalfa growers regularly use large quantities of herbicides: this is wrong. Once alfalfa is well established, it tends to squeeze out weeds on its own. Farmers growing hay for horses especially avoid pesticide application to the extent possible. (Comment Number: APHIS-2007-0044-8397-9)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response). In regard to the herbicide applications of conventional alfalfa growers, Section III.E.2 and appendix J of the DEIS discuss the common practices of alfalfa weed management. APHIS does not recommend that organic growers spray herbicides on their crops. In regard to gene flow to and from feral alfalfa populations see response to comment APHIS-2007-0044-12026-7 for Issue 3.0
In regard to isolation zones and adventitious presence, see the response to comment APHIS-2007-0044-11741-4 for Issue 1.0.

Comment Excerpt Text:
Based on our investigations on roadside alfalfa populations occurring in western Canada, we can confidently say that alfalfa persists in roadside habitats without managed cultivation and can act as a reservoir for novel traits. Therefore, we believe that stewardship and co-existence programs need to consider the occurrence of feral populations in novel trait confinement protocols, if a strict trait confinement is warranted. It is possible that strict adherence to stewardship practices, including the management of feral populations, can reduce the adventitious presence of GM traits and may facilitate the co-existence of GM and non-GM alfalfa. However, total confinement of novel traits in alfalfa within the production fields is highly unlikely under practical field conditions. Therefore, from our understanding, alfalfa may not be a suitable crop for traits that would require strict confinement and in such cases, regulatory approvals should be stringent.

The degree to which feral alfalfa populations need to be managed and other stewardship practices should be implemented should depend on the nature of risk posed by the GM trait and the threshold level allowed in non-GM alfalfa. It is unfortunate that there exists no clear regulation on threshold levels permitted in non-GM alfalfa. Therefore, regulations and practices should be in place, before unconfined release, to ensure that the interests of both adopting and non-adopting farmers are protected. In particular, more emphasis is vital to protect vulnerable

sectors, including organic farming, from the adventitious presence of novel traits. Particular consideration to issues related to thresholds, enforcement and liability may greatly enhance the acceptance of GM alfalfa among the stakeholders. (Comment Number: APHIS-2007-0044-8841-1)

Response: APHIS acknowledges the comment and the presence of roadside feral alfalfa in many parts of North America. APHIS acknowledges the commenters concern with GE alfalfa control, and has included an evaluation of an additional alternatives which addresses coexistence issues. See response to comment APHIS-2007-0044-11741-4 for Issue 1.0.In regard to gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
GM alfalfa genetic material is also likely to contaminate non-GM alfalfa stands through cross-pollination by other methods. Feral alfalfa may serve as a conduit that transfers the trait of glyphosate resistance to conventional or organic alfalfa in future years. It is impractical for farmers to control the spread of feral alfalfa which may contain the glyphosate-resistant gene through the application of non-glyphosate herbicides. (Comment Number: APHIS-2007-0044-8978-8)

Response: In regard to gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
Page 23: regarding feral alfalfa: Alfalfa has many of the above attributes and competes well with other native and introduced plants in a variety of settings.

Comment: this statement is a gross generalization and really needs to be clarified. What are the variety of settings? Does it compete with smooth bromegrass on low fertility sites in the upper Midwest? There is no evidence for this. For example, alfalfa in a road ditch or old hayfield in Minnesota, will have to compete with perennial grasses that have greater tolerance to extremes in moisture and fertility. While I have observed feral alfalfa in grass areas next to fields and in road ditches, I have never observed this “feral” alfalfa to spread or volunteer within an adjacent area as varieties lack assexual reproduction capability. In addition, any seed that may have been produced (depends on cross fertilization and honeybees will avoid alfalfa in Minneosta because of tripping mechanism) will be deposited to the soil surface where it is very subject to insect and mammal predation. (Comment Number: APHIS-2007-0044-9164-2)

Response: APHIS acknowledges the comment. APHIS has updated Section III.A.3 and ppendix H to better discuss the environmental parameters that can contribute or prevent successful establishment of feral alfalfa.

Comment Excerpt Text:

These points are further illustrated by the lack of feral alfalfa in the Midwest. We participated in a study where we randomly selected 10 sites within 10 randomly selected counties in Wisconsin and then drove down the road until we found a feral alfalfa plant in the ditch bank (Kendrick et al, 2005). In spite of millions of acres of alfalfa (some fields on every dairy farm), we generally had to drive over 1 mile before we found a feral alfalfa plant in the ditch bank. If seed were produced on feral plants we would have found many more feral alfalfa plants. Kendrick et al (2005) reported on a survey of a total of 940 roadside sites were surveyed among 47 counties in California, Idaho, Pennsylvania, South Dakota, and Wisconsin. They summarized this data as at approximately 22% of the sites, feral populations were located within 2000 m of cultivated alfalfa. On average, feral populations occupied 3% of the area surveyed (500 m2 per site). It should be stressed that, across the 5 states, 78% of survey sites had no feral alfalfa within 2000 m of cultivated alfalfa. When feral alfalfa is present, it is rarely targeted for control. Conventional feral alfalfa can be managed, as can feral plants with the RR gene. Methods for effective feral control include herbicides currently used to control conventional alfalfa such as mowing, and spot-spraying with 2, 4-D and banvel. (Comment Number: APHIS-2007-0044-9720-7)

Response: APHIS acknowledges the comment. The DEIS and FEIS include the information in this comment.

Comment Excerpt Text:
Furthermore, the assumptions that GM alfalfa contamination should or can be controlled by the farmer are obviously flawed when we look at another USDA programs that specifically prevents this control. The Conservation Reserve Program (CRP) utilizes alfalfa in their seed mixes that are planted in newly enrolled land in the upper Midwest and the West.

According to the Natural Resource Conservation Service (NRCS) of USDA, “Haying and grazing of CRP acreage is authorized under certain conditions to improve the quality and performance of the CRP cover or to provide emergency relief to livestock producers due to certain natural disasters.”

NRCS reports that, “Generally, CRP acreage may not be hayed or grazed during the Primary Nesting Season for certain wildlife established by state FSA committees in consultation with USDA's Natural Resources Conservation Service (NRCS) State Technical Committee.” This period is long after the pollination of alfalfa and other legumes has occurred.

In the area of “Managed Haying and Grazing”, NRCS authorizes haying and grazing no more frequently than one out of every three years “after the CRP cover is fully established.” [Footnote 3 United States Farm Service Agency, Conservation Programs, Emergency Haying and Grazing]

In the West it is common practice to utilize that hay by cutting one third of a field each year, allowing two thirds of the field to go to seed each year. There is no way to prevent pollination, or the spreading of seed in this or other CRP haying and grazing scenarios. (Comment Number: APHIS-2007-0044-9882-12)

Response: Appendix H of the DEIS discusses the CRP program. The additional details provided by the comment have been added to the FEIS in appendix V.5.4.

Comment Excerpt Text:
In our petition[Footnote 1 See Petition Seeking an Environmental Impact Statement Concerning the Deregulation of Genetically Engineered Wheat Varieties.], we noted this issue and the connection between the economic and environmental impacts of releasing Roundup Ready alfalfa. Nearly 80 million tons of alfalfa is grown each year on 22 million acres in the U.S., according to USDA statistics. Nearly 90 million tons more is grown and harvested in mixed hay production on 40 million more acres. Feral and volunteer alfalfa is ubiquitous in the West. The potential cost of any unintended adverse agronomic, environmental or economic impacts of release of Roundup Ready alfalfa are large, and are largely unexamined in the EIS. (Comment Number: APHIS-2007-0044-9882-2)

Response: In regard to economic impacts on honey producers, see the response to comment APHIS-2007-0044-5287-1 for Issue 5.9. In regard to economic impacts on organic farmers and downstream markets (e.g., dairy and cattle), see the response to comment APHIS-2007-0044-9882-1 for Issue 5.0. In regard to impacts on international trade, see the response to comment APHIS-2007-0044-3404-1 for Issue 5.4.

Comment Excerpt Text:
According to "The Feral Nature of Alfalfa and Implications for The Co-Existence of Genetically Modified (GM) and Non-GM Alfalfa" by Muthukumar V. Bagavathiannan and Rene C. Van Acker, the establishment, presence and persistence of feral alfalfa populations will have implications for the release of GM alfalfa as these populations will serve as reservoirs for novel traits and act as bridges for long-distance gene flow. As such, feral alfalfa is a barrier for the successful co-existence of GM and non-GM alfalfa. Strict adherence to purpose designed stewardship practices can help minimize the potential of GM trait escape into feral and non-GM alfalfa and increase the chances of successfully achieving coexistence between GM and non-GM alfalfa. [Footnote 2 The Feral Nature of Alfalfa and Implications for The Co-Existence of Genetically Modified (GM) and Non-GM Alfalfa Muthukumar V. Bagavathiannan1 and Rene C. Van Acker2 1Department of Plant Science, University of Manitoba, Winnipeg, MB, Canada, R3T 2N2 2Department of Plant Agriculture, University of Guelph, Guelph, ON, Canada, N1G 2W1] (Comment Number: APHIS-2007-0044-9882-9)

Response: In regard to stewardship practices, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response). In regard to gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

3.5 Issue 3.5 – Weediness Potential of Alfalfa

Comment Excerpt Text:
When alfalfa "volunteers" in a yard, pasture, or roadside ditch, it's amazing how quickly it spreads, even where it was never planted.

As a feed for organic, forage-only production models where no grain is fed to ruminant livestock in the winter, non-GMO contaminated alfalfa is critically important due to its nutritional profile for meeting protein requirements in the winter. Such sustainable production models (grass when it is available, hay when it is not, and no grain) would be close to impossible without non-GMO alfalfa in many parts of the country. Because of this, not only organic alfalfa producers are threatened by the spread of Roundup Ready alfalfa, but organic livestock producers are in danger as well.
For farmers who look at 'organic' or 'naturally raised' simply as market differentiators, they may say, "So what?" and will not see a problem. But, they should see the active contamination of their neighbors' fields due to their choices as a problem.
Nothing organic farmers do threatens to put conventional farming neighbors out of business. The same cannot be said for the intentional choice to use GMOs like Roundup Ready alfalfa. If the result of those choices reduces the diversity of our farm operations and causes more people to leave farming, who benefits? (Comment Number: APHIS-2007-0044-0369-1)

Response: In regard to alfalfa volunteer weeds, see the response to comment APHIS-2007-0044-10263-8 for Issue 3.4. In regard to the adventitious presence of GT alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for Issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Short Version: GE contamination of feed crops is both anti-competitive and environmentally harmful.
Anti-competitive: Organic feed contaminated by GE traits cannot, by USDA's own regulations, be used by organic dairies. Result 1: organic dairies have to find alternative sources and pay more for the now-scarcer feed. Practical outcome: non-organic dairies are given a competitive advantage by the USDA.
Result 2: Organic farms are effectively taxed for being organic. If their product is contaminated they suffer large losses that do not befall their competitors. (Not enough words permitted to discuss the inability of liability actions to even this playing field.) Practical outcome: failure of some organic farms, reduction of that farmland's value and its probably sale at a bargain price to neighboring GE using farms. Double advantage to GE users.
Environmental damage:
1. Glyphosate resistant weeds are already a well documented problem; encouraging large-scale glyphosate use in comparatively uncontaminated ecosystems may well result in more of these weeds.
2. It is a given that some farmers will fail to comply with whatever safety practices are mandated. There is no practical way to avoid this, thus no efficacy- anywhere - for the safety practices. Unleashing "just a little" altered DNA is like being a little bit pregnant.
Damage to consumers:
Price of organic products goes up for no reason connected to weather, transportation costs or other reasonably expected hazards of farming. USDA is thus again advantaging non-organic entities.
For these reasons, I believe it is anticompetitive and environmentally harmful to grant unregulated status to Glyphosate-tolerant alfalfa and I hope such status will be denied.

(Comment Number: APHIS-2007-0044-0801-1)

Response:
In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6. In regard to the adventitious presence of non-GE or organic alfalfa with GT alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to the impact of GT alfalfa deregulation on market competition, appendix T of the DEIS analyses the impact of the presence of genetically engineered content in alfalfa used as feed in organic farming. As long as organic producers establish adequate buffer zones to prevent the contamination from genetically modified crops, have not intentionally used genetically engineered products, and have adequate procedures in place to prevent commingling or contamination of organic crops by genetically engineered products, then organic certification is not lost with the unintended presence of genetically engineered content. , the analysis is expanded in the FEIS to further discuss the impact of testing for genetically engineered material as a potential requirement for access to sensitive markets. The final impact on the competitiveness of organic farms depends on the extent to which testing is required for alfalfa hay (rather than for seeds) and on the impact of deregulation on demand in downstream markets.
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Comment Excerpt Text:
What will be different from the cases of RR-soybeans, RR-corn and RR-cotton is that release of RR alfalfa will start a system that will have no waiting period for glyphosate-tolerant weeds to appear; RR alfalfa is the weed. As has been noted above, alfalfa is widely adapted to different environments and exits widely on and off agricultural lands, and this “feral” alfalfa will greatly accelerate spread of the glyphosate-tolerant genetic trait if release is allowed. The widespread, almost ubiquitous use of Roundup®/glyphosate, including use by non-agricultural land managers and householders will apply powerful selection pressure to increase RR alfalfa.
Alfalfa has the characteristic of partial seed dormancy, 50% or more of its seed can be dormant, germinating many years after seeding (9). This characteristic coupled with tolerance to glyphosate, our best and most widely used herbicide, truly raises RR alfalfa to the superweed category. If in some worst case scenario, the release of RR alfalfa is allowed to go on for any extended period of time, new types of glyphosate-tolerant weeds will be generated just as in the case of the three RR crops cited. (Comment Number: APHIS-2007-0044-10138-5)

Response: In regard to alfalfa volunteer weeds, see the response to comment APHIS-2007-0044-10263-8 for Issue 3.4. APHIS’ plant pest risk assessment in appendix W of the FEIS addresses APHIS’ analysis of GT alfalfa being a plant pest risk.

Comment Excerpt Text:
Glyphosate has been a really useful tool for agricultural production in the area where my research has been conducted in the Pacific Northwest. Glyphosate has been very important in controlling weeds, including newly emerging alfalfa in vegetable and row crops. Alfalfa tends to

present itself as a weed in other crop fields, including conventional sugar beets and onion. An important strategic technique in vegetable weed control is to spray the weeds in a field after planting and just before the intended crop emerges (for example in fields planted to sugar beet or onion). Alfalfa has hard seeds and those hard seeds are present in all crop production fields in this region. The alfalfa that emerges prior to the emergence of onion and sugar beet is currently controlled with glyphosate. With the non-regulated status of GT, alfalfa, this current weed control practice could be compromised (Comment Number: APHIS-2007-0044-10157-1)

Response: If glyphosate resistant alfalfa was cultivated in prior years, hard seed characteristics could contribute to volunteer populations in the following crop rotation. If farmers choose to use GT alfalfa, other herbicides could be used to remove volunteers. In regard to other herbicides used for alfalfa removal see response to comment APHIS-2007-0044-11037-28 for Issue 7.1. In regard to alfalfa volunteer weeds, see the response to comment APHIS-2007-0044-10263-8 for Issue 3.4.

Comment Excerpt Text:
GT Alfalfa is different than other GT crops, such as sugar beets, corn and soybean. Without care, cultivation, and planting provided by humans, sugar beet, corn, and soybean plants do not long survive. Alfalfa, on the other hand, when left unattended, can thrive as a weed. GT alfalfa planted for forage or seeds can act as a weed in the other GT crop fields. In most other crops, propagation and survival are easy to control. Alfalfa will always produce a certain proportion of hard seed that will come up later and has the potential to present itself in different GT crop fields, as well as other places where it is not intended. If there are other GT crops in the same crop rotation as GT alfalfa, some weed problems with GT alfalfa can be expected to emerge from hard seed, even if these weed populations are not economic factors in the other GT crops. Because of this inherent property of alfalfa to act as a weed, confining the genetic movement of GT alfalfa will be infeasible in regions where conventional alfalfa seed is grown (Comment Number: APHIS-2007-0044-10157-5)

Response: In regard to alfalfa volunteer weeds, see the response to comment APHIS-2007-0044-10263-8 for Issue 3.4.

Comment Excerpt Text:
East of the Cascades in the Pacific Northwest and across the Northwestern states to the Dakotas, alfalfa acts as a weed. This feral alfalfa grows along roadsides, ditches, and edges of fields, and often grows uncontrolled or may be controlled along with other weeds through mowing, cultivation, or the application of glyphosate and other herbicides. At present, few of these feral alfalfa plants contain the GT trait. As more GT alfalfa is grown, this will change as the trait is transferred to feral alfalfa. On page 101 in table 4-3 and elsewhere, the non-regulated status document states “The GT trait is not expected to impart increased fitness in feral alfalfa” but the truth of the matter is apt to be exactly the opposite.. Although glyphosate is a poor herbicide for controlling conventional alfalfa, it is still used on many waste areas to help control a wide range of weeds. In alfalfa seed production areas, these weedy areas include feral alfalfa. Since many waste areas are occasionally sprayed with glyphosate, the genetic composition of feral alfalfa

will shift towards GT alfalfa. It will not be possible to control the flow of the GT trait from these unmanaged areas to production fields because they will be outside of contractual control (Comment Number: APHIS-2007-0044-10157-6)

Response: In regard to changes in feral alfalfa populations, gene flow from GE alfalfa to feral alfalfa is possible. If hybrid seed successfully forms, it must disperse beyond the range of alfalfa autotoxicity, establish and mature. If established, feral GT alfalfa exposed to occasional spraying of glyphosate for weed control could potentially have greater fitness and contribute to population changes. An expanded section discussing the potential for occasional or sublethal exposure to glyphosate has been included in the FEIS, appendix H. In regard to gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Comment Excerpt Text:
At the bottom of page B-3, the non-regulation document reads "Feral plants have a large disadvantage over commercial fields as they are not managed; there is a reduced chance of synchronous flowering and a high chance they are destroyed by insect[s], and thus they seldom produce viable seed. The low relative abundance of pollen and pollinators and the high degree of environment stress on croplands relative to those within commercial seed production fields will help reduce the likelihood and commercial importance of seed-to-feral and subsequent feral-to-seed or feral-to-hay gene flow risk to near zero." This statement appears to be based strictly on opinion with no objective facts or observations. My professional experience tells me that this statement is false for the alfalfa seed production areas that I know. Feral alfalfa is often heavily visited by pollinators and often has very different insect pest dynamics, so they are often highly productive of seed in direct contradiction to the non-regulated status regulation document (Comment Number: APHIS-2007-0044-10157-7)

Response: In regard to gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0. The FEIS has been updated with additional discussion regarding feral alfalfa in appendix V.

Comment Excerpt Text:
Roundup Ready alfalfa system will increase use of toxic chemicals for eradication of volunteer RR alfalfa

Alfalfa stands grow dense and thick, with extremely deep roots. Removal is no easy task. This explains why many growers who use tillage have to make multiple passes, and why thorough removal of an old alfalfa stand is often accomplished with a combination of tillage and chemicals. [Footnote 24: U of Wy (2006). "Roundup Ready Alfalfa," University of Wyoming Cooperative Extension Service, B-1173, February 2006, Table 3.] Even so, volunteer plants springing up in the following season's crop are to be expected, and may prove to be significant problems for many growers. Volunteer RR alfalfa has the potential to be a widespread problem, for instance in vegetable fields previously planted to alfalfa, [Footnote 25: Tickes, B. (2002). "Evaluation of Stinger (clopyralid) for weed control in broccoli," 2002 Vegetable Report, College of Agriculture and Life Sciences, University of Arizona.] just as volunteer RR corn is

becoming a significant weed problem in RR soybean fields planted in subsequent years. As with alfalfa stand removal, if the volunteer alfalfa is Roundup Ready, then glyphosate is eliminated as an option for controlling it. As a result, there will be an increase in the use of the non-glyphosate herbicides listed above for stand removal, and/or others appropriate to the follow-on crop, to control volunteer RR alfalfa. APHIS gives a few examples of herbicide regimes that have shown promise in controlling volunteer RR alfalfa in a following season corn crop – but once again, as with alfalfa stand removal, fails to give any quantitative estimate of the increase in herbicide usage this would require:

"Additional data demonstrated that early postemergence applications of herbicides (applied during the stage between the emergence of a seedling, and the maturity of the plant) used to control weeds in corn (Harness XTRA (acetochlor + atrazine), Degree (acetochlor), and Degree XTRA (acetochlor + atrazine) applied in tank mixtures with broadleaf herbicides Banvel (dicamba), 2,4-D, Marksman (atrazine + dicamba) and Hornet (clopyralid + flumetsulam) effectively controlled GT alfalfa in a GT corn crop." [Footnote 26: EIS at 20.]

Thus, it appears that tank mixtures of up to 6 different herbicides will be applied to control RR alfalfa volunteers. Dicamba is a chlorophenoxy herbicide of the same class as 2,4-D, discussed above, and the State of California recently required both compounds be labeled as "probable human carcinogens." Acetochlor was described above.

Atrazine is a potent endocrine-disrupting compound that has been found to cause gonadal malformations in frogs at concentrations as low as 0.1 part per billion, and act as an endocrine disruptor in fish and reptiles as well. [Footnote 27: Hayes, T.B. et al (2006). "Characterization of Atrazine-Induced Gonadal Malformations in African Clawed Frogs (Xenopus laevis) and Comparisons with Effects of an Androgen Antagonist (Cyproterone Acetate) and Exogenous Estrogen (17ß-Estradiol): Support for the Demasculinization/Feminization Hypothesis," Environmental Health Perspectives 114 (Suppl. 1): 134-141.] A recent study demonstrated complete feminization and chemical castration of male African clawed toads from long-term exposure to just 2.5 parts per billion (ppb) atrazine, which is an environmentally-relevant concentration. [Footnote 28: Hayes, T.B. et al (2010). "Atrazine induces complete feminization and chemical castration in male African clawed frogs (Xenopus laevis), Proceedings of the National Academy of Sciences (Early Edition), www.pnas.org/cgi/doi/10.1073/pnas.0909519107.] Atrazine is a leading suspected culprit in the worldwide decline of amphibians, [Footnote 29: Biello, D. (2008). "World without Frogs: Combined Threats May Croak Amphibians," Scientific American News, October 30, 2008.] as are Roundup formulations with POEA (polyethoxylated tallowamine) surfactants (see supporting materials on atrazine as well as the studies by Dr. Rick Relyea on Roundup's toxicity to many species of frogs at quite low levels.

Atrazine is one of the most heavily used used corn herbicides, with lesser use in soybeans. In 2005, atrazine use in the U.S. totaled nearly 63 million lbs. on corn and soybeans: 62.29 million lbs. on corn and 0.61 million lbs. on soybeans. [Footnote 30: USDA NASS (2006), op. cit. For corn, 57.390 million lbs. (p. 19) reported on 93% of corn acreage (p. 2), for 57.390/0.93 = 62.29 million lbs. nationwide. For soybeans, 0.542 million lbs. (p. 97) on 89% of soybean acreage (p. 2) = 0.61 million lbs. nationwide.] Atrazine is one of the most common pesticide contaminants

of ground and surface waters in the U.S. Atrazine has been demonstrated to induce breast and prostrate cancers in laboratory animals, [Footnote 31: Fan, W. et al (2007). "Atrazine-Induced Aromatase Expression Is SF-1 Dependent: Implications for Endocrine Disruption in Wildlife and Reproductive Cancers in Humans," Environmental Health Perspectives 115: 720-727.] and workers exposed to atrazine in manufacturing plants have substantially increased rates of prostate cancer, reinforcing the carcinogenic potential of this compound. [Footnote 32: Cox, C. (2002). "Group uncovers study linking atrazine with prostrate cancer," Journal of Pesticide Reform 22(2): Summer 2002.] Because of these health threats, the European Union banned atrazine in 2004. The U.S. EPA yielded to pressure from Syngenta and others, allowing atrazine use to continue despite its many harmful effects. [Footnote 33: LoE (2006). "EU on Atrazine," Living on Earth, PBS, transcript of interview with Tyrone Hays, April 21, 2006. http://www.loe.org/shows/segments.htm?programID=06-P13-00016&segmentID=1; Blumenstyk, G. (2003). "The Price of Research: A Berkeley scientist says a corporate sponsor tried to bury his unwelcome findings and then buy his silence," The Chronicle of Higher Education, October 31, 2003. http://chronicle.com/article/The-Price-of-Research/21691.
]
APHIS does not supply any estimate of the increase in the use of atrazine, acetochlor, monosodium methanearsonic acid, the chlorophenoxy herbicides 2,4-D and dicamba, clopyralid, picloram, or any other non-glyphosate herbicide that will be required for:

1) Removal of old stands of RR alfalfa
2) Eradication of Roundup Ready alfalfa volunteers in follow-on crops
3) Control of glyphosate-resistant weeds fostered by the RR alfalfa system, both independently of and in conjunction with existing RR crop systems, including RR soybeans, RR corn, RR cotton, RR canola, or RR sugar beets. (Comment Number: APHIS-2007-0044-11037-29)

Response: In regard to alfalfa volunteer weeds, see the response to comment APHIS-2007-0044-10263-8 for Issue 3.4. In regard to stand removal practices for GT alfalfa, see the response to comment APHIS-2007-0044-11037-28 for Issue 7.1. In addition appendix V analyzes changes in herbicide use with the adoption of GT alfalfa.

Comment Excerpt Text:
GT Alfalfa is a noxious weed

The PPA defines a noxious weed as "any plant or plant product that can directly or indirectly injure or cause damage to crops …or other interests of agriculture, irrigation, navigation, the natural resources of the United States, the public health, or the environment."[Footnote 6: 7 U.S.C. § 7702(10).] The unfortunate and inexplicable exclusion of the safeguards against harm by introduced plants that act as noxious weeds from the regulations governing genetically engineered organisms means that APHIS has been unable to properly analyze or regulate these inventions. It is only recently, nearly ten years since the PPA was passed (and twenty-three years since the beginning of regulation of genetically altered plants), that the USDA has proposed a revision of the regulation to include the ability to regulate genetically engineered plants if they pose risks as noxious weeds.[Footnote 7: See, generally, Liebert, 28 BIOTECHNOLOGY L. REP. 382.] The long overdue inclusion of this basic component of the PPA to the regulation of

new plant species that have been genetically altered is an important and necessary step in safeguarding agriculture in the United States.
The risks of harm that GT alfalfa poses to conventional and organic alfalfa farmers (as detailed in section II below) are those posed by a noxious weed. The potential for gene flow between plantings of GT alfalfa and organic and conventionally grown crops and other consequences of deregulating GT alfalfa strains that prompted the lawsuit challenging the decision to deregulate the plants [Footnote 8: Geertson Seed Farms, et al., v. Mike Johanns, No. C 06-01075 CRB, 2007 WL 518624 (N.D. Cal. 2007).] are what APHIS, in the DEIS, refers to as "Unavoidable Impacts."[Footnote 9: DEIS, at IV(I)(1).] Indeed, APHIS's inadequate regulation of genetically engineered plants as compared with conventional plants that can be regulated as noxious weeds makes this kind of harm unavoidable and inevitable. The historical abdication by APHIS of its responsibility to prevent these harms guarantees that both deregulation of GT alfalfa and the cumulative impacts of GE crop deregulation will have adverse effects on American agriculture. APHIS, by minimizing these impacts based on its inability to regulate them at this time, fails to assess adequately the actual harm to the human environment that will result. The DEIS is therefore inadequate in its analysis and should be revised to assess thoroughly the noxious weed risks posed by deregulation of GT alfalfa. No deregulation of new genetically altered plant species should proceed until a revised regulation that provides for containment of the noxious weed risks posed by them is adopted by the USDA. (Comment Number: APHIS-2007-0044-11741-2)

Response: In regard to alfalfa volunteer weeds, see the response to comment APHIS-2007-0044-10263-8 for Issue 3.4 APHIS disagrees with the assertion that GT alfalfa is a noxious weed. The PPRA in appendix W includes an assessment of weediness in GT alfalfa. According to that assessment APHIS has not identified any differences in the weediness potential of GT alfalfa when compared to non-GT alfalfa. The commenter focuses on gene flow as an undesirable. Gene flow is a normal biological process. The consequences of gene flow between GT alfalfa and non-GT alfalfa are analyzed in the FEIS. APHIS does acknowledge that there are markets that are sensitive to the low levels of GT alfalfa in non-GT varieties.

Comment Excerpt Text:
From a seed producers stand point, if the seed growers in our valley begin full-scale production of genetically modified alfalfa, their cheapest way to control weeds will be with round-up. As you know there are always break out weeds in seed fields which will be repeatedly sprayed with roundup. Given a ten to twenty year period, if this continues, the weed seed from these fields would undoubtedly have begun the process of round up resistance because they would be sprayed with it and did not die. That fact should be elementary. That being the case, any weed seed that is shipped with that seed to be planted would have the resistance to round up. (Comment Number: APHIS-2007-0044-1773-3)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response to comment APHIS-2007-0044-9936-19 for Issue 3.6.

Comment Excerpt Text:

2. Although the intent of developing GM alfalfa was to maneuver around the weed issue, there are numerous reports coming from around the country on the effects of blanket application of the herbicide Roundup as well as other broad-spectrum herbicides, namely the development and propagation of herbicide resistant plants or "super" weeds. With GM alfalfa, farmers will use glyphosate-containing herbicides to kill everything but alfalfa. However, in the process of doing so you end up selecting the plants that have the capability to be build resistance to this herbicide. Eventually, Roundup will not work to keep weeds out of the farmer's fields. So in the end, the propagation of these "super" weeds will increase, leaving us fewer weed control options. (Comment Number: APHIS-2007-0044-3548-3)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response to comment APHIS-2007-0044-9936-19 for Issue 3.6.

3.6 Issue 3.6 – Increased Glyphosate Resistance of Weeds

Comment Excerpt Text:
I think that Roundup Ready Alfalfa will once again be a strong candidate for increasing the hay acres and potentially producing more hay for our livestock. However I hate to play the devil's advocate, but I do believe that with the alfalfa as a Roundup Ready variety, we are encouraging the use of strictly one herbicide (glyphosate) for the control of every weed. I know there are certain families of weeds that are already glyphosate tollerant and am questioning whether this is in the end a good alternative. I would like to actually see that the RR Alfalfa will produce more and over winter better in the harsh midwest before I would even consider it on my familes farm. Again I think that this would be a very strong market item, but I don't know if it is the correct answer because I fear of herbicide abuse if all a producer ever plants is RR crops. I have no problem with the Bio-Tech crops because they are able to do so many things and we would have eventually gotten to the point of production we currently are at but it would have taken much longer had it been done all through selective breeding process' without the bio-technology (Comment Number: APHIS-2007-0044-0483-1)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment. In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6.

Comment Excerpt Text:
My major concerns of Roundup Ready Alfalfa Include
Effect on Weed Resistance, Soil Organisms, and Ground Water Contamination, Economics, Yield, and Monopolization.
Weed Resistance, Soil Organisms, and Ground Water Contamination:
One of the most feared results of using Roundup Ready alfalfa by growers in my area is the weed tolerance factor. After many continuous years of winter forage and roundup ready silage corn rotation, growers fear the pig weed debacle in the south. Pig-weed, Johnsongrass, and Nettle are common in most these growers fields. This weed seed is plentiful in these soils as well as spread by lagoon water; which also raises salinity and Phosphorus levels. (Comment Number: APHIS-2007-0044-0933-2)

Response: In regard to avoiding shifts to glyphosate resistant weeds and management of glyphosate resistant weeds, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6.

Comment Excerpt Text:
Will weed shifts hurt glyphosate?
Delta Farm Press
Feb 11, 2005 12:00 PM, By Elton Robinson Farm Press Editorial Staff
http://deltafarmpress.com/mag/farming_weed_shifts_hurt/
"Wilcut said the use patterns of glyphosate and the fact that it is non-residual "will likely result in a change of emergence patterns within a weed species, to biotypes that germinate later and thus have a greater potential for escaping and setting seed for subsequent germination. Some weed scientists in the United States think that this is already occurring."
Wilcut said the overuse of Liberty Link technology could also lead to resistance in certain weeds. Resistance is most likely to occur in weeds that have a history of developing resistance to multiple herbicide modes or sites of action, according to Wilcut. Here are a few:"
Ambrosia species (common ragweed and giant ragweed): resistance to glyphosate; ALS herbicides; triazine and other PSII inhibitors (Cotoran, Direx, Lexone/Sencor); and Protox inhibitors (Blazer, Spartan, Reflex and Valor). At least six species are found in the United States.
Chenopodium species (lambsquarters): resistance to ALS; triazine and other PSII inhibitors; likely resistance to glyphosate; Protox inhibitors; and dinitroanilines. At least four species in the United States.
Amaranthus species (pigweed, including waterhemp and Palmer amaranth): resistance to ALS; triazine and other PSII inhibitors; dinitroanilines; at risk for resistance to glyphosate in waterhemp, Palmer amaranth and smooth pigweed. At least 10 species in the United States and approximately 50 species worldwide.
Annual grasses including goosegrass, foxtails, crowfootgrass, signal grasses, panicums and crabgrasses. Resistance to ACCase inhibitors; ALS; dinitroanilines; triazine and other PSII inhibitors. Ten-plus species at a minimum in the United States.
Johnsongrass, resistance to ALS; ACCase inhibitors; and dinitroanilines.
Conyza species (horseweed and fleabane family): resistance to a number of different sites of action, including glyphosate. At least four species in the United States.
Ryegrasses have developed resistance to every current herbicide site of action. Likely four or more species in the United States.
Another possible at risk weed is the Xanthium species, or cockleburs. (Comment Number: APHIS-2007-0044-0933-5)

Response: In regard to avoiding shifts to glyphosate resistant weeds and management of glyphosate resistant weeds, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6.

Comment Excerpt Text:
Herbicide-Resistant Weeds Force Change In Agriculture

02/07/2007 10:07AM
Cattle Network
http://www.cattlenetwork.com/Herbicide-Resistant-Weeds-Force-Change-In-Agriculture/2007-02-07/article_FeedByproducts.aspx?oid=722117
Consolidation in agriculture has resulted in fewer and larger companies, thus limiting the amount of research and development, said Roose. "The chemical industry has consolidated into a handful of companies, and the seed companies have consolidated into a smaller handful. The chemical companies are basically owned by the seed companies, and that's just the way agriculture has gone," he said.
The success of these relatively new seed technologies depends upon finding genes that affect agriculture on a mass scale, while avoiding downsides such as large yield loss, explained Gurian-Sherman. The 20 years or so of research only produced two, out of hundreds, commercially successful genes--Roundup Ready and Bacillus thuringiensis, or Bt in corn.
"The problem with this technology -- a silver bullet approach -- is that biology is working against you," he said. "It is not a sustainable technology."
The rise of the superweeds
Among the issues with GMOs, the manufacture of herbicide tolerant (HT) biotech crops, particularly Monsanto's RR crops, has resulted in the creation of hard-to-kill "superweeds."
http://www.sourcewatch.org/index.php?title=Monsanto_and_the_Roundup_Ready_Controversy
Herbicide resistance and usage
There is now an attempt to verify worldwide how bad the problem of herbicide resistance has become. WeedScience documents (so far) "323 Resistant Biotypes, 187 Species (112 dicots and 75 monocots) and over 300,000 fields" [25] [26] [27]. Most of the resistances here are due to herbicide overuse in general however because those weeds tolerant of Roundup are closely associated with our food supply and the because of the ubiquity of Roundup Ready crops they are a particular concern. According to Monsanto the 2007 worldwide total of their GM crops are 234-242 million acres [28]. (Comment Number: APHIS-2007-0044-0933-9)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6.

Comment Excerpt Text:
Noxious weeds are amongst the most potent and prolific weeds that farmers may encounter in the United States. It is now apparent that noxious weeds are also becoming glyphosate resistant. Baucom and Mauricio in a series of studies (2004, 2008) have found that morning glory- a prominent noxious weed in the American southeast. Morning glories are not only glyphosate resistant but also demonstrate a strong selection for tolerance in the presence of glyphosate (Baucom and Mauricio 2004; Baucom and Mauricio 2008). This research demonstrates that noxious weeds have the capacity to adopt resistance, and further, that glyphosate resistance is strongly selected for, indicating its potential to continue to expand throughout other weed populations. (Comment Number: APHIS-2007-0044-11018-13)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6.

Comment Excerpt Text:
However much the experts APHIS consults favor greater use of weed-killers, it is important to remember that very few farmers find any use for them on alfalfa. If they did, then much more than 7% of alfalfa hay acreage would be treated with herbicides.

Unfortunately, the introduction and adoption of a pesticide-based weed control system like Roundup Ready alfalfa will substantially increase herbicide use on alfalfa. That is, it is likely that many of the farmers who now use little or no herbicide will switch to GT alfalfa. This assessment is based chiefly on two considerations. First, GT crop systems are very seductive, in that glyphosate initially offers effective weed control in an unregulated GT crop system. But after a few years, the GT system's built-in overreliance on glyphosate leads to rapid evolution of glyphosate-resistant weeds and "weed shifts" to species with natural tolerance to glyphosate. These glyphosate-resistant and glyphosate-tolerant weeds proliferate, making glyphosate progressively less effective, leading first to increased doses and more frequent applications of glyphosate, then to supplementation of glyphosate with multiple other herbicides. Thus, after a brief honeymoon period of effective weed control, the GT crop system rapidly leads to greater use of more toxic weed-killers, with concomitant adverse impacts on human health, the environment and farmer income. This dynamic has been thoroughly demonstrated with unregulated use of other GT crop systems, and has already led to such severe glyphosate-resistant weed infestations on millions of acres that leading weed scientists warn that glyphosate-resistant weeds pose a threat to world food production. Glyphosate-resistant weeds as the inexorable result of GT crop systems are discussed further in Appendix 2. (Comment Number: APHIS-2007-0044-11037-14)

Response: In regard to avoiding shifts to glyphosate resistant weeds and management of glyphosate resistant weeds, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6. In regard to the impact of RR alfalfa on herbicide use, see the response to comment APHIS-2007-0044-6240-2 for issue 6.0.

Comment Excerpt Text:
One obvious consequence of introducing the RR alfalfa system would be a substantial increase in the use of glyphosate, over already extremely high and growing levels. Glyphosate is (by far) the most heavily used chemical pesticide in the history of agriculture, due primarily to the widespread adoption of other RR crop systems. EPA's latest estimate for overall agricultural use of glyphosate in the U.S. is 135 million lbs. acid equivalents, [Footnote 6: EPA (2009). "Glyphosate Summary Document Registration Review: Initial Docket," Environmental Protection Agency, June 2009, p. 12. See also EPA (2008), both in supporting materials.] which translates to 182 million lbs. of the most commonly used isopropylamine salt of glyphosate, as found in many of Monsanto's glyphosate products, including Honcho brand herbicide (Figure 1).

The adverse consequences of unrestrained use of glyphosate with RR crop systems argues for great caution before any more RR crop systems, including RR alfalfa, are deregulated. These adverse consequences include a rapidly growing epidemic of glyphosate-resistant weeds;

increased disease susceptibility and reduced nutritional content of major crops, stemming mainly from adverse impacts of glyphosate on soil microbiota; increased rates of cancer and possibly other diseases in farmers and farmworkers who use Roundup; and a possible role in the worldwide decline of amphibian populations. These important issues are discussed in detail in several documents included in the supporting materials. A documented overview can be found in the file entitled Glyphosate Registration Review – FINAL 9-21-09, which CFS submitted to the EPA in September of last year for the initial phases of its registration review of glyphosate, and which is included in the supporting materials submitted to this docket. We would add that the EPA last reviewed glyphosate in 1993, and that there has been an enormous increase in its use since that time, as well as a substantial amount of new research on the various adverse impacts of glyphosate and glyphosate-based herbicide formulations on the environment and the interests of agriculture. CFS believes it would be only prudent of APHIS to refrain from taking any action, such as deregulation of RR alfalfa, that promises to substantially increase the use of this herbicide, before EPA has the opportunity to review glyphosate's registration and impose any needed restrictions on its use. (Comment Number: APHIS-2007-0044-11037-18)

Response: In regard to avoiding shifts to glyphosate resistant weeds and management of glyphosate resistant weeds, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6. In regard to the impact of RR alfalfa on herbicide use, see the response to comment APHIS-2007-0044-6240-2 for issue 6.0. In regard to impacts on soil biology, see the responses to other more specific comments for Issue 3.6, Issues 4.1 through 4.4, and Issue 8.3. In regard to impacts on amphibians, see the response to comment APHIS-2007-0044-7268-2 for Issue 4.1.2. In regard to human health impacts, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for Issue 6.0.

In regard to the concern that deregulation of RR alfalfa by APHIS would affect any EPA review of glyphosate, this is not the case. EPA has jurisdiction over pesticides and pesticide labeling, and our action does not impact that authority. If EPA chooses to change the label on glyphosate, growers of GT alfalfa must follow that label.

Comment Excerpt Text:
One clear consequence of the vastly increased glyphosate use to be expected with introduction of the RR alfalfa system is acceleration of the emergence and spread of glyphosate-resistant weeds, which is covered in some depth in Benbrook (2009), included in the supporting materials.

Since that report was released just months ago (November 2009), there has been a flood of new reports of GR weeds (see Appendix 3). CFS has kept close tabs on glyphosate-resistant weed reports on the best available source, which is the Weed Science Society of America's reporting system at www.weedscience.com. As Appendix 3 makes clear, the confirmed reports of both the number of GR biotypes and the acreage infested by them have increased dramatically of late. From November 2007 to the present, the maximum acreage infested has increased from just over 2 million acres to 11.4 million acres.

In Appendix 4, we describe a biotype of a new GR weed species that has particular relevance to alfalfa, sugar beet and wheat cropping systems, glyphosate-resistant kochia.

We have discussed kochia at some length because it is an especially problematic weed in alfalfa and sugar beets, and because there is a high likelihood that GR kochia will emerge rapidly in RR alfalfa and RR sugar beets. Continued, unregulated use of RR crop systems ensures that the future will see the evolution of many other GR weeds.

Chuck Foresman, manager of weed resistance strategies for Syngenta Crop Protection, Inc., estimates a 40% growth rate in acreage infested with glyphosate-resistant weeds in the coming years, with 38 million row crop acres infested with GR weeds by 2013, or one in every four acres. [Footnote 8: Syngenta (2009). "Leading the fight against glyphosate resistance," Syngenta Crop Protection, Inc.] (Comment Number: APHIS-2007-0044-11037-21)

Response: In regard to avoiding shifts to glyphosate resistant weeds and management of glyphosate resistant weeds, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6. APHIS has evaluated the suggested references and included them where appropriate (appendix G).

Comment Excerpt Text:
1) Arsenic-based herbicides make comeback to control GR weed caused by RR crop systems: In 2006, the EPA decided not to reregister (i.e. prohibit all further uses of) arsenic-based herbicides. The EPA came to this decision because of concern that these organic arsenicals could contaminate drinking water supplies; wind up in meat and milk products derived from livestock fed cotton byproducts laced with arsenical herbicide residues; and impair the health of farmers and farm-workers who apply these chemicals. The EPA subsequently changed course and decided to reregister (permit continued use of) organic arsenical herbicides on cotton. The major reason for this about-face was the desperate need of cotton growers for effective herbicides to control an extremely damaging glyphosate-resistant (GR) weed known as Palmer amaranth. [Footnote 9: EPA Arsenic (2009a). "Amendment to Organic Arsenicals RED," Letter from EPA's Richard P. Keigwin, Director, Special Review and Reregistration Division, to Registrant, April 22, 2009;] GR Palmer amaranth first arose in 2005, and has since infested millions of acres of cotton- and soybean-growing land in the South and Midwest. The extremely rapid emergence of this GR weed since 2005 is directly attributable to the RR cotton and RR soybean systems, with their heavy and (at least initially) near exclusive reliance on glyphosate. While other uses of these arsenic-based herbicides will be phased out over the coming years, the exemption for continued use on cotton appears to have no time limit. [Footnote 10: EPA Arsenic (2009b). "Organic Aresenicals; Product Cancellation Order and Amendments to Terminate Use," EPA Notice, Fed. Reg. Vol. 74, No. 188, Sept. 30, 2009, pp. 50187-50194. Last page has exemptions for cotton.] No one predicted the emergence of this damaging weed, just as no one predicted GR kochia would emerge. This example illustrates the potential for harm to human health and the environment from use of a class of toxic, arsenic-based herbicides specifically for control of a noxious GR weed whose emergence is attributable to unregulated RR crop systems. (Comment Number: APHIS-2007-0044-11037-22)

Response: In regard to the impact of RR alfalfa on herbicide use, see the response to comment APHIS-2007-0044-6240-2 for issue 6.0.

In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6.

Comment Excerpt Text:
Before 1996, weeds were not observed to have evolved resistance to glyphosate in the field, but since then, the introduction of transgenic glyphosate tolerant crops has led to evolution of a number of resistant weeds as the result of the greatly increased use of the herbicide particularly during the post-emergent growth of the crops. Glyphosate reisistant Asiatic dayflower (Commelina cumminus L) common lambsquarters (Chenopodium album L) and wild buckwheat (Polygonum convolvulus L) are reported to be increasing in prominence in some agro ecosystems as are populations of horseweed (Conyza canadensis (L) Cronq) [1].
In regions of the USA where transgenic glyphosate resistant crops dominate, there are now evolved glyphosate-resistant populations of the economically damaging weed species Ambrosia artemissifolia (rag weed), Ambrosia trifida L.(great ragweed), palmer pigweed (Amaranthus palmeri), common water hemp (Amaranthus rudis) , rough fruit amaranth (Amaranthus tuberculatus) and various Conyza (horse weed) and Lolium (rye grass) species.
Likewise, in areas of transgenic glyphosate resistant crops in Argentina and Brazil, there are now evolved glyphosate resistant populations of Johnson grass (Sorghum halepense) and Mexican fireplant (Euphorbia heterophylla) [2]. These herbicide resistant weeds pose a clear threat to the transgenic crops dominating North and South America [3]. (Comment Number: APHIS-2007-0044-12104-1)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6.

Comment Excerpt Text:
There is no simple remedy for the evolution of resistance to glyphosate. Interestingly, the inventor of both glyphosate and the herbicide tolerant crops, Monsanto Corporation, does not appear to be engaged in finding remedies for the invasion of resistant weeds. There has been an effort to remedy the invasion of resistant weeds by the academic community. Simulation modeling has been developed. Glyphosate use for weed control prior to crop emergence is associated with low risks of resistance. These models are based on assumptions that low risks can be further reduced by applying glyphosate in sequence with other broad-spectrum herbicides prior to crop seeding [4]. Post-emergence glyphosate use, however, associated with glyphosate-tolerant crops, very significantly increases the risks of resistance evolution. Annual rotation with conventional crops reduces these risks, but the proportion of resistant populations can only be reduced to close to zero by mixing two of three post-emergence glyphosate applications with herbicides that have alternative modes of action. Weed species that are prolific seed producers with high seed bank turnover rates are most at risk of glyphosate resistance evolution. The model is especially sensitive to the initial frequency of resistance alleles, and other genetic and reproductive parameters, including weed breeding system, dominance of the resistance trait and relative fitness, influence rates of resistance. (Although these assumptions may be quite irrelevant in view of numerous physiological mechanisms of the ‘fluid genome’ that can produce

resistant mutations in plants exposed to non-lethal levels of glyphosate, as discussed in [5] (GM Crops Facing Meltdown in the USA, SiS 46).
Over the past decade, the most problematic weeds in agronomic cropping systems have shifted away from perennial grass and perennial broad leaf weeds to primarily annual broadleaf weeds, although the glyphosate resistance mechanisms in weeds are currently poorly understood [6]. It appears that post-emergent use of glyphosate may be a main contributor to evolved glyphosate resistance, but eliminating post-emergent herbicide treatment practically eliminates all the advantages of and hence the need for herbicide tolerant crops.
Evaluation of herbicide programs for the management of glyphosate-resistant waterhemp (Amaranthus rudis) in maize involved pre-emmergent application with the herbicide glufosinate followed by a post-emmergent treatment of the transgenic maize with glyphosate which controlled water hemp better than pre and post emmergent treatment with glyphosate alone [7].
Maize growing in the EU27 increased to over 13 million ha in 2007, most of which (>80 percent) grown in just eight countries (France, Romania, Germany, Hungary, Italy, Poland, Spain and Bulgaria). The number of herbicides used to control the wide spectrum of weeds occurring in all these countries is likely to decline in the future, and care need to be taken to manage potential weed shifts to more difficult-to-control species and to reduce the risk of selection for glyphosate-resistant weeds [8].
In 2002, a glyphosate resistant Johnson grass (Sorghum halepense) appeared in Argentina and now covers at least 10 000 ha. The introduction of novel genetically modified crops promoted the use of more herbicides. This in turn reinforces the emergence of herbicide-resistant weeds, constituting a new phenomenon of intensification, the “transgenic treadmill" [9].
Many herbicide tolerant crops become “volunteer” weeds that infest crop rotations. Those weeds complicate cultivation, contaminate crops, and enhance gene transfer to weedy relatives. A transgenically mitigated (TM), dwarf, herbicide-resistant construct using a gibberellic acid-insensitive (Deltagai) gene in the B. napus crop was effective in offsetting the risks of transgene establishment in volunteer populations of B. napus (oilseed rape) [10]. Dwarfing the transgenic crop did not hurt yield of the oil seeds, but controlled the volunteer weeds because they were shaded by a taller crop. Mitigation by dwarfism worked well in greenhouse experiments but failed in field experiments. The proposed mitigation increased escape and persistence of transgenic weeds [11]. An alternative mitigation strategy for transgenic rice involved the introduction of a potpourri of traits including dwarfism, non-shattering, no secondary dormancy and herbicide sensitivity [12].
The companies selling herbicides and herbicide tolerant transgenic crops are in no hurry to control herbicide resistant weeds. The multiple herbicides used to control transgenic weeds may come as an economic blessing. (Comment Number: APHIS-2007-0044-12104-2)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate usage, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6. In regard to alfalfa volunteer weeds, see the response to comment APHIS-2007-0044-10263-8 for Issue 3.4.

Comment Excerpt Text:
The genetic basis of many of the glyphosate resistant weeds remains unknown; but those studied in detail show that there is no single genetic alteration responsible in all of the resistant weeds. Some populations of goosegrass from Malaysia, rigid ryegrass from Australia,and Italian

ryegrass from Chile exhibit target site-based resistance to glyphosate through changes at amino acid 106 of the 5-enolpyruvylshikimate-3-phosphate synthase (EPSPS) gene. Mutations change amino acid 106 from proline to either serine or threonine, resulting in an EPSPS weakly resistant to glyphosate. The moderate level of resistance is sufficient for commercial failure of the herbicide to control these plants in the field. Other mechanisms of resistance include a nontarget site resistance mechanism has been documented in glyphosate-resistant populations of horseweed and rigid ryegrass from the United States and Australia, respectively. In these resistant plants, there is reduced translocation of glyphosate to meristematic tissues. Both of these mechanisms are inherited as a single, nuclear gene trait [14].
EPSPS gene amplification has been found to lead to glyphosate resistance in Amaranthus palmeri populations from Georgia, in comparison with normally sensitive populations. EPSPS enzyme activity from resistant and susceptible plants was equally inhibited by glyphosate. Genomes of resistant plants contained from 5-fold to more than160-fold more copies of the EPSPS gene than did genomes of susceptible plants. Quantitative RT-PCR on cDNA revealed that EPSPS expression was positively correlated with genomic EPSPS relative copy number. The amplified genes were not clustered on the chromosomes but distributed among all of the chromosomes [15, 16]. These results suggest that the EPSPS genes were amplified through mobile genetic elements (jumping genes). Interestingly, in a laboratory experiment with alfalfa cells in culture reported eight years before the Amaranthus investigation gradual stepwise increases in glyphosate in culture medium led to gene amplification of the EPSPS gene ‘ [17]. Another evolutionary glyphosate resistance mechanism was observed in the horse weed. The mutant weeds rapidly pumped the herbicide into vacuoles preventing contact of the herbicide with the chloroplast [18].
Conclusion
The evolution of glyphosate resistance among weeds that interfere with the productivity of crops is approaching catastrophic proportions. The evolutionary process leading to the resistant weeds has been described as a “transgenic treadmill” that renders current use of transgenic crops unsustainable. As current transgenic crops are rendered obsolete through weed resistance, the crops will be replaced with new transgenic varieties made available at higher prices to the farmers [19] (GM Crops Increase Herbicide Use in the United States , SiS 45) followed by another round of weed evolution to resistance. (Comment Number: APHIS-2007-0044-12104-4)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6.

APHIS acknowledges that there are different molecular mechanisms of resistance to glyphosate and that different methods are more or less effective in rendering weeds resistant. IPM is necessary to manage the development of resistant weeds, and understanding the modes of resistance can help to develop IPM strategies.
Appendix G has been updated to further discuss the different mechanisms of glyphosate resistance in weeds.

Comment Excerpt Text:

Herbicides kill weeds by disrupting normal plant functions (Prather et al. 2000). Pesticides may be classified by their "mode of action," that is, the initial enzyme, protein or biochemical step affected by the herbicide's application. Several "mode of action" categories are described below:

Some of the most common modes of action include the following (Tu et al., 2001):

- Auxin mimics (2,4-D, clopyralid, picloram, and triclopyr), which mimic the plant growth hormone auxin causing uncontrolled and disorganized growth in susceptible plant species;

- Mitosis inhibitors (fosamine), which prevent re-budding in spring and new growth in summer (also known as dormancy enforcers);

- Photosynthesis inhibitors (hexazinone), which block specific reactions in photosynthesis leading to cell breakdown;

- Amino acid synthesis inhibitors (glyphosate, imazapyr and imazapic), which prevent the synthesis of amino acids required for construction of proteins;

- Lipid biosynthesis inhibitors (fluazifop-p-butyl and sethoxydim), that prevent the synthesis of lipids required for growth and maintenance of cell membranes.

Resistance

Herbicide resistance occurs when the herbicide's mode of action is no longer effective at killing a target weed. More specifically, weed resistance has been defined as the naturally occurring inheritable ability of some weed biotypes (individual plants) within a given weed population to survive an herbicide treatment that would, under normal use conditions, effectively control that weed population (HRAC, 2007). Through evolutionary selection, plants susceptible to the herbicide die, while those few having some type of natural resistance survive and reproduce without competition from the susceptible plants. Through repetition of this process across generations of plants, resistance of a significant portion of a weed population can survive and spread.

The application of herbicide to the plant does not, itself, cause a mutation in later generations of the plant. Rather, over time, those few plant biotypes that are not susceptible to the herbicide overtake those which are. There are four main avenues by which a weed species is resistant to an herbicide. The first and most common mechanism is an alteration in the plant at the site of the herbicide's action. Resistant weeds simply do not react to the herbicide in the same way the majority of the weed population previously did. Second, resistance may also occur through a plant's enhanced metabolism of an herbicide (whereby the plant "overproduces" the target enzyme, protein, etc. to such an extent that the application of an interfering herbicide does not harm the plant). Third, resistance may occur due to reduced absorption and translocation of the herbicide in the weed biotype (i.e., by either physical or chemical means, the herbicide does not reach the target site where it induces the toxic response). Finally, a fourth mechanism of resistance to glyphosate is an increase in the number of copies of the gene responsible for resistance.

For some herbicides, such as acetolactate synthesis (ALS) inhibitors, a single amino acid change in the plant can result in virtual immunity to the class of herbicides. This has led directly to the preponderance of resistant weed species for this mode of action, with 95 weed species identified to date worldwide that now show resistance to ALS herbicides (Weed Science, 2008).

Other factors, such as a long soil residual activity, which exposes plants to the herbicide for a long period of time, and a high effective kill rate for a wide range of weed species, which rapidly depletes the susceptible genes from the population, leaving only the resistant weeds, can also increase the likelihood of resistance (Prather, 2000). Additionally, the density of weeds can impact the probability of herbicide-resistant plants in the population – the higher the weed density, the higher the chance that some resistant plants will be present.

Herbicide-resistant weeds are not new phenomena. In 1957 in Hawaii, the first herbicide resistant weed was identified, a spreading dayflower resistant to the synthetic auxin 2,4-D (Heap, 2007). There are currently 119 weed biotypes in the U.S., 38 weeds have biotypes that are resistant to ALS herbicides and 23 weeds are resistant to triazine herbicides, while thirteen weeds have developed biotypes resistant to glyphosate in the U.S. (Heap, 2007). An international survey of herbicide-resistant weeds has identified 317 resistant biotypes in 183 weed species worldwide. [Footnote 1: http://www.weedscience.org/in.asp] In fact, all weed populations probably contain individual plants (biotypes) which are resistant to some herbicide (HRAC, 2008).

Interestingly, herbicide resistance did not evolve as early as did resistance to insecticides or fungicides (chemicals designed to kill insects and fungus, respectively). This delay has been attributed to characteristics of plant life cycles and genetics, among other factors. The appearance of herbicide resistance is increasing exponentially, mirroring earlier resistance trends seen in insecticides and fungicides (Prather, 2000).

Weeds, even more so than many other plants, contain an enormous amount of genetic diversity that allows them to survive under a wide range of environmental conditions (Prather, 2000). Given this genetic diversity, it is not surprising that a slight genetic mutation could occur in the site of action for a particular herbicide. Weeds possess other traits that promote resistance, as well, such as a high rate of seed production, and relatively early seed germination (Prather, 2000). These traits, combined with continuous selection pressure from a specific herbicide or herbicide family (with a common mode of action) can lead to the development of resistance.

Because the development of herbicide resistance is essentially the spreading of a resistant trait to more and more resistant offspring, resistance within a weed population can be mitigated by the early control of any individual resistant weed plants. Resistance problems usually go undetected until about 30 percent weed control failure is observed for a particular species (Prather, 2000). These control methods include a variety of farming practices, which should also be considered when evaluating the risk of developing herbicide resistance (HRAC, 2007). Even taking all of these factors into account, however, most experts agree that the development of weed resistance cannot be accurately predicted (HRAC, 2008).

The same farming methods used to minimize the risk of herbicide resistance can also be used to mitigate resistance once it has been found. Most cases of herbicide resistance involve a single mutation or modification that affects either a single herbicide or a single mode of action. Plants resistant to any herbicides using a common mode of action are said to have "cross resistance." Using two herbicides with different modes of action to target the same weed will significantly reduce the odds of developing weed resistance to either or both herbicides.

Attacking a weed via different modes of action can be achieved in several ways, including tank mixtures, rotating herbicides between seasons or using multiple herbicides in sequence on the same crop (Gressel and Segel, 1990; Beckie, 2006). Tank-mixing involves mixing two or more herbicides in the spray tank immediately prior to application of the herbicides to the field or target. Alternately, a grower may use one herbicide mode of action to "burn down" or kill the weeds in the field before planting, and another herbicide mode of action "in-crop" (i.e., on the crop) after it has been planted.

Weeds, including herbicide-resistant weeds, can disseminate by wind, water, animals and man (Weed Control, 1971). Gene flow through pollen or seed movement from herbicide resistant weed populations can provide a source of herbicide resistant alleles in non-herbicide resistant populations or fields (Beckie, 2006).

It is nearly impossible to completely control the spread of herbicide resistance through pollen flow or weed seed movement by natural agents such as wind. In fact, seed movement has the potential to influence herbicide resistant gene spread on a much larger scale than pollen flow (Beckie, 2006). Preventive measures can be implemented to reduce movement or spread of herbicide resistant weed seeds, but they are not expected to prevent movement altogether. Some of the preventative measures growers can adopt to help prevent this spread include: planting weed-free seed; cleaning equipment used for tilling, leveling and harvesting when moving from field to field; covering grain trucks; applying composted manure versus fresh manure; and mowing to control weeds along fence lines, ditches, headlands, roadsides, and irrigation canals.

Table 1 lists the practices or farming options that may have an impact on the development of an herbicide-resistant weed. The Herbicide Resistance Action Committee

(HRAC) has assigned a level of risk (low, moderate, or high) to each farming practice, depending on how each practice is performed (HRAC, 2008); however, no single agronomic practice will mitigate resistance for all herbicides or all weeds. As a result, weed resistance needs to be managed on a case-by-case basis and tailored for the particular herbicide and grower needs.

Table 1. Assessment of the Risk of Resistance Development per Target Species - Cropping System Evaluation (Comment Number: APHIS-2007-0044-7620.4-2)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6. APHIS has evaluated the suggested references and included them in the FEIS where appropriate.

Comment Excerpt Text:
The practical consequences to the farmer of the development of any herbicide-resistant weed biotype include the need to use an additional herbicide or take other cultural control measures (e.g., tilling, hand weeding) to control the resistant weed, the cost for the additional herbicide or other measures, and reduced flexibility for the grower. However, the herbicide is rarely ever made obsolete because of resistance. Only under exceptional circumstances has resistance become a limiting factor for crop production. Even in those cases, production limitations exist only on a local basis within a country or region (e.g. some locations in Australia with resistant Lolium rigidum or a few in Europe with resistant Alopecurus myosuroides) (HRAC, 2008). Generally, there are sufficient alternative herbicides and cultural control measures to ensure that resistant weeds are effectively managed.

Effective control programs such as those listed above would be similarly effective in slowing the movement of resistant weeds to non-crop ecosystems (such as fence lines or roadsides). It could be expected that other weed control measures, such as mowing, would also be used in crops such as alfalfa and in non-crop ecosystems in order to control weedy species. Use of a cultural method of weed control in the non-crop ecosystem would aid in limiting the growth and reproduction of weedy species, including a potentially herbicide-resistant weed biotype.

It is important to remember in the context of crop and non-crop ecosystems that a weed species' herbicide-resistant phenotype is not thought to have any particular positive effect on the weed's fitness in the absence of the herbicide to which it is resistant. In other words, if the herbicide to which it is resistant is not present, such a weed biotype would have no advantage against other biotypes of weeds of the same species for light and nutrients. In fact, a reduction in fitness has been found with some herbicide-resistant weed species (Neve, 2007). A reduction in fitness of an herbicide-resistant weed species, coupled with no use of the selective herbicide in a crop or non-crop ecosystem, would likely result in the decline of that particular weed biotype within the weed species. (Comment Number: APHIS-2007-0044-7620.4-4)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6.

Comment Excerpt Text:
Glyphosate has been in widespread commercial use since it was first registered by EPA in 1974. Glyphosate acts as an EPSPS inhibitor, interfering with a plant's synthesis of the amino acids tryptophan, phenylalanine and tyrosine. EPSPS proteins catalyze the transfer of the enolpyruvol group from phosphoenol pyruvate (PEP) to the 5-hydroxyl of shikimate-3-phosphate (S3P), thereby yielding inorganic phosphate and 5-enolpyruvylshikimate-3-phosphate (Alibhai and Stallings, 2001). Because of the stringent specificity for substrates, EPSPS enzymes are known to bind only PEP and glyphosate, and the only known metabolic product produced is shikimic acid-3-phosphate, the penultimate product of the shikimic acid pathway.

Target site alteration is a common resistance mechanism among many herbicide classes, such as ALS inhibitors and triazines, but is less likely for glyphosate. For this class of herbicides, the mode of action is the interference of a critical metabolic process in the plant by binding to a

target protein and disrupting the required function. The “specificity” of this interaction is critical for the opportunity to develop target site mediated resistance. Because the herbicide contacts discreet amino acids during protein binding, changing one of these contact point amino acids can interrupt this binding.

Specificity of inhibitor binding is dependent on the number and type of the amino acids serving as contact points and can be measured indirectly by counting the number of unique compounds that can bind in the same site.

One extreme are target enzymes that are efficiently inhibited by a wide array of compounds, e.g., ALS and acetyl CoA carboxylase (ACCase) are inhibited by over 50 and 20 separate herbicide compounds, respectively, that bind both within and outside the active site (HRAC, 2002; Trannel and Wright, 2002), respectively. These cases demonstrate that numerous non-critical amino acids are involved outside of the active site, offering a relatively large range of permissible mutations. In these two cases, a single amino acid change can result in virtual immunity to the class of herbicides and has directly led to the preponderance of resistant weed species for these mode-of-actions, with 93 and 35 species, respectively, identified to date for ALS and ACCase herbicides.

In contrast, glyphosate binds only to the key catalytic residues in the active site. Very few selective changes can occur near the active site of the EPSPS enzyme without resulting in fatal or serious damage to the plant. This level of damage generally would not allow a plant to survive to pass on resistance. Following plant mutations, another method of herbicide resistance mentioned above is an enhanced metabolism of the herbicide. The lack of glyphosate metabolism or significantly slow glyphosate metabolism has been reported in several species and reviewed in various publications (Duke, 1988; Coupland, 1985). This characteristic of glyphosate makes resistance via this mechanism unlikely.

Many glyphosate-resistant weed species currently identified have shown some degree of reduced translocation of glyphosate within the plant, and this is hypothesized to be the primary way in which a weed species could become resistant to glyphosate. Weed resistance to other herbicides caused by reduced translocation of the herbicide have been reported in other non-glyphosate herbicide-resistant weed species. However, these cases have been much less common than weed resistance caused by a change at the target-site enzyme in weeds. Extensive use of glyphosate may lead to the development of additional glyphosate-resistant weed species. However, with reduced opportunities for weeds to become resistant to glyphosate via two of the possible four mechanisms utilized by herbicide-resistant weed biotypes, weeds remain less likely to become resistant to glyphosate compared to some other herbicides for which weed species have demonstrated the ability to develop resistance via target site and enhanced metabolism.

Table 2 shows the weed species in which glyphosate-resistant biotypes have been identified. The number of weed species that have developed resistance to glyphosate is low in comparison to the substantial acreage treated worldwide. These glyphosate-resistant weed biotypes are controlled in the same way as are other herbicide resistant weed biotypes – through the use of alternative herbicides and/or cultural methods of weed control, such as tillage or crop rotation (Steckle and Breeden, 2004).

Table 2. GLYCINE (G/9) RESISTANT WEEDS (Comment Number: APHIS-2007-0044-7620.4-6)

Response: APHIS acknowledges the comment. In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response to comment APHIS-2007-0044-9936-19 for Issue 3.6. APHIS has evaluated the suggested references and included them in the FEIS where appropriate.

Comment Excerpt Text:
As a non–selective herbicide, glyphosate cannot be used directly (or "in–crop") on a conventional crop to kill weeds without killing the crop itself. The development of crops bred to be glyphosate–resistant has allowed glyphosate to be sprayed in–crop for the first time. This has led to more widespread use of glyphosate, which invariably increases the potential for the development of weed resistance.

The glyphosate–resistant trait in a glyphosate–resistant crop has no effect per se on the control of weeds. From a weed resistance standpoint, the use of a specific herbicide with an herbicide–resistant crop is no different than the use of a selective herbicide in a conventional crop. In fact, of the 16 currently confirmed glyphosate–resistant weeds globally, at least five of these biotypes occurred in areas where no glyphosate–resistant crop was grown (Heap, 2007). (Comment Number: APHIS-2007-0044-7620.4-7)

Response: APHIS acknowledges this comment. In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response to comment APHIS-2007-0044-9936-19 for Issue 3.6.

Comment Excerpt Text:
I do care about GE contamination. Consider that Glyphosate-resistant pigweed first turned up in late 2004 in Macon County, Georgia, and has since spread to other parts of Georgia as well as to South Carolina, North Carolina, Arkansas, Tennessee, Kentucky and Missouri. An estimated 100 000 acres in Georgia are severely infested with pigweed and 29 counties have now confirmed pigweed resistance to glyhosate, according to weed specialist Stanley Culpepper at the University of Georgia. In 2007, 10 000 acres of glyphosate-resistant pigweed infested land were abandoned in Macon County. (Comment Number: APHIS-2007-0044-7670-2)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6.

Comment Excerpt Text:
StatementNovember 2009 The Draft5 Impact states "Thus, we conclude that the increased use of glyphosate does not guarantee an increase in glyphosate-resistant weeds and even with some potential for an increase in glyphosate-resistance weeds, there is no data to confirm such a

potential increase in glyphosate-resistant weeds would amount to a significant effect on the environment."
ISIS disagrees there are data confirming potential increase in glyphosate resistant weeds and there are data showing that such resistant weeds will profoundly affect the environment by causing a shift in weed species and in effecting crop yield and/or management costs.
Both the Monsanto corporation and USDA are guilty of promoting band aid solutions involving use of ever increasingly toxic herbicides to resistant weeds and feral volunteer glyphosate resistant crops. More study in the genetic basis pf resistant weeds and means of coping with feral resistant alfalfa is required.
The enlosed article 'Glyphosate Resistant Weeds" provides the references overlooked by USDA that provide evidence disagreeing with the USDA conclusions. This commentary is number 44 of ISIS' submission to the USDA on requests for non-regulated status for transgenic crops .
(Comment Number: APHIS-2007-0044-9264-1)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6.

Comment Excerpt Text:
Before 1996, weeds were not observed to have evolved resistance to glyphosate in the field, but since then, the introduction of transgenic glyphosate tolerant crops has led to evolution of a number of resistant weeds as the result of the greatly increased use of the herbicide particularly during the post-emergent growth of the crops. Glyphosate reisistant Asiatic dayflower (Commelina cumminus L) common lambsquarters (Chenopodium album L) and wild buckwheat (Polygonum convolvulus L) are reported to be increasing in prominence in some agro ecosystems as are populations of horseweed (Conyza canadensis (L) Cronq) [Footnote 1: Owen MD, Zelaya IA. Herbicide-resistant crops and weed resistance to herbicides. Pest Manag Sci. 2005, 61(3), 301-11].
In regions of the USA where transgenic glyphosate resistant crops dominate, there are now evolved glyphosate-resistant populations of the economically damaging weed species Ambrosia artemissifolia (rag weed), Ambrosia trifida L.(great ragweed), palmer pigweed (Amaranthus palmeri), common water hemp (Amaranthus rudis) , rough fruit amaranth (Amaranthus tuberculatus) and various Conyza (horse weed) and Lolium (rye grass) species. Likewise, in areas of transgenic glyphosate resistant crops in Argentina and Brazil, there are now evolved glyphosate resistant populations of Johnson grass (Sorghum halepense) and Mexican fireplant (Euphorbia heterophylla) [Footnote 2: Powles SB. Evolved glyphosate-resistant weeds around the world: lessons to be learnt. Pest Manag Sci. 2008, 64(4), 360-5.]. These herbicide resistant weeds pose a clear threat to the transgenic crops dominating North and South America [Footnote 3: Sheridan ,C. Reprot blames GN crops for herbicide spike, downplays pesticides reductions. Nature Biotechnology 2010, 28, 112-13.]. (Comment Number: APHIS-2007-0044-9264-2)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6. The cited references were reviewed and included in appendix G of the FEIS as appropriate.

Comment Excerpt Text:
The evolution of glyphosate resistance among weeds that interfere with the productivity of crops is approaching catastrophic proportions. The evolutionary process leading to the resistant weeds has been described as a "transgenic treadmill" that renders current use of transgenic crops unsustainable. As current transgenic crops are rendered obsolete through weed resistance, the crops will be replaced with new transgenic varieties made available at higher prices to the farmers [Footnote 19: Cherry B. GM crops increase herbicide use in the United States. Science in Society 45 (in press).] (GM Crops Increase Herbicide Use in the United States , SiS 45) followed by another round of weed evolution to resistance (Comment Number: APHIS-2007-0044-9264-3)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6.

Comment Excerpt Text:
Post-emergence glyphosate use, however, associated with glyphosate tolerant crops, very significantly increases the risks of resistance evolution. Annual rotation with conventional crops reduces these risks, but the proportion of resistant populations can only be reduced to close to zero by mixing two of three post-emergence glyphosate applications with herbicides that have alternative modes of action. Weed species that are prolific seed producers with high seed bank turnover rates are most at risk of glyphosate resistance evolution. The model is especially sensitive to the initial frequency of resistance alleles, and other genetic and reproductive parameters, including weed breeding system, dominance of the resistance trait and relative fitness, influence rates of resistance. (Although these assumptions may be quite irrelevant in view of numerous physiological mechanisms of the 'fluid genome' that can produce resistant mutations in plants exposed to non-lethal levels of glyphosate, as discussed in [Footnote 5: Ho MW. GM crops facing meltdown in the USA. Science in Society 46 (to appear).] (GM Crops Facing Meltdown in the USA, SiS 46).
Over the past decade, the most problematic weeds in agronomic cropping systems have shifted away from perennial grass and perennial broad leaf weeds to primarily annual broadleaf weeds, although the glyphosate resistance mechanisms in weeds are currently poorly understood [Footnote 6: Johnson,W,Davis,V,Kruger,G,Weller,S Influence of glyphosate resistant cropping systems on weed species shifts and glyphosate resistant weed populations. European Journal of Agronomy 2009, 31,1 62-72.]. It appears that post-emergent use of glyphosate may be a main contributor to evolved glyphosate resistance, but eliminating post-emergent herbicide treatment practically eliminates all the advantages of and hence the need for herbicide tolerant crops. Evaluation of herbicide programs for the management of glyphosate-resistant waterhemp (Amaranthus rudis) in maize involved pre-emergent application with the herbicide glufosinate followed by a post-emergent treatment of the transgenic maize with glyphosate which controlled water hemp better than pre and post emergent treatment with glyphosate alone [Footnote 7: Legleiter T and Bradley K. Evaluation of herbicide programs for the management of glyphosate resistant water hemp in Maize.]Crop Protection 2009, 28, 917-22]. Maize growing in the EU27 increased to over 13 million ha in 2007, most of which (>80 percent) grown in just eight countries (France, Romania, Germany, Hungary, Italy, Poland, Spain and Bulgaria). The number of herbicides used to control the wide spectrum of weeds occurring in all these countries is likely to decline in the future, and care need to be taken to manage potential weed shifts to more

difficult-to-control species and to reduce the risk of selection for glyphosate resistant weeds [Footnote 8: Dewar AM .Weed control in glyphosate-tolerant maize in Europe. Pest Manag Sci. 2009, 65(10), 1047-58.].
In 2002, a glyphosate resistant Johnson grass (Sorghum halepense) appeared in Argentina and now covers at least 10 000 ha. The introduction of novel genetically modified crops promoted the use of more herbicides. This in turn reinforces the emergence of herbicide-resistant weeds, constituting a new phenomenon of intensification, the “transgenic treadmill" [Footnote 9: Binimelis R, Pengue W, Monterrosom I.‘‘Transgenic treadmill”: Responses to the emergence and spread of glyphosate-resistant johnsongrass in Argentina Geoforum 2009,in press doi:10.1016/j.Geoforum.2009.03.009]. (Comment Number: APHIS-2007-0044-9264-4)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6. The cited references were reviewed and included in appendix G of the FEIS as appropriate.

Comment Excerpt Text:
ISSUE FOUR Weed seed transfer

The transfer of weed seed across the country is a very serious problem. State and Federal seed laws try to restrict the transfer of weed seed via crop seed. Large seed, like corn and bean seed is usually not much of a problem because weed seed is usually small and can be screened out easily. Alfalfa seed, however, is small like most weed seeds and seed laws allow for rather high amounts of weed seed in alfalfa. Certified alfalfa seed is allowed to have as much as 0.2% common weed seed, very small amounts of restricted weed and no noxious weed seed. Nevertheless, there could be a small amount of noxious weed seed in a lot of seed because only a 50 gram sample of seed is checked to determine the presence of noxious weed seed.

If glyphosate is widely used with RR alfalfa seed production, the glyphosate will kill the weeds that are highly susceptible. At the low rates that are allowed on RR alfalfa, any weed that has resistance or some tendency to have resistance will survive. The prodigy of these plants will likely develop higher levels of resistance to glyphosate.

Alfalfa seed production takes a full season with no forage cutting so the glyphosate resistant weeds will have the chance to mature and make seed that will be harvested with the alfalfa seed. Seed cleaning will not clean out the glyphosate resistant weed seed but some seed lots might still be able to pass the 50 gram test. These seed lots will then be shipped across the country and distributed to alfalfa forage growers for planting.

Farmers that are using RR corn, soybeans, and other RR crops and consider this technology an important tool in their operation should be very concerned about the spread of weeds that are resistant to glyphosate. RR alfalfa seed will likely spread glyphosate resistant weeds rapidly throughout all of the locations where RR alfalfa might be used. (Comment Number: APHIS-2007-0044-9537-4)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6.

Comment Excerpt Text:
I am a professional involved in ecological restoration and management work, and because of this, I have great reservations about the request to release glyphosate-tolerant alfalfa for general use without regulatory restriction.
While I occasionally use herbicides, including Roundup and post-patent glyphosate products in my work, I generally restrict the use to spot or wick applications directly to the target species. Planting a glyphosate-tolerant crop, particularly a perennial species such as alfalfa, encourages broad-scale, broadcast application of the herbicide over many years, increasing its use and contamination of the environment.
It also increases the probability of weeds developing glyphosate resistance, including perennial analogs of alfalfa in the legume family, such as birdsfoot trefoil, crown vetch, and non-native clovers, which are already difficult to control in natural areas. Alfalfa itself occasionally is a problem in natural areas, and a glyphosate-resistant strain could prove more problematic to control. There is also the possibility where a bacterial or viral vector could transmit the glyphosate-resistance gene across the species barrier, particularly in closely-related species such as legumes, which are very difficult to control in fire-managed natural areas such as prairies or savannas.
The encouragement of transgenic perennial species with herbicide resistance to in a crop that is generally managed without heavy herbicide use will increase herbicide resistance among weeds, potentially create a highly invasive superweed, and potentially lead to the future use of a more toxic, persistent herbicide as glyphosate, a relatively more benign product, becomes ineffective. Therefore, I urge the Department of Agriculture to reject this application for non-regulated status for glyphosate-resistant transgenic alfalfa. (Comment Number: APHIS-2007-0044-9812-1)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6. In regard to hortizontial gene transfer see response to comment number APHIS-2007-0044-11018-2 for issue 11.16. In regard to the potential for escape and spread of GT feral alfalfa, several other herbicides could be used to control the occurrence of escaped GT alfalfa. appendix H discusses how alternative herbicides, mechanical removal, and spot burning are possible alternative control strategies for glyphosate resistant weeds.

Comment Excerpt Text:
Although one of APHIS's proposed scoping questions (especially #8) addressed issues related to the likely increase in Roundup-Resistant weeds, and associated environmental impacts, the EIS did not address it significantly. The economic impact of such increases and environmental impacts on alfalfa growers has not been properly studied. (Comment Number: APHIS-2007-0044-9882-17)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6.

Comment Excerpt Text:
The EIS fails to analyze the potential acceleration in the development of Roundup resistant weeds. Widespread adoption of Roundup Ready technology in corn and soybeans has led to increasing problems with Roundup-resistance. Widespread planting of Roundup Ready alfalfa will worsen this problem, especially where alfalfa is used in rotation with other Roundup Ready crops. Increasing Roundup resistance will lead to use of herbicides with relatively greater environmental impacts, and to increased costs for both adapting and non-adapting farmers. (Comment Number: APHIS-2007-0044-9882-8)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6.

Comment Excerpt Text:
Increasing glyphosate-tolerant crops systems can and will increase the instances of glyphosate-tolerant weeds, causing farmers to use more toxic herbicides than the glyphosate that is currently available to them. As discussed in separately submitted CFS comments, weed resistance to glyphosate is well documented. Weed resistance is an increasingly expensive and environmentally harmful problem faced by US farmers. However, APHIS' discussion of this increased cost to farmers is also inconclusive.

USDA admits that GT alfalfa will require more toxic herbicides like 2,4-D and dicamba for taking out old stands. (DEIS at 66). Yet, the DEIS is silent on the cumulative effects of the increased use of more toxic pesticides in response to weed resistance to glyphosate. As more weeds become resistant to glyphosate, this so called "environmentally friendly" herbicide will no longer be available for farmers and landscapers. They will be forced to use more toxic herbicides and destroy many of the benefits of alfalfa growing.

Monsanto and weed scientists are well aware of the problem of weed resistance caused by these glyphosate-tolerant crop systems and are advising farmers to employ non-glyphosate herbicides (preemergence, residual herbicides; tank mixes) to control and forestall the further spread of glyphosate-resistant weeds. For instance, paraquat and 2,4-D are recommended in addition to glyphosate to control GR horseweed and Pigweed. [Footnote 64 Laws, F. (2006). "Glyphosate-resistant weeds more burden to growers' pocketbooks," Delta Farm Press, November 27, 2006, http://deltafarmpress.com/news/061127-glyphosate-weeds/. For an overview of recommendations by weed scientists and Monsanto for controlling and/or forestalling GR weeds, see: FoEI-CFS (2008). "Who Benefits from GM Crops? The Rise in Pesticide Use," Friends of the Earth International-Center for Food Safety, January 2008, Section 2.3. http://www.centerforfoodsafety.org/pubs/FoE%20I%20Who%20Benefits%202008%20-%20Exec%20Sum%20FINAL.pdf]. And, glyphosate-tolerant crop systems promote the creation of new herbicides. Monsanto recently announced the approval of a new herbicide for use on resistant weeds. Monsanto representative Kerry Overton stated that "[f]armers face a number of weed control challenges in cotton and soybean production." [Footnote 65 Agriculture Online, Monsanto Targets Resistant Weeds with New Herbicide, Feb. 2, 2010, available at http://www.agriculture.com/ag/story.jhtml?storyid=/templatedata/ag/story/data/1265129824811.

xml] On both crops, glyphosate based herbicides are heavily used. (See DEIS 171). This new herbicide formulation will provide improved control over the famed palmer amaranth, the dominant pigweed in the south. (DEIS at G-28). The glyophosate-resistant palmer amaranth is "the most competitive and rapidly growing species of pigweeds and can reach a height of six feet." [Footnote 66 For a detailed discussion of the significant impacts of glyphosate-resistant weeds, see the CFS Comments.] In sum, the cumulative impacts of increased herbicide use in GT alfalfa were not properly analyzed. (Comment Number: APHIS-2007-0044-9936-19)

Response: APHIS acknowledges that glyphosate use can result in the evolution of glyphosate resistant weeds. However, glyphosate resistant weeds are most likely to become prevalent under conditions that consistently exert the same selection pressures favoring glyphosate resistance. Several techniques are available to effectively rotate the selection pressures on weeds. These approaches can minimize shifts to glyphosate resistant weeds as well as reduce the emergence of new glyphosate resistant weeds. For example, as discussed in Section III.E.3 of the DEIS, Monsanto recommends that alfalfa can be rotated to grass crops (corn and cereal crops) or broadleaf crops. In addition, as mentioned in Section 4.2 of appendix G of the DEIS, Van Deynze et al. (2004) recommend that the best way to prevent weed shifts is to avoid using the same herbicide year after year, rotate herbicides and crops, and include nonherbicide strategies to control weeds.

In G of the FEIS, APHIS has added a discussion of glyphosate resistance developing in perennial analogs of alfalfa in the legume family, such as birdsfoot trefoil, crown vetch, and non-native clovers.
APHIS has updated Table 3-18, Section IV.B.5, appendix G text, Tables G-7, G-8, and appendix H-4 of the DEIS with current information from the Weed Science Society of America's reporting system at www.weedscience.com.

APHIS has also expanded its discussion of weed management strategies in appendix G of the FEIS.
APHIS has evaluated the suggested references and included them in the FEIS where appropriate.

APHIS has updated terminology in appendix G of the FEIS based on WSSA published definitions of resistant species and tolerant species (www.wssa.net). "Herbicide resistance" is defined as the inherited ability of a plant to survive and reproduce following exposure to a dose of herbicide normally lethal to the wild type. Weed scientists translate "dose of herbicide normally lethal to the wild type" as the rate listed on the EPA label for the herbicide (HRAC, 2009). "Herbicide tolerance" is defined as the inherent ability of a species to survive and reproduce after herbicide treatment. This implies that there was no selection or genetic manipulation to make the plant tolerant; instead, it is naturally tolerant. The terms "traditionally glyphosate-resistant" and "Historically Naturally Resistant" have been updated to "naturally tolerant."

Comment Excerpt Text:
Other crops genetically engineered for tolerance to glyphosate have been used safely on millions of acres for over a decade, and with new versions of biotech soybeans, corn and crop offering

"stacked" resistance, there is less risk than ever of glyphosate-resistant weeds forming – providing a steady stream of innovation is allowed to flourish.
As the first EIS prepared for a any commodity crop to date, the RR Alfalfa EIS, APHIS should share its extensive experience in assessing the potential risks of biotechnology-derived or "GE" plants. APHIS has the requisite expertise to assess all potential risks to health or the environment posed by GE plants, which USSEC growers has found compare favorably to plants developed through traditional breeding (indeed, through "no till" and gene-mapping for allergens, biotech soybeans show every sign of being better for the environment and safer for human health). Several reports from the National Academy of Sciences, the Council for Agricultural Science & Technology, and other scientific and regulatory bodies around the world, confirm that the process of genetic engineering does not raise unique risks, and has actually brought health and environmental benefits that were largely unforeseen. (Comment Number: APHIS-2007-0044-9968-5)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment.

3.7 Issue 3.7 – Unintended differences in GT alfalfa (yield)

Comment Excerpt Text:
I am a hay farmer in North Central Iowa. I live in a region that has been converted from native habitats of prairie and wetland to fence row to fence row, erosion prone monoculture plantings of GM crops. I am direly concerned about the prospects of Round-Up Ready (RR) alfalfa - the impacts that would have on the health and well-being of my neighbors, the farmers, their families, our local communities and economies. Big Ag bureaucrats do not stop to think about true environmental impact, soil health, sustainability of farm families and rural townships. Dollar signs drive this enterprise, not compassion. Studies show that nutritional value declines in GM crops; that the Cauliflower Mosaic Virus used in DNA recombination of RR crops is disruptive to the intestinal flora and reactivates other dormant pathogens in livestock; that the ability of RR legumes, of which alfalfa is, to fix nitrogen is compromised. This plays beautifully to those who profit on necessary chemical inputs to remediate compromised soil health. RR species have proven to be adeptly promiscuous in spreading their genetics, and if allowed will compromise all pure seed supplies of alfalfa in only a handful of years, and in turn put the entire organic dairy industry in jeopardy. As a conservationist, the statistics showing a five-fold increase in Round-Up usage at the introduction of a new RR crop is alarming. The surfactant in Round-Up has proven toxic to amphibians and pollinators, two integral components of healthy wetlands and prairies, their absence our Midwest canary in the coalmine. I am ashamed of my senators for such blatant disregard for the well-being of their constituents in their support of this movement, and consider their actions to be based on monetary gain, and egregious ad immoral. Their shameless promotion of GM organisms put us all in harms way and economically dependent on Big Ag. I stand against RR alfalfa. (Comment Number: APHIS-2007-0044-0362-1)

Response: In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for Issue 5.2. In regard to the effects of the cauliflower mosaic virus on livestock, appendix W of the DEIS discusses the transgene vector and cassette used in the development of GE alfalfa J101 and J163. The Cauliflower Mosaic Virus was not used in the development of these lines. In regard to the ability of GE alfalfa to have higher

promiscuity, no significant differences were detected regarding the flower number of morphology of GE alfalfa when compared with conventional alfalfa. In regard to the genetic engineering process and unintended plant traits including out-crossing rate, see response to comment APHIS-2007-0044-7620-38 for Issue 13.

In regard to increased glyphosate use, see the response to comment APHIS-2007-0044-0402-1 for Issue 6.3.

In regard to impacts on amphibians, see the response to comment APHIS-2007-0044-7268-2 for Issue 4.1.2. In regard to impacts on pollinators (bees), see the second paragraph of the response to comment APHIS-2007-0044-5338-1 for Issue 4.0. In regard to impacts on soil, see the responses to other more specific comments for Issue 3.6, Issues 4.1 through 4.4, and Issue 8.3.

Comment Excerpt Text:
Dear Sirs,
I have been using the Roundup technology since it appeared back in 1996 in RR soybeans. There are certain weeds that are more tolerant of glyphosate because of their physical structure(ie. leaf shape-size-cuticle thickness-lack of leaves-etc.), but as a whole, Rup does a very good job against most grasses a lot of broadleaf weeds that are present in our fields. We have had a field of RR alfalfa since before the planting moratorium and it has been the easiest field of alfalfa to keep clean we have ever planted. We spray it once a year to clean everything up and it is good for the rest of the season. The quality of hay is A1+ with fine stems--lots of leaves--high protein--and excellent feedability. We cannot expect Rup to do all of our herbicide work in all crops every year, but if the technology is managed correctly, it will do a tremendous job in alfalfa or any other crop that contains the Rup trait. Smart stewardship of this technology will allow us to continue to use it for years to come despite the presence of certain harder to kill tolerant weed types. Please bring RR alfalfa back to us so we can again use this affordable, effiecient, safe, eco-friendly, extremely GREEN technlolgy on our farms ad infinitum!!!! (Comment Number: APHIS-2007-0044-0494-1)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate use and terminology, see the response for comment APHIS-2007-0044-9936-19 for Issue 3.6.

Comment Excerpt Text:
Yield: If RR Alfalfa varieties are promoted to be higher yielding, I've yet to see it.
If I'm reading this University of California Variety trial correctly, only three of the top ten varieties were RR. And four varieties yielded less than dinosaur genetics (Cuff101). To the best of my knowledge, RR alfalfa varieties have offered no new improved characteristics since inception other than the RR gene. They appear to be nothing more than genetics of the 1980's and 1990's with the addition of the RR gene.
[See original comment for table - 2007-2009 YIELDS, UCD RR and Conventional Variety Trial. Trial planted 2/07/2007]
[See original comment for table - Stats from this trial (No Exps.):] (Comment Number: APHIS-2007-0044-0933-14)

Response: A summary of yield information is presented in Table 4-4 in Section IV.D.1 and Table K-8 in appendix K of the DEIS. That analysis indicates that there is no conclusive evidence on whether GT alfalfa presents higher or lower yields than non-GT alfalfa. As stated in Section 2.2 of appendix K of the DEIS, the lead researcher (Daniel Putnam) on the University of California, Davis studies cited by the commenter concludes that in general, the yield performance of GT alfalfa cultivars (as a group) are no different than what would be expected from similar conventional lines of equal fall dormancy characteristics. Appendix U of the FEIS has been updated to include additional yield data.

Comment Excerpt Text:
Unknown and Unintended Effects
Interesting recent research verifying earlier work suggesting that the simplistic notion that "one gene = one function", the basis of much of genetic engineering, is actually a myth is escalating the debate. "Evidence of a networked genome shatters the scientific basis for virtually every official risk assessment of today's commercial biotech products, from genetically engineered crops to pharmaceuticals.
What Increased Yield?
"GM chemical companies constantly claim they have the answer to world hunger while selling products which have never led to overall increases in production, and which have sometimes decreased yields or even led to crop failures" says Peter Melchett, Soil Association policy director. According to the report by the Soil Association, "The yields of all major GM crop varieties in cultivation are lower than, or at best, equivalent to, yields from non-GM varieties" [67]. (Comment Number: APHIS-2007-0044-0933-18)

Response: In regard to the genetic engineering process and unintended plant traits, see response to comment APHIS-2007-0044-7620-38 for Issue 13.

Comment Excerpt Text:
The presence of the RR gene, of itself, is well documented to reduce the uptake and physiological efficiency of essential trace mineral nutrients critical for plants, animals, and humans.
The only purpose for insertion of the glyphosate tolerant gene (RR gene) is to promote the additional use of glyphosate! Thus, the deregulation of glyphosate-tolerant alfalfa can not be properly established without the simultaneous evaluation of the impact of the glyphosate applied to the alfalfa on its entry into the food chain and environment [see attachments].
It should be recognized that there is nothing in the glyphosate-tolerant plant that operates on the glyphosate applied to the plant. The technology only inserts an alternative enzyme (EPSPS-II) not blocked by glyphosate in mature tissue. Thus, when glyphosate enters the plant, it is not selective; it chelates with a host of essential nutrient elements that influence nutrient availability, disease resistance, and the plants other physiological functions for the life of the plant or until it is exuded through the roots to accumulate in soil or groundwater. Glyphosate is a potent microbiocide toxic to N-fixing bacteria in alfalfa nodules and to other soil organisms important for nutrient access and uptake.

Glyphosate is not significantly degraded in most soils or the plant and accumulates for the life of the plant (for up to 6-8 years) to immobilize essential plant, animal, and human nutrients. Glyphosate is the most significant agronomic factor for wheat and barley head scab with its associated carcinogenic, estrogenic, and neural mycotoxins affecting animals and humans. Details and references in attached file. (Comment Number: APHIS-2007-0044-1699-1)

Response: Concerning the chelating action of glyphosate, see response to comment APHIS-2007-0044-9547-4, discussion of mode of action of glyphosate, for Issue 4.0. Regarding the nutritional value of GT alfalfa, see last paragraph in response to comment APHIS-2007-0044-0362-1 above in this section (Issue 4.4).
The FEIS appendix U, Section 3, includes an expanded discussion of glyphosate effects on nitrogen fixing bacteria.
US EPA uses a registration process to regulate the sale, distribution, and use of pesticides in order to protect health and the environment under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). Thus EPA can mandate label restrictions for protection of human health and the environment and is conducting a review of the registration of glyphoste-containing herbicides.
As noted in the response to comment APHIS-2007-0044-10966-13 for Issue 4.1.2, APHIS has expanded its discussion of the potential effects of glyphosate on wild plants, including threatened and endangered species, in the FEIS Sections IV.C.2 and IV.C.3 and in the FEIS appendix N.
As described in the DEIS Section IV.C.5, in general glyphosate has a low toxicity to animals. The FEIS expands the discussion of toxicity of glyphosate in combination with water-soluble surfactants to frogs and other amphibians in Section IV.C.3 and appendix N.

Comment Excerpt Text:
My wife Pat and I own Essay Haying and Trucking, LLC. We reside at Alliance, NE 69301. We are in the alfalfa growing and marketing business. We have 130 acres of pre-ban R.R. alf. This average produces 15% more tonnage than our 800 acres of traditional alf. Cost for production is 75% cheaper as roundup is costing us 10-11 dollars a/acre to treat, as other chemicals such as Valpar, Raptar, Pursuit & Chateau costs between 30-40 dollars a /case to treat! Next, roundup lasts us all season without re-treatments aother herbicides don't usually last all season because annual weeds come up at different times of the season.
Next, we feel roundup ready alf uses much less water because we aren't wasting water on weeds and grass that are undesireable to our customers. We now have water restrictions in place in our counties we raise [cut off]
Planting & Growing season. Even though tech fees for RR alf seed is expensed at maybe $125 per bag or $55 acre / 5 yrs = 11 per year tech fee we don't have to use $35 acre herbicide so it will be us back to use RR alfalfa.
Genetic engineering won't be available to maybe our product desirable or cheap food costs. (Comment Number: APHIS-2007-0044-1852-1)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment regarding the potential for increased yield under some conditions.

In regard to the relative costs of GT and non-GT alfalfa, see response to comment APHIS-2007-0044-0511-1 for Issue 5.0. appendix G the FEIS added information that weeds use valuable water resources and fields with fewer weeds have the potential to reduce water use.

Comment Excerpt Text:
The University of Nebraska Lincoln has conducted research that proves GMO crops actually yielded less than conventional crops. Yield results in corn from Ohio State University show conventional corn varieties out yielding GMO varieties. The Union of Concerned Scientists published a research paper that shows GMO crops yield less than the conventional crops.
The single most consistent increasing item associated with GMO crops is the cost of the seed. Depending on which GMO crop you examine, the seed costs have increased much faster than yields. In 1993 before GMOs, cotton seed was $45-$60 per 50 lb. bag. Today cotton seed only costs $697.19 per 280,000 (not 50 lbs.) seed count bag. To be fair the tech fee is only $412.20 per bag of the $697.19. The fungicide and insecticide seed treatment is $125 per bag. This seed treatment was not needed in 1993 before glyphosate was used year after year and damaged the soil to an extent that now opportunistic fungi and insects prohibit good emergence of plants without these seed treatments.
Seed corn was $60 - $80 per bag before GMO seed corn, today GMO seed corn is priced over $400 per bag. I could go on but I think you get the point. (Comment Number: APHIS-2007-0044-3395-3)

Response: In regard to GT alfalfa yield, see the response to comment APHIS-2007-0044-0933-14 for Issue 3.7.
The FEIS expands the discussion of glyphosate effects on soil microorganisms and opportunistic fungi in Sections IV.C.3 and IV.G.1 and Appendices J and N. Because specific sources are not cited regarding changes in soil from glyphosate that favor opportunistic insects, the comment cannot be evaluated.
In regard to seed costs, the FEIS expands the analysis of the impact of deregulation on the seed market.

Comment Excerpt Text:
The DEIS also does not adequately discuss if nitrogen fixation is reduced in the seed produced when glyphosate tolerant varieties of alfalfa cross contaminate organic varieties of alfalfa. Although the glyphosate tolerant trait has benefits in an agricultural system reliant on herbicide, in the organic system where glyphosate is strictly prohibited, the glyphosate tolerant genes could have unintended consequences with negative impacts on the normal physiology of the cross contaminated alfalfa plant. Could cross contamination of glyphosate tolerant DNA into the gene pool of normal alfalfa cause decreases in yields, decreases in nitrogen fixing ability, and changes to secondary proteins that could affect the palatability of the crop and therefore value as forage? These questions are not addressed in the DEIS. (Comment Number: APHIS-2007-0044-6769-6)

Response: The petition submitted by Monsanto and Forage Genetics International has data comparing GT alfalfa to non-GT alfalfa. The PPRA in appendix W contains the agency's analysis of the data submitted in the petition. In regard to the question concerning adventitious

presence of glyphosate-tolerant DNA in non-GT varieties of alfalfa, there is no evidence that the presence of the GT allele has any effect on nitrogen fixation or palatability.
In regard to the genetic engineering process and unintended plant traits, see response to comment APHIS-2007-0044-7620-38 for Issue 13.

Comment Excerpt Text:
Socioeconomic Impacts of GT alfalfa

Regarding the narrow issue of comparative forage yield potential of GT and non-GT varieties, FGI agrees with the two statements in the DEIS that are outlined below, but also provides the following information and interpretations that APHIS may also note.

Item 1. Putnam (2008) notes that in general, the yield performance of GT alfalfa cultivars (as a group) are no different than what could be expected from similar conventional lines of equal fall dormancy characteristics. Moreover, he notes that there are differences between conventional varieties that are due to fall dormancy, and due to the superiority of individual cultivars within a dormancy group, but the range of variation observed in conventional cultivars is similar to the range of variation observed in GT cultivars (Putnam, 2008).

DEIS at 126.

FGI has had first-hand experience in the development and forage yield performance testing of all of the GT cultivars (varieties). FGI and multiple third-party researchers have compared them to numerous conventional lines with equal fall dormancy characteristics at multiple locations over multiple seasons. Many third-party state alfalfa test site yield trial data are published on the internet on a web site hosted by the North American Alfalfa Improvement Conference (NAAIC) (http://www.naaic.org/Resources/yields.html, accessed February 24, 2010). At least 19 of the published public tests compared one or more RRA varieties to one or more conventional alfalfa varieties under uniform, “conventional” (non-glyphosate) weed management conditions. State trial data has been published from Michigan, Kansas, South Dakota, New York, Minnesota, Kentucky, New Mexico, Washington, Wisconsin, California, Iowa and Colorado. Use of glyphosate in these mixed trials would have killed or severely damaged any non-GT varieties. These “conventional” trials allow the comparison of the innate genetic yield potential of all varieties under only a non-glyphosate herbicide weed control system. These data collectively confirm the statement of Putnam (Item 1). In addition to these data, APHIS has previously reviewed controlled, comparative, phenotypic assessment data and has concluded that vegetative growth and plant vigor (i.e., forage yield) of the GT alfalfa lines are similar to their non-transgenic control lines (Rogan and Fitzpatrick, 2004). DEIS, App. W at W-7.

In Table 4-4 of the DEIS at page 126 and Table K-8 at appendix K, page K-13, the yield data of GT and non-GT varieties is presented. It should be noted that this is a subset of the published public data, that yield potential comparisons may be confounded by variety differences in fall dormancy, and that there are limited statistical differences between entries. For these reasons, the data in Table 4-4 need not be conclusive or necessarily closely supportive of FGI and public scientists’ experience that, when managed with non-glyphosate weed control, “there are

differences between conventional varieties that are due to fall dormancy, and due to the superiority of individual cultivars within a dormancy group, but the range of variation observed in conventional cultivars is similar to the range of variation observed in GT cultivars." DEIS at 126.

Five other public variety trials were published on the NAAIC web site (Wisconsin and Oklahoma). These state trials compared the yield of a set of GT alfalfa varieties (only) under (1) non-glyphosate and (2) glyphosate weed control systems. At all locations, in all years, yields were consistently numerically greater for glyphosate treated plots compared to other herbicide treatments. Numerous commercial hay growers have publicly commented and RRA grower survey data support that, under producer conditions, the actual forage yield on GT varieties using glyphosate as a primary tool for weed control has been highly satisfactory and or greater than that expected for non-GT varieties under other weed control management systems.

Item 2.

With respect to quality, conventional alfalfa hay varies in terms of weed content, and so it is difficult to make direct comparisons between GT and conventional alfalfa hay from a weed content standpoint. Putnam (2008) argues that while the relative weed-free nature of GT alfalfa tends to give it an edge in terms of quality over conventional alfalfa, one cannot systematically attribute higher quality to GT alfalfa over conventional alfalfa, since sometimes conventional weed control systems can be quite effective. However, Van Deynze et al. (2004), Dillehay and Curran (2006), and Rankin (undated) all report better weed control in GT alfalfa using the glyphosate weed management system, suggesting there is the potential for higher quality forage from GT alfalfa.

DEIS at 126.

The GT trait per se has no effect on pure alfalfa forage quality. High quality is attainable with either conventional or GT alfalfa varieties—if and when weeds are not present in the harvested forage. The presence of weeds in forage typically has a highly negative impact on feed quality of the harvested forage. To the extent that GT alfalfa allows the producer to achieve and maintain much better control of weeds in alfalfa compared to conventional methods of weed control, there may be higher forage quality of GT alfalfa. APHIS may note that Van Deynze, Dillehay and Curran and Rankin and others have determined improved forage quality in studies wherein glyphosate and non-glyphosate weed control treatments were applied. As described in the DEIS, it is challenging and costly to attain high levels of weed control and high quality alfalfa forage under many conditions. GT alfalfa used in combination with glyphosate can improve the likelihood and level of weed control in alfalfa. In general, many commercial GT alfalfa hay producers report improved weed control at a lower cost, less crop injury due to herbicides, lower weed content and higher forage quality of the hay harvested.

In addition, to these data, APHIS and FDA have previously reviewed controlled, comparative, compositional analysis assessment data and have concluded that pure GT alfalfa is not different from pure non-transgenic control alfalfa in studies where weeds were not present (Rogan and Fitzpatrick, 2004). DEIS, App. W at W-7. (Comment Number: APHIS-2007-0044-7620-35)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment.

Comment Excerpt Text:
In 2004, Monsanto and FGI submitted a petition for deregulation to APHIS, requesting a determination of nonregulated status for RRA, which has been genetically engineered to be resistant to glyphosate, the active ingredient in Roundup® agricultural herbicides. [Footnote 6: The glyphosate tolerance of RRA events J101 and J163 was imparted by the insertion of a 5-enolpyruvylshikimate-3-phosphate synthase ("EPSPS") gene from Agrobacterium sp. strain CP4 ("CP4 EPSPS") into the alfalfa genome. When alfalfa plants containing the inserted gene are treated with Roundup herbicide, the plants are unaffected since the continued action of the expressed tolerant CP4 EPSPS enzyme provides the plant's need for aromatic amino acids. See RRA Petition at 3. RRA varieties will be commercialized using a combination of two different CP4 EPSPS insertion events combined through a conventional breeding process. Id.] The deregulation petition included extensive information evaluating RRA's phenotypic characteristics, results of multiple field tests, and RRA crop compositional assessments. [Footnote 7: PPA regulations require that deregulation petitions contain, among other items: (i) a description of the biology of the nonmodified recipient plant; (ii) relevant experimental data and publications; (iii) a detailed description of the differences in genotype between the regulated article and the nonmodified recipient organism; (iv) a detailed description of the phenotype of the regulated article; and (v) field test reports for all trials involving the regulated article. 7 C.F.R. § 340.6(c).] Specifically, over the course of six growing seasons and using field test sites across the country, Monsanto and FGI collected RRA data on, among other things, (1) dormancy, germination, and emergence; (2) vegetative growth; (3) reproductive growth; (4) disease, insect, and abiotic stressor interactions; and (5) interactions with symbiotic organisms. RRA Petition at 99. These phenotypic characteristics evaluate whether there are any biologically meaningful differences between a biotechnology derived crop and the unmodified crop that suggest that the former may pose a greater plant pest risk than the latter. [Footnote 8: See 7 C.F.R. § 340.6(c)(4) (requiring that information be submitted to "substantiate that the regulated article is unlikely to pose a greater plant pest risk than the unmodified organism from which it is derived, including but not limited to: Plant pest risk characteristics, disease and pest susceptibilities, expression of the gene product, new enzymes, or changes to plant metabolism, weediness of the regulated article, impact on the weediness of any other plant with which it can interbreed, agricultural or cultivation practices, effects of the regulated article on nontarget organisms, indirect plant pest effects on other agricultural products, transfer of genetic information to organisms with which it cannot interbreed, and any other information which the Administrator believes to be relevant to a determination" as well as any other information the petitioner may have that indicates a regulated article may pose a greater plant pest risk than the unmodified recipient organism).]

The results of these extensive quantitative and qualitative assessments showed no biologically meaningful differences between RRA and non-GE alfalfa with respect to (i) dormancy and germination characteristics; (ii) reproductive characteristics; (iii) morphology and viability of pollen; (iv) mean seed yield, mean seed weight, and mean number of seeds produced per flower pollinated; or (v) forage composition. See RRA Petition at 254 (discussing conclusions of

phenotypic evaluation); Draft EIS at 12 (summarizing APHIS' risk assessment); id. at Ap. W (APHIS' risk assessment, independently evaluating data submitted in deregulation petition); id. at Ap. U (discussing the character and quality of glyphosate-tolerant alfalfa traits and the data categories evaluated for assessment of plant pest risk potential). Additionally, alfalfa populations containing either of the transformation events were no more susceptible to disease or insect pests than conventional alfalfa populations, and extensive evaluation of the history and characteristics of alfalfa in the U.S. confirmed that alfalfa has no relatives present in North America for hybridization.

In sum, this comprehensive evaluation showed that there are no biologically meaningful differences between alfalfa populations that contain events J101 or J163 and the non-transgenic alfalfa control or alfalfa reference variety populations. In other words, the genes inserted into RRA confer only a single trait – tolerance to the herbicide glyphosate – and do not confer any plant pest characteristics to alfalfa that would justify continued regulation by APHIS under the PPA. RRA Petition at 254. APHIS independently evaluated these data in its plant pest risk assessment and reasonably reached its preliminary conclusion that RRA poses no plant pest risk and should therefore be fully deregulated. See Draft EIS at 12 and 14 (concluding that "1) the two lines show no evidence of increased weediness compared to the non-transgenic control; 2) neither line exhibits increased insect or disease susceptibility; 3) the genetic sequences from plant pests inserted into the alfalfa lines do not pose a plant pest risk; and 4) neither line exhibits increased plant pest risk characteristics."); id. at Ap. W; see also 40 C.F.R. § 1506.5(a) (an agency can rely on information submitted by applicants, as long as the information is independently verified by the agency). [Footnote 9: Monsanto and FGI note that prior to issuing a final decision to deregulate RRA, APHIS must complete both the environmental review required by NEPA and determine that the alfalfa lines are unlikely to pose a plant pest risk under the PPA.] (Comment Number: APHIS-2007-0044-7620-7)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment that there are no biologically meaningful differences between alfalfa populations that contain events J101 or J163 and the nontransgenic alfalfa control or alfalfa reference variety populations..

Comment Excerpt Text:
Roundup Ready alfalfa provides growers the ability to achieve dependable, cost-effective, and unsurpassed
broad spectrum weed control, including species that adversely affect hay quality, value, and stand longevity,
with less risk of crop injury and shorter pre-harvest interval than most herbicides used in conventional alfalfa.
Production of high-quality, weed-free conventional alfalfa hay requires skillful management and timely
herbicide application. Some herbicides for conventional alfalfa must be applied only when the crop is dormant
(limited opportunity for application) and often do not provide season-long weed control. Most herbicides

registered for postemergent application to weeds in conventional alfalfa control only grass or broadleaf weeds.
And other postemergent herbicides that control both grass and broadleaf species are expensive (e.g., imazamox,
Raptor®) or pose risks to workers during mixing and handling (e.g., paraquat, Gramoxone Inteon®). The
Roundup Ready alfalfa system is simpler, allows greater flexibility in the timing of low-cost glyphosate
herbicide applications, and improves stand establishment and longevity. Collectively, these advantages lead to
greater yield of high quality hay and higher profitability over the life of the stand.
History has shown that near exclusive use of any weed management practice changes the floral spectrum of
weed populations over time. Repeated use of herbicides with the same mode-of-action can lead to populations
of species (biotypes) that are resistant to those herbicides. The potential for weed resistance to herbicides is
common to all herbicides; not just glyphosate. The processes leading to weed resistance are understood and
science-based stewardship recommendations are increasingly being practiced by farmers who understand the
importance of weed resistance management. (Comment Number: APHIS-2007-0044-7944-2)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment.

Comment Excerpt Text:
Detractors of the technology occasionally claim that there may be a yield drag with roundup ready alfalfa. The available data do not support this. Numerous University-conducted trials have shown that forage yield of many roundup ready varieties is not significantly different from the highest yielding varieties (IA, 2007; KS, 2007; KY, 2006; MI, 2007; MN, 2007 (multiple locations); NM, 2006; NY, 2007, SD, 2007; WA, 2007 (multiple trials); WI, 2007; UC Davis, 2006 (multiple trials)). Alfalfa variety trials are generally conducted as research at the Universities and the information is distributed by the Extension Service at that University. (Comment Number: APHIS-2007-0044-9720-8)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment. The NAAIC yield data has been added to appendix V4.3

3.8 Issue 3.8 – J101 and J163 transformation event details

No comments are associated with this issue.

4.0 Issue 4 – Biological Impacts

Comment Excerpt Text:
Scientist finding many negative impacts of Roundup Ready GM crops
GM Watch
Friday, 08 January 2010 13:52
http://www.gmwatch.org/index.php?option=com_content&view=article&id=11840:scientist-finding-many-negative-impacts-of-roundup-ready-gm-crops
What types of things are you seeing in the Roundup Ready system?
RK: "This system is altering the whole soil biology. We are seeing differences in bacteria in plant roots and changes in nutrient availability. Glyphosate is very systemic in the plant and is being released through the roots into the soil. Many studies show that glyphosate can have toxic effects on microorganisms and can stimulate them to germinate spores and colonize root systems. Other researchers are showing that glyphosate can immobilize manganese, an essential plant micronutrient."
What are glyphosate's impacts on beneficial soil bacteria?
RK: "The most obvious impact is on rhizobia, a bacterium that fixes nitrogen. It has been shown that glyphosate can be toxic to rhizobia. (Nitrogen fixing bacteria are important to soils because nitrogen is the most commonly deficient nutrient in many soils.)"
What about research showing increased incidence of Fusarium in Roundup Ready GM crops?
RK: "We've taken field surveys and seen an increase in Fusarium with the use of glyphosate. Some Roundup Ready varieties even without using glyphosate tend to be more susceptible to being impacted by Fusarium. It could be an unintended consequence of genetic manipulation that could make it more susceptible."
Your paper also mentioned the potential of glyphosate to contaminate groundwater.
RK: "Yes, under certain circumstances. The big assumption for claims that glyphosate is benign is that it isn't immediately absorbed by the soil. But research is showing that isn't necessarily true; that it is still available in the soil. If soil is full of phosphorous, glyphosate could leach into ground water. For example, farmers may use manure from confined animal feeding operations as a fertilizer. The soil will then contain high amounts of phosphorus, which overwhelms the soil. Any glyphosate that hits the soil will be a potential contaminant. It can stay in the soil or it might run off into streams or waterways."
What about glyphosate resistant weeds?
RK: "We have eight different species of glyphosate resistant weeds in Missouri. Some species of Johnson Grass are found in fields where Roundup is used year after year. It is a very aggressive weed. To solve the problem of weed resistance, genetic engineers are developing soybeans that tolerate Roundup and Dicamba, another herbicide. They are incorporating another gene resistant to another herbicide. When resistance happens again, will they then develop a plant resistant to five or six herbicides? It's an illogical circle." (Comment Number: APHIS-2007-0044-0933-7)

Response: The news article provided by the commenter does not include citations of actual studies.
Regarding the chelating properties of glyphosate and the plant nutrient manganese (Mn), the mode of action of glyphosate as an herbicide is inhibition of the shikimate pathway essential for biosynthesis of aromatic amino acids and other aromatic compounds (see DEIS section IV.C.4).

Within plants, glyphosate chelates Mn, which is a cofactor for the 5-enolpyruvylshikimate-3-phosphate synthase (EPSPS) enzyme in the shikimate pathway. While it is true that glyphosate can chelate manganese (Mn) and other cations, the experiments leading to the conclusion that micronutrients are immobilized in soils so that nutrient deficiencies result in plants appears not to be valid. Reduced efficacy of glyphosate as an herbicide is observed when it is tank mixed with fertilizers containing Mn, a limiting trace mineral in some regions of the United States (Johal and Huber 2009). The mixing of glyphosate with cations prior to spraying reduces its efficacy as an herbicide and reduces the availability of cations (e.g., Mn) in the tank mixture (http://www.css.msu.edu/varietytrials/corn/Cropping%20Systems/mngly.pdf). While Eker et al. (2006) have demonstrated that root-to-shoot transport of Mn and iron (Fe) from a nutrient solution is inhibited by pretreatment of the roots with glyphosate at 6 percent of the recommended application/concentration, the mode of action is unclear. Farmers can supplement crops with add sufficient quantities of the trace micronutrients in areas of the country where they are deficient to grow the crops. The presence of chelated micronutrients in fertilizer/herbicide mixing tanks prior to application is of no consequence to the nutritional value of forage to animals.

Regarding plants transporting glyphosate from leaves to roots where it may eventually be released to soil, section IV.G.1 of the FEIS now includes a discussion of the potential for this environmental pathway.
Regarding glyphosate effect on microbes in the soil, the FEIS includes an expanded discussion of glyphosate and nitrogen-fixing bacteria and other microbial communities in soils in sections IV.C.3 and IV.G.1 and appendices J and N.

Regarding potential pollution of groundwater, section IV.G of the DEIS cited studies that show that glyphosate does not move deep into the soil, nor is it transported at high levels to or through the groundwater, and does not persist long in soil. The half-life of glyphosate in soil laboratory studies is two days. In agricultural soils, the half-life of glyphosate ranges from 1.7 to 197.3 days, but is typically less than 60 days. Mineral soils facilitate adsorption of glyphosate to soil particles. As described in section IV.G.3.a of the DEIS, glyphosate can migrate to surface waters when erosion conditions lead to the loss of surface soil particles; however, deregulation of GT alfalfa would likely lead to an increase in conservation tillage and no-till systems, which would result in less soil erosion.

As discussed in response to comment APHIS-2007-0044-10966-7 for issue 4.1.2 (last paragraph), and section IV.C.4, IV.G.1 and appendix J section 2.2.2 of the DEIS, some studies (in USDA FS, 2003; Araujo et al. 2003) have shown an increase in microbial activity in soils subject to glyphosate application. While differential increases of certain bacterial populations may be associated with glyphosate application, these may be associated with increased degradation of glyphosate (Lancaster et al., 2009). The FEIS expands the discussion of glyphosate and plant susceptibility to disease in sections IV.C.3 and IV.G.1 and appendices J and N. Section IV.C.3 of the FEIS, includes discussion of Fusarium in soils for GT crops in particular.

In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for issue 3.6.

Discussion of tolerances to multiple pesticides is beyond the scope of this EIS.

Comment Excerpt Text:
Alfalfa provides important habitat for wildlife. The potential effects of Roundup Ready alfalfa feed on the health and productivity of livestock and wildlife have not been analyzed by independent scientists.
Over 130 species of birds visit alfalfa fields each year, including endangered species. The USDA failed to analyze the impacts on birds, insects, and other beneficial organisms.
Roundup is highly toxic to frogs at field-relevant concentrations.
(Comment Number: APHIS-2007-0044-2301-3)
Response: As discussed in section IV of the DEIS, APHIS did analyze impacts of GT (glyphosate-tolerant or Roundup Ready) alfalfa on the health and productivity of livestock (DEIS section IV.D.3) and wildlife (DEIS section IV.C.4) and concluded from the available studies that GT alfalfa is not nutritionally distinguishable from conventional alfalfa. The DEIS discussed possible direct impacts of GT alfalfa, including its pollen and seeds, on birds, insects, and other beneficial organisms in sections IV.C.1 and IV.E.2 (bees) and appendix O (bees). No evidence for adverse effects deriving from the weediness (no more weedy than nontransgenic alfalfa), changes in nutritional content, or from the expressed transgenic protein could be expected on health or behavior of these organisms.
The DEIS considered potential effects of increased use of glyphosate on wildlife, birds, insects, and other organisms in sections IV.C.2, IV.C.3, and IV.C.5 and appendix N. Potential risks to threatened and endangered species were summarized in section IV.C.2. Under some aerial glyphosate application scenarios, there is some possibility of drift into adjacent areas that may contain endangered or threatened species of plants. At high glyphosate application rates, some adverse effects could be expected within 250 feet of the sprayed fields. Label restrictions imposed by EPA on glyphosate use should mitigate those threats. As described in the DEIS, section IV.C.3, use of GT alfalfa with glyphosate for weed control may result in reduced use of more toxic and persistent herbicides in those areas where farmers are supplying markets that require weed-free alfalfa. An expanded discussion of risks to threatened and endangered species from increased use of glyphosate is included in the FEIS, section IV.C.2. The FEIS expands the discussion of toxicity of glyphosate and water-soluble surfactants to frogs and other amphibians in section IV.C.3 and appendix N.

Comment Excerpt Text:
Hello, please do not let round up ready alfalfa into the food chain.
I am against this product and do not want to eat food that has been genetically engineered. I especially do not want to have more of the food chain taking in round up.
This is out of control. Where does the USDA think all the millions of gallons of round up are running off to? - Our water supply, not to mention all the plants in the water (that fish eat) that are being killed by the round up. We need LESS chemicals in the environment, not more. The USDA should be protecting us from chemicals, not sanctioning their use and degrading the environment - and the population.
Thank you. Julian Catford (Comment Number: APHIS-2007-0044-5219-1)

Response: As stated in section IV.C.4 of the DEIS, deregulation of GT alfalfa could lead to an increase in the use of glyphosate overall in agriculture, although it might also lead to a reduction in use of more toxic and persistent herbicides. As a result, it is possible that more glyphosate could enter surface waters. The toxicity of glyphosate to aquatic plants is described in the DEIS in appendix N, section 4.4. Conservation tillage or no till in GT alfalfa fields could help to mitigate such impacts by reducing runoff to surface waters.
Contamination of the "food chain" with glyphosate is not a concern. As shown in table N-7 of the DEIS, glyphosate does not bioconcentrate in fish; in fact, glyphosate concentrations in fish remain less than those in water in the experiments conducted to date. In addition, as noted on page N-4 of the DEIS, U.S. EPA (2006c) also noted that studies with lactating goats, laying hens, rats, rabbits, and cows fed a mixture of glyphosate and its metabolite AMP indicated that there was very little transfer of residues from feed to animal tissues and no bioaccumulation. See the response to comment APHIS-2007-0044-0352-1 for issue 6.3 for further discussion regarding the toxicity of glyphosate.

Comment Excerpt Text:
With all that we know about the potential health and horticultural effects of pesticide use, it's unnecessary to be genetically re-designing crops in order to allow an herbicide manufacturer to increase usage of their own product. Glyphosate is not as non-toxic and degradable as is promoted by its manufacturers many studies have found this. With the awareness of the benefits to the environment and health of both humans and animals of organic and more sustainable agricultural methods, let's go forward, not backward. If we're going to pad someone's pockets, lets help an industry headed in a healthier direction, and not threaten their livelihood (crop interbreeding/unfair competition). I'm a concerned consumer and an organic gardener. It's possible to exist and grow without glyphosate. Invest in the promotion of knowledge, not already wealthy corporations (Comment Number: APHIS-2007-0044-5261-1)

Response: Because the commenter did not cite specific sources, the basis for the comments cannot be evaluated. However, as discussed in section IV.C.3 and appendix N of the DEIS, glyphosate has been found to be less persistent and less toxic to plants and animals than most of the other herbicides used on alfalfa.

Although not vulnerable to hydrolysis or photolysis, microbes in soils, surface waters, and oxic sediments degrade glyphosate quickly (metabolic half life of 1.85 to 2.06 days in soils and 7 days in a water-sediment system according to U.S. EPA, see table N-6 of DEIS). Field dissipation studies indicate half lives as short as 2.6 days in Texas, although as long as 140.6 days in Iowa, with the slower rates corresponding to colder climates (table N-6 of DEIS). Table N-7 of the DEIS compares values for parameters related to environmental fate of gylphosate with 20 other herbicides used on alfalfa. The half lives of glyphosate in various environmental media are generally comparable to or shorter than those for the other herbicides.

A comparison of the Environmental Impact Quotient (EIQ) developed by Kovach et al. (1992) for the New York State Integrated Pest Management Program (and updated annually) among herbicides is provided in appendix N, table N-48, of the DEIS. Table N-48 shows that the

ecological EIQ for glyphosate is lower than that for 16 of 18 other alfalfa herbicides and that the total EIQ for glyphosate, which also considers potential impacts on farm workers and consumers, is lower than the EIQ for all but one (EPTC) of the other 18 herbicides.

The FEIS includes an expanded discussion of toxicity of glyphosate and water-soluble surfactants to frogs and other amphibians in sections IV.C.4 and IV.C.5, and appendix N, and includes studies cited by the commenter.

In regard to fair/unfair competition among private companies in the agricultural industry, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0.

Comment Excerpt Text:
I'm writing to say that I once purchased meat from large-scale CAFO in my local grocery supermarkets. No longer do I purchase meat from these kinds of places. There are many reasons for this, but the one at hand today is the genetic modification of grains that are fed to animals.
-GMO fed animals produce potential unforeseen problems for generations of animals and humans that eat these animals.
-GMO feed limits the ability of small and large farms to compete unless they too use GMO feed for their livestock. In essence, forcing them to change their unique operation to one just like every other.
-This leads to Monsanto having control over the entire seed distribution business. Doesn't sound too competitive to me. It sounds like a monopoly.
-This will also mean the increased use of toxic pesticides, which is already a problem. See the Gulf of Mexico dead zone for details.
Please reconsider this EIS (Comment Number: APHIS-2007-0044-5264-1)

Response: Because the commenter did not cite specific sources, the basis for the comments cannot be evaluated. The subject of this EIS is the GMO glyphosate-tolerant (GT) alfalfa, which differs from conventional alfalfa only in the inserted gene and in the CP4 EPSPS protein. Sections III.B.4 and IV.E.2 of the DEIS discussed the study of Combs and Hartnell (2007) that found no negative effects of the CP4 EPSPS protein or gene consumption on the nutritional condition of dairy cattle, livestock, or poultry fed GT alfalfa compared with controlled alfalfa hay. In addition, no effects on bees, earthworms, or other nontarget organisms in the areas where GT alfalfa was planted in 2005 have been reported to Monsanto or to the FDA (see DEIS section IV.E.2).
In regard to seed market concentration, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0.
In regard to the impact on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.
In regard to the monopoly comment and the impact on seed market concentration, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0. The “dead” zone in the Gulf of Mexico is not attributed to pesticides. Scientists believe that it is the result of excess nutrients, nitrogen in particular, causing seasonal hypoxia (lack of oxygen). Fertilizer runoff in the Mississippi River drainage area reaches the Gulf in concentrations that favor algal blooms and then bacterial decomposition of dying algae and animals that feed on algae. The decomposing

bacteria consume oxygen to a level below that required to support animal life (Donner, SD, Scavia, D. 2007. Limnol. Oceanogr 52: 856-861 and Scavia, D, Donnelly, KA. 2007. Environ. Sci. Technol. 41: 8111-8117).

Comment Excerpt Text:
Please do not deregulate Roundup Ready Alfalfa. I want truly organic products and Roundup Ready will contaminate organic farming, dairy and meat with GMO's (Comment Number: APHIS-2007-0044-5269-1)

Response: See the response to comment APHIS-2007-0044-5264-1 for issue 4.0.

Comment Excerpt Text:
Dear USDA,
We are opposed to glyphosate-tolerant alfalfa. Our first concern is the negative impact this GMO-alfalfa will have on organic milk production. It will curtail effective organic production as the 10's of millions of organic consumers define it and expect it. This leads into our second concern, which is genetic purity and ownership. Pollen drift will be a huge issue. Bees pollinate alfalfa -- and they will not stay within one field. As a result, modified alfalfa pollen will mix with original public-domain strains. Given alfalfa is a perennial crop and a stand has variable aged plants, who owns the mixture of plants? The owner of the trait or the farmer who was the unintended recipient of the unwanted pollen on his/her volunteer plants? The legal record for such issues suggests traditional - and especially organic - farmers will be penalized to the point of being forced out of business. This is entirely inconsistent with USDA's 160 year-old national mandate.
Our final point is there are agronomic reasons to NOT release a GMO-version of this plant. Traditional alfalfa breeding as funded by USDA continues to result in significant increases in yield. The payoff is far more than in corn, say. Many farmers are not currently adequately fertilizing alfalfa for phosphorus, potassium and micronutrients. Those nutrients limit its yield -- not weeds. So, why modify it for a specific herbicide? Especially why modify it to handle a herbicide given alfalfa requires bees to pollinate it and increased reliance on a herbicide will result in an unintended reduction in bee viability. We realize in theory a herbicide has no impact on an insect. But the peer-reviewed literature shows herbicides consistently impact animals and the ecosystem. Isn't that why EPA regulates them? Finally, how will the subsequent crops be established? I guess deep fall plowing to eliminate volunteer alfalfa? Erosion will skyrocket!
(Comment Number: APHIS-2007-0044-5274-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. In regard to the burden of control measures, see response to comment APHIS-2007-0044-11689-10 for issue 9.0. In regard to economics, see response to comment APHIS-2007-0044-5274-1 for issue 5.0. In regard to ecosystem effects, see response to comment APHIS-2007-0044-5274-1 for issue 4.0.
With respect to bees, the herbicide glyphosate, which might increase in use with planting of GT alfalfa, is considered “practically nontoxic” according to EPA standards, as discussed in section III.B.2.a.6 of the DEIS. As quoted in appendix O, section 1.7, of the DEIS, after extensive

review of the available data, Giesey et al. (2000) stated "Honey bees are not affected by glyphosate formulations, either by ingestion or direct overspray, at maximum use rates." In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for issue 3.1.

While weeds can be tolerated in alfalfa stands grown on grazing lands, alfalfa grown to provide good quality hay for horses, cattle, and other livestock needs to be relatively weed free to ensure nutritional content (DEIS section IV.B.5). Alfalfa grown for hay to be transported and sold across state lines must be free of noxious weeds for some states (e.g., California) (DEIS appendix B, p. B-14). In addition, certain customers including the Bureau of Land Management and the US Forest Service also requires hay to be Certified free of noxious weeds when used in certain areas (DEIS appendix V).

Alfalfa is a perennial crop, and so new growth from established GT alfalfa in spring will provide the subsequent crop in most years. GT alfalfa with glyphosate spraying will reduce weeds, and therefore, the need for tillage and will allow more adoption of conservation tillage and no-till practices (DEIS section IV.G.1). Only once every four to six years or longer are alfalfa plants removed and the fields replanted with the same or other crops (DEIS section III.A.2.b).

Comment Excerpt Text:

Please stop the approval of any roundup ready seeds! Please protect our biodiversity and work for the people of this country, not the corporations! Please stop experimenting on all of us with GMOs (Comment Number: APHIS-2007-0044-5282-1)

Response: The protection of biodiversity is now addressed in the FEIS in sections IV.C.1 and IV.C.2 discussing potential impacts on threatened and endangered species. See response to comment APHIS-2007-0044-0868-1 for issue 4.1.

Comment Excerpt Text:

Please do not allow genetically engineered alfalfa to be approved. This will inevitably contaminate the organic produce that I purchase for my family, I steer clear of any products that contain any GE ingredients. This is especially important to my as some of my family have health challenges and it is well know that GE foods have been altered at the cellular level, and are no longer in the state that nature intended. This is NOT good for our bodies, our children's bodies, or developing babies bodies. This seems to be a very thoughtless and irresponsible consideration, to allow for alfalfa, of all important staples for our livestock, our dairy cows to be genetically modified. It seems to me that people are catching on to the fact that the more genetically engineered agriculture we have, dispite what they have been assuring us, there is even more pesticide, herbicide, fungicide and fertilizer application. This has proven to be disasterous to our environment and the future of healthy soil. We need our soil to be healthy if we expect a healthy field, garden or livestock.

WE DO NOT want genetically engineered alfalfa! Please, for the sake of our children, do not approve this request (Comment Number: APHIS-2007-0044-5302-1)

Response: APHIS acknowledges the comment and the market for GE-free foods among consumers of organic and other foods. Regarding movement of transgenes into organic crops,

our analysis of relevant information supports a different conclusion. As discussed in appendix V sections 5.5-5.11 of the DEIS, coexistence strategies (e.g. equipment sanitation, harvest management, field separation, contractual practices) can limit the occurrence of GE traits from non-GE alfalfa below seed certification thresholds (0.5 percent).

Regarding an increase in glyphosate use, see the response to comment APHIS-2007-0044-6240-2 for issue 6.0.

As discussed in the DEIS, section IV.C.3, increasing use of GT alfalfa and glyphosate for the“weed-free” markets for alfalfa is not expected to increase, and might possibly decrease, the overall environmental impacts from toxicity and persistence of herbicides used in agriculture. The FEIS includes clarification of likely changes in patterns of herbicide application with the deregulation of GT alfalfa in section IV.C.3.

Comment Excerpt Text:
I care deeply about providing the people of our nation with nurtious, healthy food, both to feed our livestock and for ourselves. GE crops are NOT healthy for the environment, the livestock or the people. I do not support the USDA in allowing Roundup ready alfalfa to be grown. It is a disgrace that our government lacks compassion for the health of the people of this nation that they would go as far as allowing this crop to be grown in the US.
GE crops DO NOT yield more crops per square acreage. They are not healthier for livestock or for the people. They do however, endanger crops that have had a long environmental history so much so that our heirloom varieties have a high chance of becoming extinct.
I am here to tell you that I DO NOT SUPPORT THE USE OF GE CROPS. It was a false statement that the USDA said that consumers don't care about contamination organic alfalfa and alfalfa-derived foods with Monsantos GE Roundup Ready alfalfa. I CARE. I SUPPORT ORGANIC FOOD (Comment Number: APHIS-2007-0044-5305-1)

Response: The commenter was not specific concerning how GE crops are not healthy; however, those issues in general were addressed in sections IV.C, IV.D.3, and IV.E of the DEIS.
Regarding productivity or yield of GE crops per acre of land and heirloom varieties of crops, the commenter did not reference specific sources and the DEIS addresses GT alfalfa only. See response to the comment APHIS-2007-0044-5305-1 for issue 5.6.
In regard to consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.
In regard to the health impacts of GE crops on livestock, see the comment APHIS-2007-0044-0362-1 for issue 4.4 (paragraph 1).

Comment Excerpt Text:
It is an oxymoron to assume that those who support organic farms and eat organic food do not care about genetically modified crops. GM crops allow for increased use of pesticides, and may drive other varieties of the same crop out of existence, all of which is contrary to the intent of the organic movement, which is to treat the earth as a sustainable resource, and which expects that the animals we eat have been fed in a way that has not harmed the environment by encouraging

more use of pesticides and contributing to a lack of genetic diversity in the food crops that feed the entire planet. GM crops benefit only the corporations who wish to reduce the world to beggary, and who seek to prevent farmers from growing and saving their own seeds. (Comment Number: APHIS-2007-0044-5315-1)

Response: APHIS acknowledges the comment; however, the DEIS addresses glyphosate-tolerant alfalfa and not all GM crops. The comment does not include specific references that can be evaluated. See also response to the comment APHIS-2007-0044-5315-1 for issue 5.6. The issue of reduced genetic diversity in food crops is outside the scope of this EIS. However, it is important to note that GT alfalfa *is not a monoculture crop. The transgene events can be crossed into the existing alfalfa cultivars. APHIS has added a discussion of the possible effects of GT alfalfa on the availability of regionally adapted varieties to appendix V.3.4.1 the FEIS.*

Comment Excerpt Text:
Please be thoughtful here! The bees are in trouble and there are major consequences to actions like this. Please listen to the inner workings of your heart - you know that it is right to do what will promote healthy and NATURAL growth on our tiny planet. Don't let another Genie out of the bottle... (Comment Number: APHIS-2007-0044-5329-1)

Response: APHIS acknowledges the comment. With respect to bees, the herbicide glyphosate, which might increase in use with planting of GT alfalfa, is considered "practically nontoxic" according to EPA standards, as discussed in section III.B.2.a.6 of the DEIS. As quoted in appendix O, section 1.7, of the DEIS, after extensive review of the available data, Giesey et al. (2000) stated "Honey bees are not affected by glyphosate formulations, either by ingestion or direct overspray, at maximum use rates."

Comment Excerpt Text:
I am against deregulation of RR alfalfa because: I am concerned that GE Alfalfa will have a different nutritional profile that will be detrimental to some animals. I am concerned that honey bees might be affected. I am concerned there won't be enough safeguards to protect farmers who produce their own seeds from contamination by GE alfalfa, and for protection from legal action by Monsanto if their seeds become glyphosphate resistant. Furthermore, I think weeds will become glyphosphate resistant eventually. And that releasing glyphosphate into the environment is harmful to amphibians. (Comment Number: APHIS-2007-0044-5338-1)

Response:
Sections III.B.4 and IV.E.2 of the DEIS discussed the study by Combs and Hartnell (2007) that found no negative effects of the CP4 EPSPS protein or gene consumption on the nutritional condition of dairy cattle, livestock, or poultry fed GT alfalfa compared with controlled alfalfa hay. In addition, no effects on bees, earthworms, or other nontarget organisms in the areas where GT alfalfa was planted in 2005 have been reported to Monsanto or to the FDA (DEIS section IV.E.2).
The commenter did not specify sources of information for effects on bees; however, glyphosate is considered "practically nontoxic" to bees according to EPA standards, as discussed in section

III.B.2.a.6 of the DEIS. As quoted in appendix O, section 1.7, of the DEIS, after extensive review of the available data, Giesey et al. (2000) stated "Honey bees are not affected by glyphosate formulations, either by ingestion or direct overspray, at maximum use rates." In addition, the DEIS appendix O presents the many studies that have examined GE crops and in particular GT crops and found no evidence that the CP4 EPSPS enzyme or that GT alfalfa contributes to or might contribute to impairment of bees and bee colonies. There also is no scientifically plausible mechanism of toxicity of the CP4 EPSPS protein for animals (see DEIS appendix O section 1.7).

In regard to gene flow due to unintentional mixing and distribution of seed, see the response to comment APHIS-2007-0044-10263-5 for issue 3.2. In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6.

The FEIS includes an expanded discussion of the toxicity of glyphosate to amphibians in section IV.C.5 and in appendix N.

Comment Excerpt Text:
I am writing in favor of the deregulating Roundup Ready alfalfa. Having spent 20 years in the crop protection chemical industry and working closely with growers I understand which production practices are good for growers. Allowing the use of Roundup Ready alfalfa as a viable choice in alfalfa production would greatly enhance the producers ability to establish and maintain a high quality alfalfa crop. Better crop condition should lead to land being able to be left in alfalfa for a longer time period resulting in less overall chemical load be applied to the land, better control of soil erosion and reduced runoff into our watersheds. Deregulation will also benifit the primary user of high quality alfalfa which is our dairy producer. The dairy industry has suffered with milk prices below break-even for quite some time and the dairy producer/alfalfa grower would definately benefit from the ability to plant Roundup Ready alfalfa (Comment Number: APHIS-2007-0044-5411-1)

Response: APHIS acknowledges the comment on benefits of GT alfalfa. Environmental benefits of lower chemical loads, lower soil erosion and reduced runoff in watersheds are discussed in section IV.G of the DEIS, and the economic benefits to dairy farmers in section IV.D.3 of the DEIS.

Comment Excerpt Text:
It is high time to apply the precautionary principle to GE feeds and foods. Please do so!
As a consumer, I will reject GE contaminated alfalfa and alfalfa-derived feeds and foods.
All farmers deserve the right to not be contaminated and to grow non-genetically engineered crops/
The USDA's mission is to "protect American agriculture," not to safeguard corporate profit.
Introducing GE alfalfa will significantly increase Round-Up application and lead to more water pollution and adverse health impacts on wildlife and people.

There will likely be significant economic harm to organic family farmers - particularly in the dairy and honey industry. (Comment Number: APHIS-2007-0044-5435-1)

Response: Regarding movement of transgenes into organic crops, our analysis of relevant information supports a different conclusion. As discussed in appendix V 5.5-5.11 of the DEIS, coexistence strategies (e.g. equipment sanitation, harvest management, field separation, contractual practices) can limit the occurrence of GE traits from non-GE alfalfa below seed certification thresholds (0.5 percent).

While glyphosate herbicide use might increase in response to the availability of GT alfalfa, as stated in the DEIS section IV.C.3, the use of other more toxic or persistent herbicides might decrease. No net increase in environmental impacts is expected (see DEIS section IV.C.3).

Nor are adverse effects anticipated for the dairy and honey industries. As discussed in sections III.B.4 and IV.E.2 of the DEIS, the study by Combs and Hartnell (2007) found no negative effects of the CP4 EPSPS protein or gene consumption on the nutritional condition of dairy cattle, livestock, or poultry fed GT alfalfa compared with controlled alfalfa hay (see response to comment APHIS-2007-0044-5338-1 for issue 4.0). As discussed in the DEIS appendix O, section 1.6, US FDA acknowledges that data from studies of 35 nutritional components of GT alfalfa indicate no significant differences from conventional alfalfa.

In regard to economic impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. APHIS found no evidence that non-GT and organic markets as a whole would be negatively affected by the unintended presence of genetically engineered material in non-GT and organic alfalfa, although specific GT sensitive segments may be.

Comment Excerpt Text:
Genetic modification giving OWNERSHIP of that substance/food product, our food source, to a private Corporation or entity IS WRONG!
Genetic modification affecting our food stream in reducing the diversity within specific or general/broad grain, grass or other species reduces the survivability potential if an unfamiliar or new threat which that modified version (having become the predominant existing variety) may not have resistance to because the genetic ability does not exist in the modified strain and was culled out as a de facto result of the commercialized nature of providing safe healthy food vs. cost efficiency in crop management (i.e., weed control). Weed control becomes the smoke screen for taking ownership through "intellectual property" laws.
Changing our land, food, air and water has changed the abundance and healthy diversity of wildlife (LIFE) in our country and presumably throughout our world (birds migrate). Would MONSANTO or any other US corporation be happy to accept a GE modified product be introduced into their MARKET AREA for which they had no complimentary product, may not compete and from which they shall not derive any financial gain?
ASK YOURSELVES WHY THIS IS NECESSARY? WHO TRULY BENEFITS AND HOW?
The public and world suffers at the resultant loss of control of another primary food / sustenance source for the food stream.

REMEMBER PLEASE! What is good for business is not always (often not at all) good for the continued good health of a nation or its people (Comment Number: APHIS-2007-0044-5452-1)

Response: See the response to comment APHIS-2007-0044-2225-3 for issue 5.0.
GT alfalfa *is not a monoculture crop. The transgene events can be crossed into the existing alfalfa cultuvars. APHIS has added a discussion of the possible effects of GT alfalfa on the availability of regionally adapted varieties to appendix V.3.4.1 the FEIS.*
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Comment Excerpt Text:
*As a farmer and consumer I will reject GE contaminated alfalfa and alfalfa-derived feeds and foods
*All farmers deserve the right to not be contaminated and to grow non-genetically engineered crops
*The USDA's mission is to "protect American agriculture," not to
safeguard corporate profit.
*Introducing GE alfalfa will significantly increase Round-Up
application and lead to more water pollution and adverse health
impacts on wildlife and people
*This will cause economic harm to organic family farmers - particularly in the dairy and honey industry (Comment Number: APHIS-2007-0044-5472-1)

Response: In regard to the economic effects, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the health impacts, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0. In regard to increased pesticide use, see the response to comment APHIS-2007-0044-0402-1 for issue 6.3.

Comment Excerpt Text:
I am against the deregulation of RR Alfalfa. Genetic engineering is a risky enterprise and the testing done to analyze its safety ignores the reality of the biological world. The real world is dynamic and unpredictable and any testing methodology that attempts to look at single threads of an organism's impact (does RR Alfalfa affect the health of a single pollinator, for example) ignores the reality that there are likely hundreds of species of Bombus that will visit alfalfa plants. Have they all been tested? Can they all be tested? For those species you test, are you testing the first generation only, what if effects are only seen in subsequent generations? The real world is way to complicated to make a realistic claim that any genetically engineered organism is safe and it is sheer hubris to believe otherwise. (Comment Number: APHIS-2007-0044-5569-1)

Response: APHIS acknowledges the comment. Because the commenter did not cite specific sources, the basis for the comments cannot be evaluated. Decisions by federal agencies in the United States must be made in the absence of absolute certainty because that is never possible. The value of obtaining additional information must be weighed against the need for a decision (The Presidential/Congressional Commission on Risk Assessment and Risk Management. 1997. Risk Management in Regulatory Decision-Making, Final Report, Volume 2,

http://www.riskworld.com/nreports/1997/risk-rpt/volume2/pdf/v2epa.PDF). When additional information or analysis would not contribute significantly to the quality of a decision, the decision should not be postponed (p. 29). Postponement in search of answers to all questions can lead to "paralysis by analysis" where new technologies cannot move forward. As described in the DEIS, Executive Summary, APHIS concluded that it had adequate information to make its regulatory decision.

Comment Excerpt Text:
Please not more genetically modified plants. I don't want to eat modified plants. I don't want to eat livestock fed on genetically modified plants. Genetically modified plants are bad for my health. Also genetically modified pants contaminates natural plants with their dirty genes and this is threatening the biodiversity of the food we eat.
Genetically modified plants are designated to give more power to the food industry. I belive that those firms can and will threatened our food supplies if not stopped immediately. (Comment Number: APHIS-2007-0044-5818-1)

Response: APHIS acknowledges the comment. Section III A and IV B of the EIS discuss gene flow between alfalfa varieties. In regard to GE plants and human health, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
I am urging the Department of Agriculture not to allow genetically modified (glyphosate tolerant) alfalfa. There are three major reasons this should not be done.
1) It is futile, in that insects will inevitably evolve resistance to glyphosate, and then the attempt to chemically control insects will become more toxic.
2) Once planted, this genetically modified alfalfa cannot be prevented from fertilizing non-genetically modified alfalfa. Organic alfalfa will be affected.
3) The main reason Monsanto wants to sell genetically modified crops, including alfalfa is to allow farmers to use Round Up with abandon, as he plants will be tolerant. But Round Up has endocrine disruptors which adversely affect human fetal development. It is socially irresponsible to allow the use of Round Up at all, much less an increased amount of it.
So, it is socially irresponsible to allow Monsanto to engage in an evolutionarily futile exercise with adverse public health consequences, and which denies the growth of organic alfalfa.
I must, therefore, strongly urge that permission not be granted (Comment Number: APHIS-2007-0044-5831-1)

Response: Glyphosate is an herbicide, not an insecticide; therefore, insects will not be evolving resistance to glyphosate. Regarding potential mixing of transgenes from GT alfalfa varieties into organic and conventional varieties, our analysis of relevant information supports a different conclusion. As discussed in appendix V 5.5-5.11 of the DEIS, coexistence strategies (e.g. equipment sanitation, harvest management, field separation, contractual practices) can limit the occurrence of GE traits from non-GE alfalfa below seed certification thresholds (0.5 percent). Regarding endocrine disruptors, see the response to comment APHIS-2007-0044-11034-2 for issue 6.1 and the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
I am writing to register my concern regarding the request for Nonregulated Status of GE (glyphosphate tolerant) alfalfa (as well as GE corn and soybeans).
These foods should not be entering our food chain. GE contamination may lead to a serious health consequences and must be subjected to more rigorous independent scientific studies. Unless and until there is a substantial irrefutable body of evidence that, over several generations, these substances do not cause harm to humans, plants, and animals, they must not be integrated into the biosphere. There is enough research that such caution is vital to protect the public and the coming generations.
GE agricultural products contaminate non GE agricultural products causing damage and illness in humans and animals. GE foods will also harm the organic food markets, of which I am a consumer.
Regarding GE alfalfa: There is some human consumption of alfalfa through greens products and alfalfa sprouts - even more significant is the consumption of alfalfa by cows (or other domestic animals in our food chain). Cow consumption of GE alfalfa will directly affect milk, yogurt, cheese, beef, and ice cream. I also object to the use of GE alfalfa that is Roundup Ready . There is research showing a direct relationship between Glypophosphate, and non Hodgkins lymphoma, (JACS). Human cell toxicity occurs far below recommended levels (American Chemical Society).
Please act to remove GE alfalfa, GE corn and GE soybeans and all other GE products from the market and from our farmlands. Only research in highly contained and restricted (eg no contamination of the biosphere) biological environments should be authorized (Comment Number: APHIS-2007-0044-6126-1)

Response: The commenter does not provide any specific sources for their statement about food-related adverse health effects, and thus APHIS cannot validate the accuracy of the comments. Section IV.E of the DEIS, however, provides an extensive analysis of potential adverse health effects and concludes that the current weight-of-evidence from similar GE crops such as GT wheat, GT soybean, GT corn, GT cotton, and GT sugarbeet suggests that the transgenic CP4 EPSPS protein present in GT alfalfa poses negligible risk to humans, livestock, and wildlife. Most studies available in the scientific literature support the view that food from GT crops is substantially equivalent to nontransgenic crops. See also the response to comment APHIS-2007-0044-11034-2 for issue 6.1.
Regarding GE crops harming organic crop production, our analysis of relevant information supports a different conclusion. As discussed in appendix V 5.5-5.11 of the DEIS, coexistence strategies (e.g. equipment sanitation, harvest management, field separation, contractual practices) may limit the occurrence of GE traits from non-GE alfalfa below seed certification thresholds (0.5 percent) according to some members of the National Alfalfa and Forage Alliance (DEIS, appendix V5.8).
Regarding glyphosate exposure, sections IV.C and IV.E of the DEIS also provides an extensive analysis of glyphosate herbicide use—which might increase in response to the availability of GT alfalfa—and concludes that the use of this herbicide does not appear to result in adverse effects in humans and animals when used according to EPA directions.

The potential for glyphosate residues in hay and forage that might be ingested by cattle to be transferred to meat and milk in beef and dairy cattle, respectively, is low. As cited in the DEIS appendix N, section 2.2, U.S. EPA (2006c) reported during a confined crop rotational study, the residues of glyphosate were undetected 30 days after treatment. As noted in appendix N, page N-4 of the DEIS, U.S. EPA (2006c) also noted that studies with lactating goats, laying hens, rats, rabbits, and cows fed a mixture of glyphosate and its metabolite AMP indicated that there was very little transfer of residues from feed to animal tissues and no bioaccumulation.
Regarding concerns for toxicity to humans, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3.

Comment Excerpt Text:
3) In 2007 Jeffrey Smith published the book, Genetic Roulette in which he scientifically documents multiple significant health and environmental risks and hazards of GE crops. This is a significant book with persuasive evidence about the potential negative impact of GE crops. These studies, along, with those from the Organic Center and others involved in such research appear to be in conflict with your research, which has determined that (at least with RR alfalfa, that ”GT Alfalfa lines has no significant effect on the environment.”) (Comment Number: APHIS-2007-0044-6353-4)

Response: APHIS acknowledges the comment, but notes that this EIS concerns GT alfalfa and not GE crops in general.

Comment Excerpt Text:
GE crops are also known to foster pesticide-induced bacteria and "superweeds" that end up plaguing fields. Each year, superweeds become more virulent as they grow increasingly resistant to pesticides and herbicides that are designed to protect GE crops from infestation. Harmful bacteria colonies also infiltrate the root systems of GE plants, disrupting delicate soil compositions and wreaking havoc within the natural ecosystem. (Comment Number: APHIS-2007-0044-8176-3)

Response: In appendix J section 2.2.2 the DEIS acknowledged that some studies (in USDA FS, 2003) have shown an increase in microbial activity in soils subject to glyphosate application. The commenter does not provide, however, any specific sources for their statement regarding bacteria infiltration of root systems of GE plants or significant disruption of soil composition. Bohm et al. (2009) found no effects on yield, total nitrogen accumulation, nodulation, and nitrogen-fixation after glyphosate was applied to the glyphosate-resistant variety of soybeans. Kremer and Means (2009) discovered the frequency of root-colonizing Fusarium increased significantly after glyphosate application to glyphosate-resistant corn and soybean. However, Powell and Swanton (2008) conclude there is insufficient evidence to prove or disprove a link between glyphosate and crop diseases associated with Fusarium. Appendix N of the FEIS has been updated with these studies
In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6.

Comment Excerpt Text:
The original decision to allow the introduction of genetically modified foods into the food supply was made in bad faith. Long-term scientific safety testing should have been conducted. Recent, scientifically rigorous research from European government agencies and academic scientists have shown that glyphosate tolerant corn and soy have adverse health impacts on the immune systems, vital organs, and reproductive health of mice and rats. Another study (the only one using human subjects) showed that DNA from glyphosate tolerant soy is transfered into the cellular DNA of the microorganisms in the human small intestine, and continues to function there. What are the long-term ramifications of this? Before the regulatory approval of any more genetically modified foods or crops, I suggest sceintifically rigorous safety studies be conducted (Comment Number: APHIS-2007-0044-9355-2)

Response: Because the commenter did not cite specific sources, the basis for the comments cannot be evaluated. Regarding use of scientifically rigorous studies to assess the potential for impacts from glyphosate-tolerant alfalfa, see the response to comment APHIS-2007-0044-9936-35 for issue 2.0.

Comment Excerpt Text:
Robert M. Zablotowicz* and Krishna N. Reddy. Impact of Glyphosate on the Bradyrhizobium japonicum Symbiosis with Glyphosate-Resistant Transgenic Soybean: A Minireview USDA Agricultural Research Service, Southern Weed Science Research Unit, Stoneville, MS 38776. Received 8 May 2003. I know this is about soybeans but was this even looked at in relationship to RR alfalfa?
Page K-21
This table is very misleading and needs to be corrected to reflect the true cost of GT alfalfa. Seeding rate should be the same for both conventional and GT alfalfa to make a fair comparison. Hay growers will delay cutting to avoid “excessive damage” and producing utility grade hay. If a hay producer is looking at the difference between waiting a week to cut because of weather or cutting now because he is at the premium (Early maturity, i.e., pre-bloom). He will choose to wait because the price difference between good (Early to average maturity, i.e., early to mid-bloom) and Utility (hay discounted due to excessive damage or mold) is a substantial difference. Issues not even addressed in the EIS Toxicity of glyphosate to humans when used as a spray on hay that is then fed to animals for human consumption and also the toxicity of the milk produced by animals that consume the hay. I could find many studies on the toxicity of glyphosate and Roundup formulations which link glyphosate to spontaneous abortions, non-hodgkin lymphoma, multiple myeloma, liver damage in rats, and poisoning of amphibians. The EIS concedes there will be an increase in the use of glyphosate and Roundup formulations, but there does not seem to be any investigation into what the increased use of glyphosate and Roundup formulations will have on human food supply.
The mode of action for glyphosate and Roundup formulations is as a metal chelator that immobilize metal macro and micro nutrients (Ca, Mg, Cu, Fe, Mn, Ni, Zn) essential for enzyme activity. In plants glyphosate and Roundup formulations can effect up to 25 different enzymes. What happens to the immobilized micro nutrients when they are fed to animals? Will there be nutrient deficiencies in the forage? In the milk? If the glyphosate and Roundup formulations are

not biodegradable [is it], later the glyphosate could release the micro nutrients, is glyphosate and Roundup formulations active again, and what effect will that have in an animal's digestive system? Also will farmer see glyphosate induced micronutrient deficiencies in their hay fields? This cost was not added to the analysis.
The mode of action for glyphosate and Roundup formulations could also be a factor in "honey bee colony collapse" many bee keepers think it is a lack of proper "nutrition" and blame "mono-culture" for the colony collapse.
What happens to the immobilized micro nutrients when bees feed on the pollen? Could there be nutrient deficiencies in the bees digestive systems? In the honey? Is the pollen deficient or is the glyphosate in the dew drops on the plant poisoning the bees by binding the nutrients in the bees digestive systems and disrupting it the bee's enzyme processes?
Micronutrients are a big part of a plants defense system to stress and disease. When the nutrients are bound up by the glyphosate and Roundup formulations the plants defense systems are compromised. What effect will that have on cropping systems? What will be the added cost to the farmer? For hundreds of years, plant breeders have been selecting for plants that are resistant to disease and now we are going to spray this crop with a chemical that will wipe out these defenses. Will there be severe increase in disease problems? I did not see this issue addressed in the EIS even though it has been found to be a problem in other crops, both RR crops and crops grown is soil with heavy accumulations of glyphosate.
There is a study on the impact of glyphosate on the Bradyrhizobium japonicum symbiosis with soybeans that found the application of the glyphosate inhibited the nodulation and nitrogen fixation process. The value of the nitrogen fixed by alfalfa is an important part of the overall cropping system. Why was this not addressed in the EIS? It has been found to cause decreases in yield for soybeans, what will be the impact on alfalfa, both for yield and amount of nitrogen fixation?
The EIS referenced this study, Gene Flow from Glyphosate-resistant Crops Carol Mallory-Smith* and Maria Zapiola which stated "Both alfalfa seed and crowns are long lived, so the presence of volunteers carrying the CP4 EPSPS gene due to seed or crowns left in the field is a potential problem." But this scientific opinion was completely ignored. The problem of hard seed should be analyzed before RR alfalfa is released. ["supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason. (40 CFR §1502.22.b).93 page of the EIS] I am not a research scientist but with just a little searching I have found so many unanswered questions. At the time RR alfalfa was reregulated, Monsanto reported there were 5,485 growers in 48 states that had planted more than 263,000 acres of Roundup Ready alfalfa. Why weren't there any new studies or reports generated from these acres? Why was such a perfect setting for research not explored? I feel it was because they knew the results would not be favorable to Monsanto or genetically modified alfalfa. They knew they would find escaped GMO plants, glyphosate toxicity, nutrient deficiency, and disease problems within those plantings. (Comment Number: APHIS-2007-0044-9547-4)

Response:
Regarding costs to farmers, see the response to comment APHIS-2007-0044-0511-1 for issue 5.8.
Regarding the potential for glyphosate residues in hay and forage ingested by cattle to be transferred to meat and milk in beef and dairy cattle, respectively, see the response to comment APHIS-2007-0044-6126-1 for issue 4.0.

As cited in the DEIS appendix N, section 2.2, U.S. EPA (2006c) reported during a confined crop rotational study, the residues of glyphosate were undetected 30 days after treatment. As noted in appendix N, page N-4 of the DEIS, U.S. EPA (2006c) also noted that studies with lactating goats, laying hens, rats, rabbits, and cows fed a mixture of glyphosate and its metabolite AMP indicated that there was very little transfer of residues from feed to animal tissues and no bioaccumulation.

The commenter did not provide sources regarding a possible link between glyphosate exposure and adverse health effects. Regarding evidence for potential human effects, see the response to the comment APHIS-2007-0044-0278-1 for issue 6.0 and the response to the comment APHIS-2007-0044-11034-2 for issue 6.1.

The FEIS includes an expanded discussion of toxicity to amphibians in section IV.C.4.
The DEIS includes a discussion of the relationship between increased use of glyphosate with increasing use of GT alfalfa on human exposures, including through food, in section IV.E.3. The DEIS (section III.C.2.c) also noted that GT-alphalfa (and glyphosate) will not be used to produce alfalfa sprouts which might be consumed by humans as stipulated in signed agreements between Monsanto/Forage Genetics International (FGI) and purchasers of GT alfalfa. As noted above in response to this comment, little transfer of glyphosate from feed into animal tissues occurs (see DEIS appendix N, section 2.2).

The mode of action (MOA) of glyphosate as an herbicide is inhibition of the shikimate pathway essential for biosynthesis of aromatic amino acids and other aromatic compounds (see DEIS section IV.C.4). While it is true that glyphosate can chelate manganese (Mn) and other cations, the experiments leading to those conclusions might not indicate that micronutrients are immobilized in soils so that nutrient deficiencies result in plants. Reduced efficacy of glyphosate as an herbicide is observed when it is tank mixed with fertilizers containing Mn, a limiting trace mineral in some regions of the US. The mixing of glyphosate with cations prior to spraying reduces its efficacy as an herbicide
http://www.css.msu.edu/varietytrials/corn/Cropping%20Systems/mngly.pdf . The farmers add sufficient quantities of the trace miconutrients in areas of the country where they are deficient to grow the crops. The presence of chelated micronutrients in fertilizer/herbicide mixing tanks prior to application is of no consequence to the nutritional value of forage to animals.

Discussion of the possibility that glyphosate immobilizes nutrients in the soil has been added to appendix N of the FEIS.

With respect to bees, the herbicide glyphosate, which might increase in use with planting of GT alfalfa, is considered “practically nontoxic” according to EPA standards, as discussed in section III.B.2.a.6 of the DEIS. As quoted in appendix O, section 1.7, of the DEIS, after extensive review of the available data, Giesey et al. (2000) stated “Honey bees are not affected by glyphosate formulations, either by ingestion or direct overspray, at maximum use rates.”

Appendix U in the DEIS reported results of studies that did not find an increased incidence of disease in GT-crops sprayed with glyphosate. Rhodes (2007) found that treatment of GT alfalfa with Roundup had no impact on its susceptibility to foliar diseases such as downy mildew

(Peronospora destructor) compared with untreated GT alfalfa controls. The DEIS appendix U, section 3, did discuss studies of disease and pest susceptibility of other GT crops sprayed with glyphosate. Although some studies showed changes in soil pathogen concentrations following glyphosate treatment, they did not find increased incidence of disease in the crop. Several reports in the literature indicate that various stresses can increase disease incidence in crops. However, studies by Sanogo et al. (2000), Sanogo (2001) and Lee et al. (2000) found no differences in disease susceptibility of glyphosate-treated and untreated GT soybeans and conventional (untreated) varieties of soybeans. Finally, no reports can be found of a change in disease or pest susceptibility in GT alfalfa planted in 2005 (260,000 acres) compared with conventional alfalfa.

The FEIS appendix U, section 3, includes an expanded discussion of glyphosate effects on nitrogen fixing bacteria.
In regard to hard seed in alfalfa, see the response to comment APHIS-2007-0044-10157-4 for issue 3.2.
In regard to why there were no new studies or reports generated from the existing acres of GT alfalfa planted in 2005 and 2006, see the response to comment APHIS-2007-0044-9882-1 for issue 4.0.

Comment Excerpt Text:
I received my PhD is forage production 35 years ago and have conducted research on alfalfa since then. I have worked with farmers growing alfalfa in the West, Northeast, Southeast, and Midwest. I work with both conventional and organic growers. I coauthored the CAST report on gene flow in alfalfa and numerous publications on alfalfa management. I was also a part of the National Alfalfa and Forage Alliance effort drafting coexistence documents and establishing industry programs to maintain Roundup Ready free seed for those desiring it.
It is important to recognize that science has shown that, just like in other crops, coexistence between those wanting Roundup Ready alfalfa and those desiring not to grow Roundup Ready alfalfa (both organic and non-organic farmers) is possible without imposing government regulations and is being achieved in practice by the alfalfa industry.
While many claims have been made about possible deleterious effects of roundup ready alfalfa, none of these claims have been substantiated by research. A thorough review of all published literature on roundup ready alfalfa could find no data indicating any negative effects (Undersander et al. 2009. Review of Roundup Ready Alfalfa. Forage and Grazinglands).
(Comment Number: APHIS-2007-0044-9720-1)

Response: The review of Roundup Ready alfalfa planted as forage and in grazinglands by Undersander et al. (2009) was published after the DEIS was completed. The review concludes that proper isolation distances and management practices can protect conventional and organic alfalfa to maintain existing domestic and export markets that might require GE-free seed. The review, therefore, is consistent with the DEIS conclusion that coexistence of GT and non-GT alfalfa is possible without federal regulations. Discussion of the Undersander et al. (2009) review has been added to sections IV.B and IV.D in the FEIS.

Comment Excerpt Text:

WORC feels that APHIS and USDA have fallen far short of providing a true picture of economic or environmental impacts of the commercial release of GE Alfalfa. These comments focus on issues of most importance to WORC and its members. These issues should have been thoroughly covered in the draft EIS but were not adequately analyzed, despite the Court's direction.

The central flaw of the draft EIS is its failure to analyze the "real life" impact of the deregulation of genetically modified (GM) alfalfa. It failed to address the contamination of non-GM alfalfa which will inevitably follow unfettered deregulation. It failed to recognize the impact non-GM alfalfa hay and seed growers, organic meat and livestock producers; producers of 'natural' beef, lamb, and other meat and livestock marketed with source-verification claims related to feed; dairy producers; and conventional and organic honey producers.

In the draft EIS, APHIS refused to recognize the potential economic impacts of deregulation on farmers and the impacts to the environment. WORC believes these two issues go hand in hand and one cannot be evaluated without the other. (Comment Number: APHIS-2007-0044-9882-1)

Response: Studies of the GT alfalfa fields planted in 2005 and 2006 have not been conducted because Monsanto had already completed extensive field trials before the petition for non regulated status was granted. No requirement exists for continued field trials, and no evidence offered that suggested additional field trials were necessary. Although locations and acres planted with GT alfalfa were not selected to serve a scientific study of environmental effects, any unexpected effects, such as increased disease susceptibility, would have become apparent in these widespread plantings. The mechanisms of crop isolation are initiated by individual growers, as are the management strategies they adopt. Because these methods are well known and have been tested on other crops, it is not necessary that they be extensively re-analyzed in GT alfalfa. No state or federal oversight exists to track agricultural traits in GT and non-GT alfalfa fields and other crops and nonagricultural areas.

sections III.B.4 and IV.E.2 of the DEIS discussed the study by Combs and Hartnell (2007) that found no negative effects of the CP4 EPSPS protein or gene consumption on the nutritional condition of dairy cattle, livestock, or poultry fed GT alfalfa compared with controlled alfalfa hay (Sidhu et al, (2000); see the response to comment APHIS-2007-0044-5338-1 for issue 4.0). In addition, no effects on bees, earthworms, or other nontarget organisms in the areas where GT alfalfa was planted in 2005 have been reported (see DEIS section IV.E.2).
Concerning potential economic impacts on farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

4.1 Issue 4.1 – Impacts on T and E Species

Comment Excerpt Text:
I am very concerned regarding this draft. I strongly believe that farmers should be free to grow the seed they want without danger of it being infused with genetically Engineered organisms. This thoughtless and unproven way of tampering and endangering our food system is irresponsible and ridiculous. I do not want to eat Genetically engineered food nor feed it to my children. There is a reason other countries have banned this irresponsible form of farming.
I DO CARE about the environmental and economic consequences of uncontrolled nation-wide

growth of GE alfalfa; and I strongly discourage the growth of this form of farming.
I also want to prevent increased pesticide use and the enhancement of invasive weeds and the associated adverse impacts on biodiversity and endangered species.
please do not go forward with this (Comment Number: APHIS-2007-0044-0868-1)

Response: In regard to potential harm to humans and wildlife from consumption of glyphosate-tolerant alfalfa and to humans from foods from livestock fed GT alfalfa, see the responses to comment APHIS-2007-0044-0278-1 under issue 6.0 and comment APHIS-2007-0044-11034-2 under issue 6.1. In regard to the potential for GT alfalfa to become an invasive in other environments, see the response to comment APHIS-2007-0044-10263-8 for issue 3.4.
In regard to the potential for increased use of glyphosate with GT alfalfa crops to enhance glyphosate-tolerant weeds in agriculture and silviculture, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6.

APHIS acknowledged in section IV.C.2 of the DEIS , the potential for increased glyphosate use, particularly in aerial applications, to possibly reach some part of populations of threatened or endangered plant species in some areas adjacent to GT alfalfa fields. The discussion of potential risks from increased use of glyphosate to T&E species of plants near GT alfalfa fields has been added to section IV.C.2 of the FEIS.

APHIS began an analysis of possible impacts of GT alfalfa on threatened and endangered (T&E) species with a request to the United States Fish and Wildlife Service (USFWS) on January 8, 2008 for a list of species, and a discussion of the action area, and the scope of a possible consultation. APHIS operates under a "decision tree" which helps BRS determine what issues need to be brought to USFWS for consultation, either formal or informal. APHIS completed an analysis of impacts on T&E species, and determined that the product would have no impact on any of those plants or animals reviewed that would overlap with alfalfa production sites. As stated by USFWS in their section 7 consultation technical assistance instructions (see http://www.fws.gov/midwest/endangered/section7/s7process/7a2process.html), responsibilities under 7(a)(2) of "implementing regulations (50 CFR part 402), federal agencies must review their actions and determine whether the action may affect federally listed and proposed species or proposed or designated critical habitat. To accomplish this, federal agencies must request from the Service a list of species and critical habitat that may be in the project area or they can request our concurrence with their species list. Once a species list is obtained or verified as accurate, federal agencies need to determine whether their actions may affect any of those species or their critical habitat. If no species or their critical habitat is affected, no further consultation is required. If they might be affected, consultation with the Service is required. This consultation will conclude either informally with written concurrence from the Service or through formal consultation with a biological opinion provided to the federal agency." APHIS contracted with an expert organization to assess the potential impacts of glyphosate on terrestrial and aquatic organisms, both plants and animals and this is presented in appendix N of the DEIS. APHIS completed its analysis of potential impacts on T&E species with reference to this analysis, and in the absence of likely impacts, was not required to further pursue consultations with USFWS.

The DEIS presented ample evidence that adverse effects are not expected in animals or plants, including T&E species, from GT alfalfa itself. As discussed in section IV.C.1 of the DEIS, GT alfalfa is not expected to become invasive in natural environments any more than conventional alfalfa. That conclusion is based on more than 150 field trials conducted over a 5-year period in 33 different states and reported by Rogan and Fitzpatrick (2004). No differences between GT and conventional alfalfa were found for the following traits that might affect the potential of a plant to become invasive: seed dormancy, seed germination, seedling emergence, seedling vigor, winter survival, spring vigor, seed yield, vegetative growth, plant dormancy, survival, and relationship with symbiotic organisms.

Wildlife, including T&E animals, might use alfalfa fields as part of their foraging range. As stated in the DEIS section IV.C.1, GT alfalfa and conventional alfalfa varieties appear to be compositionally and nutritionally equivalent with the exception of expression of the transgene protein (discussed in DEIS appendices Q, U, and P). Thus, adverse nutritional effects are not expected in wildlife foraging on GT alfalfa or its seeds.
Also, as discussed in section IV.C.1 of the DEIS, the CP4 EPSPS protein does not have toxic or pathogenic effects in plants or animals that might affect T&E species or their habitat (see DEIS appendices U and P). The proteins expressed in the events J101 and J163 do not dispose plants to become more susceptible to disease, because during growth without glyphosate treatment, both the novel gene and the existing EPSPS gene function in the shikimic acid pathway to make amino acids; during glyphosate treatment, the agrobacterium derived EPSPS gene functions normally because of its reduced affinity for glyphosate (McCann et al., 2006). No additional susceptibility to disease was found in extensive field trials of J101 and J163 (Monsanto and FGI, 2004; McCann et al., 2006).

Finally, GT alfalfa is not able to hybridize with any state or federally threatened or endangered plant species or with any plant species proposed for federal listing (see DEIS appendix I).

Comment Excerpt Text:
The APHIS determination of “not a plant pest” doesn’t include the risks to animals or humans, and is therefore not an acceptable conclusion to base the entire EIS on. The EIS shows glyphosate to be toxic to microorganisms, birds, amphibians, and fish, including an acute toxicity in mice, the animal of choice to evaluate impacts to humans. (Comment Number: APHIS-2007-0044-2325-8)

Response: The DEIS addressed potential risks to humans, animals, and plants in sections IV.B through IV.I using the risk assessment paradigm explained in the DEIS section IV.A. Thus, determination of “not a plant pest” is not the only criterion on which the conclusion of the DEIS is based.

Comment Excerpt Text:
APHIS claims it analyzed the direct effects of GT alfalfa to determine whether an impact was expected on any listed or proposed T&E species or any designated critical habitat. (DEIS at 114). Yet, there is no evidence it consulted with FWS. Instead, APHIS concludes that it has “not

identified any stressor that could affect the reproduction, numbers, or distribution of a T&E species or species proposed for listing." (DEIS at 116). Further, APHIS considered the effect of the production of GT alfalfa on critical habitat or habitat proposed for designation and could identify no difference from impacts that would occur from the production of other alfalfa varieties (non-GT or organic varieties." Id. APHIS concludes that following a determination of nonregulated status, GT alfalfa "would have no effect on federally listed threatened or endangered species or species proposed for listing, nor is it expected to adversely modify designated critical habitat proposed for designation, compared to current agricultural practices." Id. Based on these conclusions, APHIS finds that "a written concurrence or formal consultation with the United States Fish and Wildlife Service or the National Marine Fisheries Service is not required." Id.

Here, there is no evidence in the DEIS that APHIS took the first steps of consultation with FWS and/or NMFS to determine whether the deregulation of GT alfalfa may harm listed species or habitat. [Footnote 84 CFS sent a Freedom of Information Act request to FWS asking for documents relating to Endangered Species Act issues and GT alfalfa. FWS was "unable to locate any records responsive to [CFS'] request." See FOIA Request # 2010-00030 and Response to FOIA Request # 2010-00030 on file with FWS and CFS.] Instead, APHIS relies on a report conducted by petitioner Monsanto along with independent review to support the conclusion that "terrestrial and aquatic T&E animals are expected to be at low risk from exposure to glyphosate used in agriculture." (DEIS at 118). Thus, prior to deregulation, APHIS must at the very least consult with FWS and/or NMFS prior to approving this deregulation. (Comment Number: APHIS-2007-0044-9936-27)

Response: The discussion of potential risks from increased use of glyphosate to T&E species of plants near GT alfalfa fields contained in the DEIS has been expanded in section IV.C.2 of the FEIS. The analysis of impacts on T&E species was conducted under the procedures established by USFWS, which included an initial contact with USFWS in 2008 (also see response to comment APHIS-2007-0044-0868-1 for issue 4.1).

Comment Excerpt Text:
The analysis of glyphosate toxicity is also lacking. The impacts of glyphosate are part and parcel of the glyphosate-tolerant crop system. As discussed in other CFS comments, any deregulation will dramatically increase amount and acreage of glyphosate use and impacts on the environment.

APHIS acknowledges that deregulation will "result in a potential increase in the use of glyphosate-based herbicide formulations." Yet again, APHIS relies on the unfounded and blatantly incorrect assumption that this increase in glyphosate-based herbicide formulations will reduce/eliminate other, more toxic herbicides. As discussed supra and detailed in other CFS comments, the vast majority of alfalfa farmers do not currently use herbicides so glyphosate will not be reducing or eliminating any herbicide use. Not only will more glyphosate be used, but it will be applied throughout the planting, not just before the planting to wipe out stands as is currently common with glyphosate. The DEIS also fails to consider impacts from commercial glyphosate formulations (e.g. those containing polyethoxylated tallowamine), shown to have

greater toxicity than glyphosate alone to amphibians and other organisms. For instance, certain formulations of Roundup have been found to be highly toxic to amphibians at field-relevant usage rates. [Footnote 85 Relyea, R.A. (2005). "The lethal impact of Roundup on aquatic and terrestial amphibians," Ecological Applications 15(4): 1118-1124; Relyea, R.A., N.M Schoeppner & J.T. Hoverman (2005). "Pesticides and amphibians: the importance of community context," Ecological Applications 15(4): 1125-1134.]
APHIS relies on its own analysis of Priester et al., 2007 and Priester et al., 2008 to determine that there are 31 counties with 78 T&E species potentially at risk from glyphosate use but concludes that negative impacts are unlikely to occur. APHIS determines this without any additional analysis of the individual sensitivity of these 78 T&S species or consultation with FWS. APHIS then admits that aerial applications at label rates could result in glyphosate drift capable of harming T&E species. "[N]egative impacts may occur in situation of aerial applications, which may be applied at a rate of 1.55 pounds glyphosate a.e. per acre and have a higher probability of drifting into neighboring fields." (DEIS at 119). APHIS attempts to minimize this risk by stating that currently, only 2% of glyphosate is applied aerially in the US. Id. APHIS does not consider a possible increase in aerial applications with the adoption of GT alfalfa. Instead, APHIS claims this risk could be "mitigated by following label use restrictions that maintain application rates below critical levels in the counties where listed species would be within 250 feet of GT alfalfa fields." Yet, APHIS fails to consider such options for mitigation based on its purported lack of regulatory authority to mandate label use restrictions for glyphosate used on GT alfalfa fields. Id. Nor did APHIS consult with FWS on this risk to protected species. (Comment Number: APHIS-2007-0044-9936-28)

Response: Section III.2 discusses research that has suggested that glyphosate is less harmful to the environment than many other herbicides and that the shift of herbicide use away from more toxic herbicides and to the use of glyphosate has resulted in a net lower environmental impact from herbicides. However, as described in section III.2.b of the DEIS, alternative herbicides would be required for stand removal of GE alfalfa. An expanded section examining the potential for higher use of alternative herbicides has been included in appendix N of the FEIS.

Appendix J includes an updated discussion of trends in glyphosate use and changes in patterns of herbicide use overall in United States agriculture. The FEIS includes an expanded discussion of toxicity of glyphosate and water-soluble surfactants to frogs and other amphibians in section IV.C.5 and appendix N. Under EPA's pesticide registration and reregistration processes under FIFRA, EPA regulates the sale, distribution, and use of pesticides to protect human health and the environment. Thus, when EPA completes its reregistration process for glyphosate-based herbicides, it will include any use restrictions warranted on the label, which might include a 250' isolation zone to protect T&E species. See also the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Issue 4.1.1 – Impacts to T and E Species from GT Alfalfa J101 and J163 Gene Product

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Comment Excerpt Text:
The CP4 EPSPS gene, which confers glyphosate resistance in GM crops, has been studied increasingly in recent years. APHIS notes that, "the transgenic CP4 EPSPS protein present in GT alfalfa poses negligible risk to humans, livestock, and wildlife." NCGA disagrees with this

statement and will present recent scientific evidence that demonstrates the persistence of the CP4 EPSPS gene in the natural environment. Much of this research has been conducted only within the last year, and studies thus far have largely failed to examine the toxicity effects of CP4 EPSPS in ecological systems and humans. Thus, it is premature to assume that this transgene presents no adverse potential impacts.

Research shows that the CP4 EPSPS gene can persist in soil for up to one year (Lerat et al. 2007). Soil persistence may be associated with soil aggregate size, as evidence suggests that larger aggregates had significantly greater gene concentration (Levy-Booth et al. 2008). Further, research conducted last year found that the persistence and movement of CP4 EPSPS was significant in soil food webs. Utilizing PCR methods, scientists found the CP4 EPSPS transgene in soil microarthropods, nematodes, macroarthopods and earthworms. Further, evidence of the transgene was present at all dates and within all animal groups of the experiment. Authors concluded that, "transgenic DNA concentration in animals was significantly higher than that of background soil, suggesting the animals were feeding directly on transgenic plant materials. This evidence clearly demonstrates the potential for gene flow and potential proliferation of GM DNA throughout a variety of ecological systems (Hart et al. 2009). Other evidence has found CP4 EPSPS in goats, indicating the potential for GM DNA to be transferred into animals for human consumption (Tudisco et al. 2007). The persistence of CP4 EPSPS as well as the lack of research on its potential impacts in ecological systems and organisms warrants considerable attention by APHIS. Assuming that CP4 EPSPS does not pose a risk to humans, livestock or wildlife is premature and needs to be reexamined. (Comment Number: APHIS-2007-0044-11018-15)

Response: Section IV.E.2 of the DEIS discussed the potential survival of plant transgenes following ingestion and absorption by animals and microorganisms. The discussion about transmission of DNA fragments and entire gene sequences is expanded in the FEIS section IV.E.2 and appendix Q, section 2.1.1.4, and includes references cited by the commenter. In regard to hortizontal gene transfer see response to comment number APHIS-2007-0044-11018-2 for issue 11.16.

Comment Excerpt Text:
The DEIS for Roundup Ready (RR) alfalfa must evaluate the potential harm of various alternatives to threatened and endangered (T&E) species, and does so on p. 114 – 124 (IV. Environmental Consequences, C. Biological Impacts), p. 163 (IV. H. Mitigation Measures, 2. Mitigation Measures by Resource Area, c. Measures to Minimize Impacts to the Biological Environment), p. 172 – 175 (IV. I. Other Impacts, 5. Analysis of Cumulative Impacts by Resource Area, a. Biological Impacts) and in Appendix N (Potential Impacts to Wildlife, Amphibians, Plants, and Ecosystems from Increased Glyphosate and Other Chemical Usage).

I will focus my comments on APHIS' analysis of impacts on terrestrial and semi-aquatic plants because they are the organisms APHIS (DEIS:119), EPA and Monsanto (Mortensen et al. 2008, p. 8) admit are most directly at risk from adoption of RR alfalfa. [Footnote 1: By restricting my comments to plants, I do not wish to imply that other organisms, e.g. amphibians, are not also at direct risk.]

More glyphosate use will result from deregulation of Roundup Ready alfalfa, resulting in greater exposure and risk to wild plants.

The purpose of planting Roundup Ready alfalfa is to be able to apply glyphosate-containing herbicides within the crop throughout the growing season. It is assured that all Roundup Ready alfalfa fields will be sprayed with glyphosate at least once a year, and probably more often. For example, according to the label directions described in the DEIS Appendix N, glyphosate-containing herbicides can be applied up to 4 times during the growing season at almost the maximum single application rate (yearly total is 5.96 lbs glyphosate a.e./acre, and maximum single rate is 1.55 lbs glyphosate a.e./acre), with at least 7 days separating applications (DEIS:N-22). APHIS provides information that a small sample of farmers already growing RR alfalfa reported either 1 or 2 applications a year, so are not using the maximum number allowed at this point (DEIS:116). However, growers are not restricted to these few applications, and with different weed pressure may opt for more in the future. This is compared to an average of one field-wide glyphosate application every 3 or 4 years in conventional alfalfa when used to burn down the crop before stand renovation or crop rotation (DEIS:116), and no glyphosate in organic alfalfa production.

This Roundup Ready/glyphosate system has resulted in dramatic increases in glyphosate use in other crops, and it certainly will in alfalfa as well (Benbrook 2009). Because only 7% of alfalfa acreage is sprayed with herbicides of any kind (NASS 1999, p. 9), significant Roundup Ready alfalfa adoption will not just substitute glyphosate for other herbicides, but will result in more acreage being treated chemically for weeds. (Comment Number: APHIS-2007-0044-10966-1)

Response: APHIS acknowledges that deregulation of GT alfalfa is likely to result in an increase of glyphosate use for alfalfa production. Use of other, more toxic herbicides could either decrease (which in turn would result in less overall risk to the environment), remain the same, or increase in alfalfa production with the increased adoption and planting of GT alfalfa, depending on several factors such as the exact adoption rate of GT alfalfa. Discussion of the potential for glyphosate and other herbicide use on GT alfalfa to affect T&E species of plants is expanded in the FEIS, sections IV.C.2 and .3 and appendix N. Appendix J discusses different adoption seneriosscenerios and the relative change in herbicide use.

Comment Excerpt Text:
Summary conclusion:
The DEIS for Roundup Ready alfalfa does not adequately provide assessment of risks to plants, including threatened and endangered species likely to be growing near Roundup Ready alfalfa fields. Important studies are ignored or glossed over that need to be considered. These studies change the assumptions upon which APHIS relies, and generally indicate a greater probability of risk to plants than APHIS concludes. (Comment Number: APHIS-2007-0044-10966-13)

Response: Discussion of the potential for glyphosate use on GT alfalfa to affect T&E species of plants is included in the FEIS, section IV.C.2 and appendix N. APHIS' analysis of impacts on T&E species was conducted under the procedures established by USFWS, which included an

initial contact with USFWS in 2008 (also see response to comment APHIS-2007-0044-0868-1 under issue 4).

Comment Excerpt Text:
Glyphosate is a broad-spectrum herbicide, able to injure or kill most plants and many microorganisms. More glyphosate applications, longer during the season and over more acres, means a greater potential for negative impacts on all plants in the area near alfalfa: trees, shrubs and wildflowers in borders and fencerows; meadow and prairie plants; aquatic and semi-aquatic plants in streams, ditches and ponds; and non-Roundup Ready crops in neighboring fields. Exposure of wild plants to glyphosate occurs via: 1) direct application to the crop itself, exposing any wild plants that are intermingled, 2) drift during applications to crops, 3) movement of glyphosate-laden soil particles and contaminated water from the application site, and 4) intentional application to areas adjacent to crop fields (hedgerows, ditches, roadways, fence lines).
Assumptions used by APHIS to determine risk to wild plants led them to conclude there would be low risk from most applications to Roundup Ready alfalfa.

In the DEIS consideration of impacts on plants, APHIS estimated the direct effects of glyphosate application and drift on injury and mortality of T&E plants within and adjacent to RR alfalfa fields. They also examined risks to non-T&E plants as an indicator of possible indirect effects on other organisms (Mortensen et al. 2008, p. 10). Assumptions and calculations are cited are clearly elaborated in the supporting document "Tier I Endangered Species Assessment for Agricultural Uses of Glyphosate and Glyphosate-Containing Herbicides", Mortensen et al., 2008, Monsanto Study RPN-2007-227 (Mortensen et al. 2008).

For estimating risk to plants from direct exposure, the Monsanto reports relied upon by APHIS assumed the following:

1) Acute but not chronic risks are assessed for plants, and those considered are "phytotoxicity, survival, plant height, plant dry weight" originally from Monsanto Report No. MSL-13320, MRID 43088701 as cited by Mortensen et al. 2008, p. 31.
2) The lowest "no-observed-effect concentration" (NOEC) for glyphosate of 0.035 lb a.e/A, determined from a study of 10 crop plants and based on the 4 growth parameters, is representative of the effect of glyphosate on wild species and growth processes important for their evolutionary fitness (Mortensen et al. 2008, p. 31).
3) The ground application rate will be the maximum allowed on the label (1.55 a.e. lbs/A) whereas the aerial application rate will be a typical rate rather than the maximum allowed (0.77 a.e. lbs/A) (Mortensen et al. 2008, p. 9).
4) Exposure from drift will be 1% of the application rate from ground equipment and 5% from aerial sprays (Mortensen et al. 2008, p. 12, 30).
5) Impacts will be the result of single applications of glyphosate rather than cumulative from multiple applications during the year, because "glyphosate is not expected to accumulate to appreciable levels from one application to the next…" (Mortensen et al. 2008, p. 9).
6) There is no difference in toxicity to plants between different formulations of glyphosate and the acid itself (Mortensen et al. 2008, p. 10).

7) Exposure is entirely from drift, with no plant absorption from soil solutions or runoff (Mortensen et al. 2008, p. 12).
8) Surfactants bind to soil and are not absorbed by plants other than by direct contact with leaves (Mortensen et al. 2008, p. 12).

Based on these assumptions, Monsanto determined that when glyphosate is applied to RR alfalfa at the maximum label rate using ground equipment, drift levels will not be at high enough concentrations to injure or kill plants. Aerial applications at both maximum label rates and typical rates could result in drift concentrations high enough to injure or kill T&E terrestrial and semi-aquatic plants, but not aquatic plants, and not non-endangered terrestrial and semi-aquatic plants (Mortensen et al. 2008, p. 32). (Comment Number: APHIS-2007-0044-10966-2)

Response: APHIS acknowledges that this summary is an accurate representation of the Mortensen et al. 2008 study as presented in the DEIS.

Comment Excerpt Text:
Finally, APHIS (DEIS:119) used Monsanto's analysis (Honegger et al. 2008) of the presence of specific T&E terrestrial and semi-aquatic plants in counties where RR alfalfa might be grown to generate a list of 78 species in 31 states (Priester et al. 2007, 2008; Honegger et al. 2008) that could be close enough to fields to be negatively impacted by adoption of the RR alfalfa/glyphosate system, if the glyphosate was applied aerially. (Comment Number: APHIS-2007-0044-10966-3)

Response: APHIS acknowledges that this summary is an accurate representation of the Honegger et al. (2008) and Priester et al. (2007, 2008) studies as presented in the DEIS.

Comment Excerpt Text:
In the DEIS (p.119), APHIS stated that only 2% of glyphosate is applied from the air onto crops in the US, and extrapolates this figure to RR alfalfa. APHIS said impacts from aerial applications could be mitigated by label use restrictions requiring lower application rates in areas where T&E plants are found within a certain distance from alfalfa fields, but that APHIS cannot mandate label use restrictions (DEIS:119), and supporting documents mention that the lower application rates are unlikely to be commercially acceptable (Mortensen et al. 2008, p. 32).

Assumptions used by APHIS to determine risks to wild plants were flawed, and likely underestimated risks.

Of course, the assessment by APHIS is only as good as the assumptions upon which it is based, and aspects of the assumptions are invalid. Relevant scientific studies are minimized or ignored, making APHIS' analysis of risks to T&E wild plants inadequate.

The most important problems with the assumptions about risk to plants are the following:

1) APHIS does not take into account the well-known sub-lethal effects of glyphosate on reproduction that can affect survival of plant species. (APHIS assumption 1: Acute but not chronic risks are assessed for plants, and those considered are “phytotoxicity, survival, plant height, plant dry weight.)

2) These reproductive problems have been shown to occur in wild plants at concentrations of glyphosate much lower than the lowest NOEC used in the risk calculations. Therefore, APHIS underestimates the risk to T&E terrestrial and semi-aquatic plants from adoption of RR alfalfa. (APHIS assumption 2: The lowest “no-observed-effect concentration” (NOEC) for glyphosate of 0.035 lb a.e/A, determined from a study of 10 crop plants and based on the 4 growth parameters, is representative of the effect of glyphosate on wild species and growth processes important for their evolutionary fitness.)

The data regarding sub-lethal glyphosate effects on plant reproductive success is reviewed, and added to by original research, in a key peer-reviewed scientific paper, not cited in the DEIS: Blackburn, L.G. and C. Boutin, 2003. Subtle effects of herbicide use in the context of genetically modified crops: a case study with glyphosate (Roundup®). Ecotoxicology 12: 271-285.

In fact, this research specifically addresses risk to the success of wild plants from drift levels of glyphosate related to increased use of glyphosate associated with RR crops, so its omission from the DEIS is puzzling – and a serious shortfall. The authors state: “The use of these new crops has raised concern about an increase in reliance on glyphosate for weed control with detrimental consequences on nontarget plants and habitats due largely to the broad spectrum nature of this herbicide. The objective of this paper is twofold: (1) to review the literature on the effect of glyphosate on seed germination and early seedling growth, and (2) to present the results of a new experiment with several crop and noncrop species. The attempt was made to build on past findings and to add to the knowledge base in an effort to move away from studies on crop plants such as soybean and grain by focusing mainly on noncrop plant species.” (Blackburn and Boutin 2003, p. 272)

Past findings are that sometimes plants that have not suffered mortality after contact with glyphosate, and in fact may not have exhibited visible symptoms of injury at all, nevertheless produce fewer seeds or seeds that have problems with germination or vigor (references cited in Blackburn and Boutin 2003; Walker and Oliver 2008; Thomas et al. 2005). Also, plants that reproduce vegetatively from tubers or rhizomes sometimes show injury in the generation subsequent to actual glyphosate application or contact (Viator et al. 2008).

Specific, unique properties of glyphosate explain how it can affect subsequent plant generations. Glyphosate applied to leaves and stems translocates with photosynthates to the most rapidly growing tissues and organs of plants, such as developing flowers and seeds (Feng et al. 2003, Feng and Chiu 2005). In most plant species, glyphosate is not metabolized, and these plant parts not only accumulate the glyphosate but also are particularly sensitive to it (Feng et al. 2003, Chen et al. 2006). Therefore glyphosate can cause pollen sterility (Chen et al. 2006, US Patent 4,735,649), potentially resulting in fewer seeds; or can cause seeds that form to be less viable and vigorous [Footnote 2: APHIS commented on the sensitivity of germinating seeds to glyphosate, but these were seeds treated as they were germinating, rather than during

development, and thus are exposed at a different stage and route than the seedlings impacted in the studies discussed in Blackburn and Boutin (2003). DEIS:N-7 states: "Glyphosate Terrestrial Plant Toxicity - Glyphosate is toxic to plants. The NOEC for seed germination in both monocots and dicots is 4.5 lbs a.e./acre application rate (USDA, 2003). The highest reported NOEC for growth is 0.56 lb a.e./acre (USDA, 2003). Therefore, glyphosate is much less toxic to germinating plants than it is to the foliage of growing plants."] (Thomas et al. 2005, Walker and Oliver 2008), probably because of damage to their meristems. Storage organs such as tubers and rhizomes can also accumulate glyphosate resulting in reduced viability of the next season's individuals, again from damage to their buds when glyphosate is remobilized as they break dormancy (Viator et al. 2008). Different species of plants are more or less sensitive to glyphosate's sexual and vegetative reproductive effects, and the stage of development at which the plant is exposed to glyphosate influences the response, as well (Blackburn and Boutin 2003, Feng et al. 2003). Environmental conditions also determine how much glyphosate is required to have an effect (Yasuor et al. 2006). In many cases, drift levels of glyphosate have been shown to cause these effects (Blackburn and Boutin 2003). Thus sub-lethal doses of glyphosate can reduce the fitness of an affected plant species, reducing population levels in subsequent generations. Because other herbicides have different basic properties – for example, less efficient or no translocation to reproductive tissues, or metabolism within the plant resulting in less accumulation and persistence – the substitution of other herbicides by glyphosate is likely to have unique effects on plants, and preferentially affecting reproductive success at low rates may be one of these. (Comment Number: APHIS-2007-0044-10966-4)

Response: Section I.B of the DEIS describes how three federal agencies are responsible for regulating biotechnology in the United States: USDA's APHIS, the U.S. Department of Health and Human Services' Food and Drug Administration (FDA), and the Environmental Protection Agency (EPA). The APHIS Biotechnology Regulatory Service's (BRS) mission is to protect America's agriculture and environment using a dynamic and science-based regulatory framework that allows for the safe development and use of genetically engineered organisms. FDA is responsible for ensuring the safety and proper labeling of all plant-derived foods and feeds, including those developed through genetic engineering such as glyphosate-tolerant alfalfa. EPA uses a registration process to regulate the sale, distribution, and use of pesticides in order to protect health and the environment under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). Thus EPA can mandate label restrictions and is nearing the end of its process of evaluating glyphosate for reregistration.

As noted in the response to comment APHIS-2007-0044-10966-13 for issue 4.1.2, APHIS has expanded its discussion of the potential effects of glyphosate on wild plants, including T&E species, in the FEIS sections IV.C.2 and IV.C.4 and in appendix N. The discussion includes studies of glyphosate toxicity on reproductive endpoints (e.g., seed set, germination vigor) and other sublethal endpoints and references cited by the commenter.

Comment Excerpt Text:
APHIS did give an example of this phenomenon in the DEIS in a section on weed shifts in different rotations, but did not link it to impacts on T&E species, nor did they explain the basis for it. The description, though, is apt: "There was high variability in wild buckwheat between the

[rotation] systems. Glyphosate is not very effective on wild buckwheat [plants], so the authors proposed that wild buckwheat seed production or viability may be restricted by glyphosate more than the wild buckwheat biomass. Therefore, after glyphosate application the plant may appear visually robust, but its ability to reproduce has been effected, so in following years less wild buckwheat is observed (Harker et al., 2005)." (DEIS:113, IV. Environmental Consequences, Weed Shifts in GT Alfalfa and GT Alfalfa Weed Management Options)

Blackburn and Boutin show that the same diminution of the "ability to reproduce" can also be caused by glyphosate in many cultivated and wild plants. In their literature review they cite 18 studies from 1972 (before glyphosate was commercialized) through 2000, including 13 species in 3 families. Most were of cultivated plants and prominent weeds. The lowest application rate shown to affect reproduction was 0.022 kg ai/ha, equivalent to 0.015 lb a.e./A, or about 1% of the maximum single application rate for RR alfalfa. (Campbell et al. 1998, as cited in Table 1; species was the grass Nassella trichotoma) Most experiments did not use such low rates so results cannot be compared to the environmental concentration assumptions used in the APHIS risk assessment.

In their own experiments, Blackburn and Boutin made a point of using drift levels of 1% and 10% of a fairly low field rate of 0.60 lb a.e./A, less than half the maximum allowed for RR alfalfa. They challenged 11 species – 8 of them wild weedy species - in 7 families to glyphosate applications at these rates, once, when the plants had developing seeds. There was a wide range of responses between species, but the most sensitive exhibited decreased germination and inhibited root and shoot growth of early seedlings even at the 1% rate (Blackburn and Boutin 2003, Table 3, p. 279). (Comment Number: APHIS-2007-0044-10966-5)

Response: APHIS has expanded its discussion of the potential effects of glyphosate on wild plants, including T&E species, in the FEIS sections IV.C.2 and IV.C.4 and in appendix N of the FEIS. The discussion includes studies of reproductive and developmental endpoints (e.g., population trends, root and shoot growth of early seedlings) and references cited by the commenter.

Comment Excerpt Text:
How does this change the risk assumptions made by APHIS?

APHIS assumes that the lowest NOEC for terrestrial plants is 0.035 lb a.e./A, based on plant height reduction in tomato (DEIS:118, "…ground application rates greater than or equal to 3.5 lb a.e./A", assuming 1% drift and using the NOEC of 0.035 lb a.e./A for tomato from Mortensen et al. 2008, p. 31).

The NOEC for reproduction ability from the most sensitive plants in the Blackburn and Boutin study is less than 0.006 lb a.e./A (calculated by me, from 1% of a 0.89 kg a.i./ha application rate), because these plants showed reproductive effects at the 1% drift simulation, which was the lowest rate tested. This number is almost 6 times lower than the NOEC of 0.035 assumed by APHIS based on Monsanto's research.

According to APHIS, the assumed Estimated Environmental Concentration (EEC) from drift following a ground application of glyphosate to RR alfalfa is 0.0155 lb a.e./A (Mortensen et al. 2008, p. 30), so using the APHIS NOEC number of 0.035 lb a.e./A, the Risk Quotient for ground applications is less than 1 and thus acceptable (Mortensen et al. 2008, p. 32). However, if the NOEC of less than 0.006 from the Blackburn and Boutin study is used instead, the Risk Quotient is unacceptable (much greater than 1) for any type of application considered.

Had APHIS taken into account relevant studies, they would have concluded that wild plants, including those that are threatened and endangered, are at risk from deregulating Roundup Ready alfalfa due to the direct effects of glyphosate.

This change in basic assumptions would alter the conclusions reached in the DEIS about impacts of RR alfalfa adoption on T&E plant species. Instead of being at risk from aerial applications only, ground equipment would also pose significant risks. In the DEIS, mitigation measures for reducing risk from aerial applications were enumerated, such as "maintaining the application rates below 3.5 lb a.e./A for ground-based application and 0.7 lb a.e./A for aerial application in the counties where listed species would be within 250 feet of GT alfalfa fields. The maximum single use application rate for ground and aerial applications of glyphosate on GT alfalfa is 1.55 lb a.e./A." (DEIS:163). However, with an NOEC below 0.006, the application rates would have to be less than 0.6 lb a.e./A using ground equipment and 0.12 lb a.e/A with aerial applications. These are not commercially acceptable rates for reliably killing most weeds. Thus, of the two alternatives under consideration by APHIS (DEIS:11-13), the only option to protect T&E terrestrial and semi-aquatic plants would be the "no action" alternative.

No studies are reported on the sensitivity to glyphosate of the 78 T&E plants determined to be at potential risk if RR alfalfa is granted non-regulated status. There is certainly more diversity within these species in growth habits, modes of reproduction, physiological characteristics and so on, than within the 10 crop plants used by Monsanto to determine the lowest NOEC. Also, Monsanto did not include reproductive effects in their determination of NOEC values. Therefore, it is likely that the lower numbers obtained in the study by Blackburn and Boutin are more relevant to the RR alfalfa DEIS than are the numbers used by APHIS.

Another factor that has not been studied for the 78 at-risk species is the impact of being able to apply glyphosate during the entire RR alfalfa growing season. It is certain that these plants will have to potential to be exposed to glyphosate during more of their growth phases, including closer to or during reproduction, making them more vulnerable to adverse reproductive outcomes. In their discussion, Blackburn and Boutin say this: "It is difficult to predict how glyphosate exposure will change a plant community due mainly to the wide variation in maturation and growth patterns of the species present at the time of application. Noncrop species growing within crops or along field margins where they may be exposed to glyphosate through overspray or spray drift may be at different phonological [phenological] stages that the crop in which or near which they are growing (Shuma et al.,1995). Some species may have mature seeds while others may have immature seeds and still others may not be reproducing yet. The future of the seeds could be affected, while in the cases where plants are not at a stage of reproduction, the death or declined vigour of the plant could result in no input of seeds for the next generation. Herbicide applications may reduce the production of viable seeds and thus reduce the

establishment or replenishment of noncrop seed reserves in the soil (Baskin and Baskin, 1998)." Again, adoption of RR alfalfa will increase the likelihood that many stages of a particular plant will be contacted by glyphosate, causing a more varied and perhaps cryptic injury pattern, not seen until the next generation. This type of injury will be difficult to monitor and mitigate until it is too late for the T&A species affected. Only the "no action" alternative will protect these plants.

Impacts of the Roundup Ready alfalfa/glyphosate system on threatened and endangered species via indirect effects were not adequately analyzed in the DEIS.

The importance of indirect effects of glyphosate on plants was described by Blackburn and Boutin in their discussion on p. 283:

"The concern [about the effects of glyphosate on reproduction] does not only exist for abundance but also composition of plant species. Plants form the base of the community. Organisms from detritivores to large predators who prey upon species which eat plants will be affected by changes in the vegetation. There could also be a negative impact on the crop to which the herbicide is applied. Without the presence of certain plant species in the surrounding areas, important pollinators may not be present and thus there will be a decline in crop pollination success. The application of glyphosate to improve crop yields may be inadvertently having the opposite effect. Likewise, Liu et al. (1997) demonstrated that glyphosate increases the sensitivity of corn (Zea mays) to two fungus species (Pythium ultimum and P. sylvaticum) by suppressing the typical pathogen-induced lignification of tissues in roots which would normally act as a barrier to invasion…An increase in glyphosate use due to the increase of crop strains engineered to be tolerant to the herbicide (Shaner, 2000) will only increase the potential negative impacts of spray drift on the nontarget communities…" (Comment Number: APHIS-2007-0044-10966-6)

Response: There is likely more variability in 78 T&E species in sensitivity to glyphosate than in 10 crop species. It is not EPA (or USFWS) policy to evaluate all potential T&E species (in this case, 78 plant species) sensitivity to a pesticide; the NOAEC from the most sensitive species from species representing several different plant families is a standard practice for EPA risk assessment in several program offices. It also might be true that a crop species not tested by Monsanto is more sensitive than most wild species in most plant families.
There is a possibility that changes in plant composition in the vicinity of GT alfalfa crops would essentially change the suitability of the "250-ft" perimeter potential drift zone for T&E species if they were present. This is discussed in more detail in section IV.C. 3 of the FEIS. The FEIS includes an expanded discussion of changes in glyphosate and other herbicide use in agriculture, including alfalfa, in response to GT crop availability in appendix J.

Comment Excerpt Text:
Indirect effects on threatened and endangered organisms that could result from glyphosate-induced changes in plant populations from adoption of RR alfalfa were dismissed based on the conclusion that drift levels of glyphosate would have no effect on non-endangered plants (Mortensen et al. 2008, p. 32). This analysis is inadequate because the same caveats of different sensitivities to glyphosate in different species and stages of the lifecycle hold for non-endangered

plants, thus the potential for drift levels of glyphosate to affect their local populations was likely underestimated.

Anther indirect effect could be a decrease in the biodiversity of plants in the Roundup Ready alfalfa fields themselves, because according to the DEIS: 17, alfalfa is a habitat: "Because it is widespread and is typically grown as a perennial crop, alfalfa also provides important habitat for wildlife (Hubbard, 2008)". It is now grown as mixed-species forage on some farms, and this will be impossible with adoption of the RR alfalfa/glyphosate system.

Glyphosate use within the RR alfalfa field precludes cultural practices such as concurrent companion or nurse plantings of other crops (oats, for example), which also increase diversity within the field. This is mentioned in the DEIS:72, but not in relation to T&E species: "Another important difference is that non-GT crops cannot be used as companion crops for GT alfalfa. This difference is important for farmers that traditionally interseed companion crops like small grains (e.g., oats) with alfalfa; it does not affect farmers that plant pure alfalfa stands. Companion crops may possibly benefit stand establishment by weed control, increased forage yield during the seedling year, and wind and frost protection for young alfalfa seedlings (Orloff et al., 1997)."

These reductions in plant diversity within the alfalfa field are likely to change its value as a habitat for birds, insects and mammals. Areas that contain a number of different species are more productive, and more resilient in the face of stresses, further reducing the value of RR alfalfa as habitat compared to alfalfa managed with other species included (Tilman et al. 2001).

To the extent that glyphosate use increases in areas directly adjacent to RR alfalfa due to better crop safety relative to use of herbicides next to conventional alfalfa, plant diversity and thus suitability for habitat is likely to decrease as a result, as well.
It is interesting that Blackburn and Boutin bring up the issue of increased disease susceptibility triggered by glyphosate, because there is a growing body of evidence that not only plant defenses are hindered, but also the disease organisms themselves may be affected by glyphosate (see articles in European Journal of Agronomy, Vol. 31, listed in "References cited", for a recent compendium of peer reviewed papers of this topic). Obviously, diseases that increase and spread can affect other plants than those directly hit with glyphosate spray.

Most plants also require symbioses with microorganisms for optimal health. Some strains of nitrogen-fixing bacteria are sensitive to glyphosate, for example (Suwa et al. 2009, reviewed in Kremer and Means 2009, article no. 8 in European Journal of Agronomy, Vol 31).

APHIS does not adequately address the many studies that have shown glyphosate-induced changes in microbial functions or populations. Instead, APHIS cites studies showing no changes (DEIS:27). Threatened and endangered plants could be negatively affected by alterations in symbiotic or pathogenic microorganisms from glyphosate applications directly to their habitats, or to nearby areas. (Comment Number: APHIS-2007-0044-10966-7)

Response: Potential risks to threatened and endangered species were summarized in section IV.C.2 of the DEIS. Under some aerial glyphosate application scenarios, there is some

possibility of drift into adjacent areas that may contain both endangered and nonendangered species of plants. At high glyphosate application rates, some adverse effects could be expected within 250 feet of the sprayed fields. Label restrictions imposed by EPA on glyphosate should mitigate those threats. As described in the DEIS, section IV.C.3, use of GT alfalfa with glyphosate for weed control may result in reduced use of more toxic and persistent herbicides in those areas where farmers are supplying markets that require weed-free alfalfa. An expanded discussion of risks to threatened and endangered species from increased use of glyphosate is included in section IV.C.2 of the FEIS.

Use of GT alfalfa with glyphosate spraying is intended to provide alfalfa fields free of other plant species for sale to markets that require "weed-free" alfalfa. If conventional alfalfa fields are being replaced with GT alfalfa to serve a weed-free market, then the fields already are being maintained as monocultures by other means (or other herbicides). Those fields already provide less value as habitat to wildlife in general than alfalfa fields in which some level of weeds are tolerated and introduction of GT alfalfa with glyphosate spraying does not change the diversity of species in the fields.

Regarding companion cropping, farmers using this method likely would not use GT alfalfa. As discussed in appendix V section 5.5–5.11 of the DEIS, non-GT alfalfa can coexist in regions where GT alfalfa is planted nearby (e.g., neighboring farmers) using effective strategies (e.g. equipment sanitation, harvest management, field separation, contractual practices).

Concerning increased susceptibility to disease in plants sprayed with glyphosate, the DEIS section IV.C.4, IV.G.1, appendix J section 2.2.2 acknowledged that some studies (in USDA FS, 2003) have shown an increase in microbial activity in soils subject to glyphosate application. The FEIS expands the discussion of glyphosate and plant susceptibility to disease in sections IV.C.4 and IV.G.1 and appendices J and N.

Comment Excerpt Text:
Adverse Impacts to Amphibians and Listed Species Requires Further
Analysis under NEPA and the Endangered Species Act
1. Potential impacts of glyphosate exposure to amphibians
APHIS concludes "Terrestrial and aquatic T&E animals are expected to be at low risk to direct effects from exposure to glyphosate used in agriculture."[Footnote 62: DEIS at 118.] This conclusion is based on an assessment conducted by the Monsanto Company along with an independent APHIS review. Relying on a report
conducted by Monsanto, the company that stands to profit greatly from the deregulation of GT alfalfa, is
questionable. In addition, the independent review conducted by APHIS, said to support the conclusions
of Monsanto's report, does not appear to be thorough when it comes to assessing the potential risks of
glyphosate exposure to amphibians.

The technical report by APHIS acknowledges that some researchers have suggested that

Roundup® could cause high mortality rates to amphibians. However, the report only specifically refers
to the Relyea (2005a)[Footnote 63: Relyea, RA, The impact of insecticides and herbicides on the biodiversity and productivity of aquatic communities, Ecological Applications 15 (2005a) at 618-627.] study and then claims that its testing methods have been called into question for using high exposure doses (3.8 mg active ingredient/L). In light of this data gap, APHIS has failed to examine other studies that have been conducted using lower exposure doses.
In another study published in the same year, amphibian tadpoles were exposed to much lower concentrations of Roundup® (1.3 mg active ingredient/L), resulting in a 40% reduction in tadpole survival and in total tadpole biomass.[Footnote 64: Relyea, RA, NM Schoeppner, & JT Hoverman, Pesticides and amphibians: The importance of community context, Ecological Applications 15(4) (2005) at 1125-1134.]

In another study nine species of larval anurans and four species of larval salamanders were exposed to
Roundup Original Max®.[Footnote 65: Relyea, RA & DK Jones, The toxicity of Roundup Original Max® to 13 species of larval amphibians, Environmental Toxicology and Chemistry 28 (2009) at 2004-2008.] The amount required to kill 50% of the individuals of each species ranged from 0.8- to 2.0-mg acid equivalents per Liter (a.e./L) for the anurans and from 2.7- to 3.2-mg a.e./L for the salamanders tested.[Footnote 66: Id.] Based on the toxicity categories defined by the U.S. Fish and Wildlife Service and the U.S. Environmental Protection Agency and the results of this study, Roundup Original Max® would be classified as moderately to highly toxic to larval anurans and moderately toxic to larval salamanders.[Footnote 67: Id]

Govindarajulu (2008) conducted a literature review for the Ministry of Environment in British Colombia, on the impacts of glyphosate herbicide on amphibians, which resulted in a classification of glyphosate herbicides as moderately to highly toxic to amphibians.[Footnote 68: Govindarajulu, P. P., Literature review of impacts of glyphosate herbicide on amphibians: What risks can the silvicultural use of this herbicide pose for amphibians in
B.C.?, B.C. Ministry of Environment, Victoria, BC. Wildlife Report No. R-28 (2008).]

Considering that several studies and reviews have found that glyphosate herbicides can be at least moderately toxic to amphibians, APHIS must thoroughly review of the potential effects to amphibians and should reconsider
its conclusion that amphibians are at low risk to direct effects from exposure to glyphosate.
The APHIS report focuses only on acute toxic effects to amphibians. It is also important to consider other ways in which amphibians may be affected by exposure to glyphosate herbicides.
Govindarajulu's review of the literature found that amphibians may suffer from sublethal effects as a
result of exposure to glyphosate herbicides. These sublethal effects can include impaired growth and
development as well as behavioral changes and can contribute to reduced survival and reproductive
success when combined with other environmental stressors.[Footnote 69: Id.]

A recent study suggests that current environmental concentrations of pesticides may be acting as sublethal stressors on amphibians, making them more vulnerable to other stressors, such as habitat alteration or disease.[Footnote 70: Boone MD & Bridges CM, Effects of pesticides on amphibian populations, Amphibian Conservation,
(Semlitsch RD, ed. Smithsonian Institution, 2003) at 152-167.] Larval amphibians also typically have to cope with the interaction of pond hydroperiod, competition, and predation as they develop towards metamorphosis and sublethal effects of contaminants can alter the abilities of larvae to successfully deal with these challenges.[Footnote 71: Semlitsch RD. 2000. Principles for management of aquatic-breeding amphibians. Journal of Wildlife Management 64(3):615-31.]

APHIS also underestimates the potential for exposure to amphibians in terrestrial habitats where individuals could be exposed to glyphosate either through contact with the soil or through direct overspray within the alfalfa fields. In a study not mentioned in the report, three species of juvenile
amphibians were exposed to direct overspray of Roundup® and found that only 21% of the amphibians
were still surviving one day after the Roundup® application.[Footnote 72: Relyea, RA (2005b). The lethal impact of Roundup® on aquatic and terrestrial amphibians. Ecological Applications 15 at 1118-1124.]
2. Risk to 78 Threatened and Endangered plant species Section 7 of the Endangered Species Act (ESA) requires all federal agencies to ensure, in consultation with the federal fish and wildlife agencies, that “any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of [critical] habitat of such species.”[Footnote 73: 16 U.S.C. § 1536(a)(2).] This provision mandates that endangered and threatened species are "afforded the highest of priorities" when actions are taken that may affect such species.[Footnote 74: T.V.A. v. Hill, 437 U.S. 153, 174 (1978).]

To guarantee compliance with the 'no-jeopardy' mandate, Section 7(a)(2) requires APHIS to consult with the appropriate wildlife agency – here, the U.S. Fish and Wildlife Service (FWS). This
obligation can be satisfied either through "formal" consultation, during which FWS issues a Biological
Opinion addressing the potential effects of the action on listed species, offers reasonable and prudent
alternatives to the action that will avoid jeopardizing the species, and where appropriate, issues an
incidental take statement specifying measures to mitigate the impacts of the authorized take,[Footnote 75: 16 U.S.C. § 1536(b); 50 C.F.R. § 402.14.] or
through "informal" consultation in the limited circumstance where the action agency determines, and
FWS concurs in writing, that the action may affect but "is not likely to adversely affect" a listed species.[Footnote 76: 50 C.F.R. § 402.13.]

Consultation is required whenever an agency action "may affect" a listed species or designated

critical habitat.[Footnote 77: 50 C.F.R. § 402.14; see 51 Fed. Reg. 19,926, 19,949 (June 3, 1986) ("Any possible effect, whether beneficial, benign, adverse, or of an undetermined character, triggers the formal consultation requirement . . .."),.]

APHIS acknowledges that glyphosate is highly toxic to plants and that there is a potential risk of glyphosate exposure to 78 species of threatened and endangered plants. A number of different toxic effects result from the exposure of non-target plants to glyphosate, all of which can eventually result in plant death. Although APHIS suggests several protective mitigation measures that could be used to reduce the risks to listed plants, the preferred alternative does not actually include a plan to implement these protective measures. APHIS admits that negative impacts to threatened and endangered species may occur through aerial applications of glyphosate, but dismiss these impacts by asserting that aerial spraying will not increase with the introduction of GT alfalfa. But considering that studies show pesticide use increasing with the deregulation of GE crops, APHIS has not provided enough evidence to support this conclusion. If aerial spraying may have negative effects to listed species, APHIS must ensure that the deregulation of GT alfalfa won't lead to an increase in aerial spraying. In addition, APHIS says that it does not have the authority to mandate its suggested label use restrictions for glyphosate used on GT alfalfa fields.[Footnote 78: DEIS at 117.] Since the increased use of glyphosate expected to result from the deregulation of GT alfalfa is expected to put 78 threatened and endangered plant species at risk APHIS must implement the "No Action" alternative to avoid the potential impacts to these species and a violation of the ESA. (Comment Number: APHIS-2007-0044-11741-21)

Response: Concerning toxicity of glyphosate and water-soluble surfactants to frogs and other amphibians, see the response to comment APHIS-2007-0044-7268-2 for issue 4.1.2 . Discussion of potential risks from glyphosate use on GT alfalfa to T&E species of plants is now included in section IV.C.2 of the FEIS. Implementation of buffer zones between GT alfalfa and conventional GT, a mitigation measure described in section IV.H.2.a of the FEIS, also will provide zones of protection for T&E plant species.

EPA is considering a spray drift buffer zone analysis in their ecological risk assessment, due for completion in 2015, to determine potential exposure reductions to nontarget aquatic and terrestrial plants (U.S. EPA 2009). Based on the conclusions of EPA's ecological risk assessment, the EPA will write label directions for glyphosate-containing herbicides. Users have the responsibility to account for local conditions when applying a glyphosate-containing herbicide.

EPA uses a registration process to regulate the sale, distribution, and use of pesticides in order to protect health and the environment under FIFRA. Thus EPA can mandate label restrictions and is nearing the end of its process of evaluating glyphosate for reregistration. APHIS' analysis of impacts on T&E species was conducted under the procedures established by USFWS, which included an initial contact with USFWS in 2008 (also see response to comment APHIS-2007-0044-0868-1 for issue 4.1).

Comment Excerpt Text:
The risk of glyphosate formulations to amphibians is a question that must be examined both for the aquatic larval stages and the adult terrestrial stages. Given that most data exist for the larval stage, I will briefly review those data first.
The effect of glyphosate on larval amphibians: Background
To understand the risk posed by Roundup® formulations to larval amphibians, one must first understand how these formulations operate. Previous studies have demonstrated that the component of Roundup® formulations that is lethal to larval amphibians is not the active ingredient, glyphosate, but the surfactant (Mann & Bidwell 1999, Howe et al. 2004).
Surfactants are chemicals that lower surface tensions. For weed control, a surfactant is added to Roundup® formulations to lower the surface tension on a leaf. Lowering the surface tension allows the active ingredient to penetrate the leaf surface and get into the plant. Because surfactants have a hydrophilic and a hydrophobic end, they dissolve well in water and they dissolve well in fats, oils, and lipids. Herein lies the problem for fish and larval amphibians. Fish and larval amphibians possess gills composed of a thin layer of cells. Surfactants are very good at penetrating the lipid bi-layer membranes of gill cells, causing the gill cells to rupture. Fish and larval amphibians with ruptured gill cells cannot breathe, so they suffocate and die. In general, strong surfactants that are effective for penetrating the leaves of plants are also very good at penetrating the gill cells of fish and larval amphibians.
In terrestrial glyphosate formulations, the most commonly used surfactant has been polyethoxylated tallowamine (POEA). Newer formulations of Roundup® formulations do not divulge the composition of their surfactants to the public, but the surfactants are known to the EPA. As detailed below, the newer formulations that have been tested on amphibians (containing undivulged surfactants) have the same toxicity as older formulations that contain the POEA surfactant.
The effect of glyphosate on larval amphibians: The Relyea (2005) study
The Draft EIS focuses on the Relyea (2005a) study which brought a great deal of attention to the potential effects of commercial formulations on amphibians. In that study, Roundup® Weed and Grass Killer was added to outdoor mesocosms that contained 45-cm deep water and 3 mg a.e./L. In that study, Relyea (2005a) found a 70% decline in amphibian species richness and an 86% decline in tadpole biomass, with three species experiencing 98% to 100% mortality.
The Draft EIS criticized this study based on three arguments. The first argument made against the study was that the application rate was unusually high. While the application rate was higher than recommended rates for alfalfa, the concentration in the water is what matters to the animals. For example, the study could have used 1/3 of the application rate and 1/3 the depth of water. This lower application rate would have still produced the same concentration and the same amount of tadpole mortality. The real issue is not the application rate, but whether the concentration in the water was one that could be observed in wetlands. Calculated concentrations

for worse-case scenarios and several surveys of glyphosate concentrations in water confirm that the concentration used in this experiment is within the range of expected and observed worst case
scenarios (Edwards et al. 1980, Beck 1985, Legris & Couture 1989, Newton et al. 1994, Couture et al. 1995, Mann & Bidwell 1999, Giesy et al. 2000, Perkins et al. 2000, Woods 2001, Solomon & Thompson 2003, Thompson et al. 2004).

The second argument made against the Relyea (2005a) study is that Roundup® Weed and Grass Killer is not intended for use over water. This is an old argument (Relyea 2006). The faulty logic is that because terrestrial formulations are not registered for use over water, the herbicide cannot occur in water. Numerous studies have repeatedly shown that this naïve view is not correct. Wetlands are commonly contaminated due to inadvertent overspray, runoff from plant surfaces during rain events, and leaching (Edwards et al. 1980, Beck 1985, Legris and Couture 1989, Newton et al. 1994, Couture et al. 1995, Giesy et al. 2000, Woods 2001, Thompson et al. 2004).

The third argument made against the Relyea (2005a) study is that Roundup® Weed and Grass Killer is not approved for use on Roundup® Ready alfalfa. Therefore, "the impacts of the preferred alternative on amphibians are unlikely." While it is correct that Roundup® Weed and Grass Killer is not approved for use on Roundup® Ready alfalfa, the argument presumes that the effects of Roundup® Weed and Grass Killer on amphibians are somehow different from the effects of formulations approved for use on Roundup® Ready alfalfa. This argument in the Draft EIS was not based on any actual studies. Moreover, it is wrong. The literature clearly demonstrates that multiple formulations of Roundup®, including formulations approved for use on Roundup® Ready alfalfa, have the same harmful effect on amphibians. Simply stated, it is the surfactant, not the latest marketing name, that determines whether amphibians die.

The effect of glyphosate on larval amphibians: Past studies

One of the striking features of the Draft EIS is its incomplete evaluation of the literature on the impacts of glyphosate formulations on larval amphibians. For example, it failed to mention that Relyea (2005b) found that the presence or absence of soils had no impact on the toxicity of Roundup® Weed and Grass Killer. It also failed to note that mesocosm experiments using 1/3 of the previously described application rate (concentration = 1 mg a.e./L) still found 29% mortality in leopard frogs, and 71% mortality in American toads (Relyea et al. 2005).

The Draft EIS also fails to consider the wealth of studies from other researchers on glyphosate and larval amphibians that have been published during the past decade. These studies include Chen et al. (2004), Edginton et al. (2004), Howe et al. (2004), Wojtaszek et al. (2004), and Relyea (2005c).

Are these studies relevant? The following quotes summarize the conclusions of just some of these studies:

"We concluded that, at EEC [environmentally expected concentration] levels, there was an appreciable concern of adverse effects to larval amphibians in neutral to alkaline wetlands. The finding that the mean pH of Northern Ontario wetlands is 7.0 further compounds this concern." (Edginton at el. 2004, p. 821).

"For both species, significant effects of the herbicide were measured at concentrations lower than the calculated worst-case value for the expected environmental concentration." (Chen et al. 2004, p. 823).

"The present results indicate that formulations of the pesticide glyphosate that include the surfactant POEA at environmentally relevant concentrations found in ponds after field applications can be toxic to the tadpole stages of common North American

amphibians." (Howe et al. 2004, p. 1933).
In summary, what the Draft EIS did was to take perhaps the highest profile study of Roundup® effects on tadpoles (Relyea 2005a) and ineffectively argue against its relevance. At the same time, the EIS ignored the large number of studies that have corroborated the Relyea (2005a) conclusions using several different commercial formulations.
The effect of glyphosate formulations on larval amphibians: New studies
There are two new studies examining the effects of terrestrial formulations of glyphosate on tadpoles. These studies were published in August 2009, perhaps not in time to be incorporated into the Draft EIS (November 2009).
The first of these studies examined eight species of tadpoles in Colombia as part of the risk assessment for the U.S.-funded program to spray Roundup® on illegal coca and poppy fields. Using a formulation of glyphosate that contains the common surfactant POEA (Glyphos-Cosmo-Flux®), the researchers found that the LC504-d ranged from 1.2 to 2.8 mg a.e./L (Bernal et al. 2009a). The researchers conclude, "Data suggest that sensitivity to Roundup-type formulations of glyphosate in these species is similar to that observed in other tropical and temperate species." (Bernal et al. 2009a, p. 961). As in the case of Roundup Weed and Grass Killer®, this formulation does not go by the same name as the formulations approved for use on Roundup® Ready alfalfa, but it contains the same active ingredient and the same POEA surfactant and has the same effect on tadpoles.
Perhaps even more relevant is the latest study by Relyea & Jones (2009). In that study, the researchers used Roundup Original MAX®, a commercial formulation that is approved for use on Roundup® Ready alfalfa. This work examined the LC504-d across 13 different species of tadpoles and larval salamanders. The LC504-d values ranged from 0.8 to 2.0 mg a.e./L for nine species of tadpoles and 2.7 to 3.2 mg a.e./L for four species of larval salamanders. Thus, the toxicity values for this approved formulation are quite similar to other tested formulations including Glyphos Cosmo-Flux® (Bernal et al. 2009a), Roundup® Original (Howe et al. 2004), Roundup® Weed and Grass Killer (Relyea 2005c), and Roundup® Transorb (Howe et al. 2004). (Comment Number: APHIS-2007-0044-7268-2)

Response: An expanded discussion of toxicity of glyphosate and water-soluble surfactants to frogs and other amphibians has been added to section IV.C.5 and appendix N of the FEIS.

Comment Excerpt Text:
Assessing the risk of terrestrial formulations to larval amphibians
For virtually all pesticides, amphibians do not have to be tested as part of the normal US EPA registration process. As a result, few toxicity data typically exist for amphibians. As a result, the standard protocol for assessing the risk of chemicals to larval amphibians has been to use fish as a surrogate group (Jones et al. 2004). This is based on the assumption that amphibians and fish have similar sensitivities. Thus, if we set an upper concentration limit based on the most sensitive fish species, we will protect all fish and all larval amphibians.
The EPA protocol changes, however, when there are amphibian data available. In this situation, the EPA will consider amphibian studies as well as fish studies, particularly when amphibian species are more sensitive than fish (Jones et al. 2004). For Roundup® formulations approved for use on Roundup® Ready alfalfa, this is clearly the case. As noted in Appendix N of the Draft EIS, the most sensitive fish data was for the rainbow trout has an LC504-d value of 3.13 mg

a.e./L. In contrast, the most sensitive tadpoles species has an LC504-d value of 0.8 mg a.e./L (Relyea & Jones 2009). Thus, tadpoles die at one-fourth of the concentration that kills fish. When the US EPA conducted its effects determination for the California Red-Legged Frog (Carey et al. 2008), these data had not yet been published. It is reasonable to expect that the upcoming EPA review of glyphosate formulations will include these new studies in developing a new upper limit for glyphosate formulations.

In assessing risk, we need to know the concentrations that cause harm (based on LC50 studies) and then compare these values to the concentrations expected in nature. To set a safe upper limit for a chemical, the standard EPA protocol to protect wildlife such as amphibians is to take the LC50 value for the most sensitive species and divide this value by 10 or 20 (Jones et al. 2004). That is, if we know the concentration that will kill 50% of the animals, dividing this concentration by 10 or by 20 should give a concentration that kills few or none of the animals. Based on the latest studies, the most sensitive amphibian species are the American bullfrog and the spring peeper. Both have LC504-d values of 0.8 mg a.e./L. If we divide this value by 10, the upper limit to protect larval amphibians is 0.08 mg a.e./L. If we divide this value by 20, the upper limit that would protect larval amphibians is 0.04 mg a.e./L.

How do these upper-limits (0.04 to 0.08 mg a.e./L) compare to the peak concentrations expected in nature? The EPA's study of the California Red-Legged Frog estimated the peak aquatic concentration for glyphosate at 0.210 mg/L (Carey et al. 2008). This means that the expected aquatic concentrations of terrestrial formulations of glyphosate (during terrestrial applications) exceed the concentrations that are deemed to be safe under standard EPA protocols.

Assessing the risk of terrestrial formulations to terrestrial amphibians

The debate over glyphosate formulations and amphibians has centered on the aquatic stages with little attention of impacts on terrestrial stages. However, there have been two studies of terrestrial applications of these products on terrestrial stages of amphibians (Relyea 2005b, Bernal 2009b). Neither of these studies was mentioned in the Draft EIS.

As a bit of background, because there are so few studies on the effects of chemicals on the terrestrial stages of amphibians, the EPA's standard protocol is to rely on bird studies. These are not studies of birds being over-sprayed, but of birds ingesting food that has been contaminated by a given chemical (Jones et al. 2004). The hope is that by setting upper levels of contamination that protect birds, we will also protect adult amphibians. Unfortunately, there are too few data to know if this is a reasonable assumption.

The EPA recently used the bird-ingestion approach to evaluate the potential effects of glyphosate formulations on the California Red-Legged Frog. In this risk assessment, the EPA concluded that there were no concerns over direct negative effects of the herbicide on adult frogs, but they did identify concerns regarding indirect negative effects on the frogs via effects on the frogs’ habitat and prey. In the end, they concluded (using standard EPA categories), "Based on the best available information, the Agency makes a May Affect, and Likely to Adversely Affect determination for the CRLF [California red-legged frog] from the use of glyphosate." (Carey et al. 2008, p. 10). In plain language, the EPA concluded that the use of glyphosate in the habitats of the California red-legged frog would likely have a negative effect on the long-term persistence of the endangered frog's population. This important conclusion by the EPA was not mentioned in the Draft EIS.

When terrestrial amphibian toxicity studies are available, the EPA reserves the option to consider amphibian studies in addition to bird ingestion studies. Two terrestrial studies exist, but neither was mentioned in the Draft EIS. In the first study (Relyea 2005b), juvenile frogs and toads were

given a direct over spray at a single application rate which is higher than the application rates for Roundup® Ready alfalfa (Table 3-2 of the Draft EIS).
A more recent study, however, examined frog survival across a range of application rates for terrestrial frogs (Bernal 2009b). As a result, this study (funded by the U.S. government) can be used to estimate safe application rates for adult amphibians. This work was conducted with Glyphos Cosmo-Flux®, a terrestrial formulation that contains the POEA surfactant. In the study, the LC504-d values ranged from 4.5 to 22.8 kg a.e./ha.
Using these data, we can again following the standard EPA protocol of determining a safe upper limit by dividing the LC50 of the most sensitive species by 10 or 20. As noted above, the most sensitive species has an LC50 of 4.5 kg a.e./ha. After dividing by 10 or 20, the safe application rate would then be 0.45 or 0.23 kg a.e./ha. In English units, this converts to 0.54 or 0.27 lb a.i./ac (1 kg a.e./ha = 1.19 lb a.i./ac).
How do these upper-limit application rates (0.27 to 0.54 lb a.i./acre) compare to the application rate used for Roundup® Ready alfalfa? The recommended applications rates for Roundup® Ready alfalfa are 1.9 to 2.0 lb a.i/ac (Table 3-2 of the Draft EIS). Hence, based on the best available data for the sensitivity of terrestrial stages of frogs, the recommended application rates for Roundup® Ready alfalfa are four to eight times higher than the application rates that would be deemed safe under standard EPA risk assessment protocols.
Closing remarks
Assessing the risks of any chemical in the environment always needs to be done using the best available data. As a scientist who has investigated amphibian toxicology for more than 10 years, it is my view that the Draft EIS provides a poor assessment of the amphibian data that were available. The vast majority of studies on amphibians and glyphosate formulations appear to have been given no consideration. Instead, the EIS focused on an ineffective attempt to dismiss a single high-profile study (Relyea 2005a).
Fortunately, past amphibian studies have used several different terrestrial formulations of glyphosate, giving us an excellent understanding of how different formulations affect amphibians. From this work, it is clear that that terrestrial formulations sold under a variety of brand names are highly relevant to formulations approved for Roundup® Ready alfalfa. Indeed, the formulations approved for Roundup® Ready alfalfa are simply the latest generation of Monsanto brand names. Independent research groups have found very similar effects on amphibians for Glyphos Cosmo-Flux® (Bernal et al. 2009a), Roundup® Original (Howe et al. 2004), Roundup® Weed and Grass Killer (Relyea 2005c), Roundup® Transorb (Howe et al. 2004), and Roundup® Original MAX (Relyea and Jones 2009). Amphibians and fish are unaware of the brand name; what matters to them is the surfactant that is added to the products.
Finally, the Draft EIS and past EPA studies have not had the opportunity to include a series of new studies (Bernal et al. 2009a, 2009b, Relyea & Jones 2009). These studies have confirmed that amphibians are highly sensitive to terrestrial glyphosate formulations at relevant concentrations and application rates. Standard risk assessment protocols indicate that the aquatic and terrestrial stages of amphibians are both at risk of mortality at the recommended application rates for Roundup® Ready alfalfa. Given this fact, it seems reasonable that any USDA decision on Roundup® Ready alfalfa should be deferred until the EPA completes its upcoming registration review. (Comment Number: APHIS-2007-0044-7268-3)

Response: The FEIS expands the discussion of toxicity of glyphosate and water-soluble surfactants to frogs and other amphibians in section IV.C.5 and appendix N and includes studies

cited by the commenter. The registration review program, as mandated by the Food Quality and Protection Act of 1996, is intended to monitor the effects of all registered pesticides and make sure each registered pesticide continues to meet the statutory standard of no unreasonable adverse effects to human health or the environment. Through the registration review program, the EPA periodically evaluates pesticides to make sure that as changes in science, public policy, and pesticide use occur, products in the marketplace can be used safely. The EPA is currently in the process of re-evaluating the use of glyphosate (see docket EPA-HQ-OPP-2009-0361 on www.regulations.gov). The EPA is anticipating conducting comprehensive human health and ecological risk assessments, including an endangered species assessment, for all uses of glyphosate. The EPA estimates completing the registration review in 2015. The ecological risk assessment planned during the registration review will allow the EPA to determine whether glyphosate's use has "no effect" or "may affect" federally listed threatened or endangered species or their designated critical habitat. When an assessment concludes that a pesticide's use "may affect" a listed species or its designated critical habitat, the EPA will consult with the USFWS and/or NMFS, as appropriate.

Regarding use of EPA's 2004 standard protocol for ecological assessments in its Office of Pesticide Programs (Jones et al. 2004), a few points of clarification and terminology are noted first. The OPP protocol, as explained in Jones et al. (2004), defines different levels of concern (LOC) for a risk quotient (RQ), which is equal to an estimated environmental concentration (EEC) divided by an LC_{50} or LD_{50}. For endangered species of aquatic animals, including larval stages of endangered amphibian species, the LOC is an acute RQ greater than 0.05. That is equivalent to dividing the LC_{50} by a factor of 20 to calculate a toxicity reference value (TRV) and using a hazard quotient (HQ), which is equal to the EEC/TRV, of greater than 1.0 as an exposure level of concern (hazard quotient is more familiar to many risk assessors).

However, for nonlisted nontarget aquatic animals, an acute RQ assuming maximum application rates of greater than 0.1 (equivalent to division of the LC_{50} by a factor of 10 and using an HQ of 1.0) is an LOC for pesticides with label restrictions. An acute RQ greater than 0.5 (equivalent to division of the LC_{50} by a factor of 2.0 and using an HQ of 1.0) is defined as an LOC for further regulatory action in addition to label restrictions.

For birds and mammals, the LOCs are less restrictive and equivalent to an LD_{50} divided by a factor of 10 for endangered species and a factor of 5 for nonlisted species (instead of the factors of 10 and 20 cited by the commenter). For plants and for chronic toxicity reference values for animals, the LOC is simply any RQ greater than 1.0. For endangered plant species, more sensitive endpoints are used than for nonlisted species.

Using the OPP policy of treating a terrestrial frog or toad as a bird, and considering nonlisted species, the application rates causing 50 percent mortality in the most sensitive terrestrial amphibian species need only be divided by a factor of 5 (or 10 for an endangered species), not 10 or 20. This means at a screening level, the recommended application rates for glyphosate formulations in the DEIS table 3-2 on GT alfalfa are two to four times higher than a level triggering concern and a more detailed assessment of risk for nonlisted and listed species, respectively. Concern could be less for formulations with less potent surfactants than POEA.

Given the toxicity of glyphosate formulations for herbicide control to various life stages of amphibians, the commenter recommended delaying the FEIS until the EPA completes its reregistration review of glyphosate herbicides. EPA's reregistration process is used to regulate the sale, distribution, and use of pesticides to protect health and the environment FIFRA. Thus, when EPA completes its reregistration process, it will include label restrictions on application of the herbicide. The risk assessment paradigm applied in appendix N of the DEIS to support the Biological Impacts section (IV.C) of the DEIS is essentially the same paradigm used in EPA's pesticide reregistration process. Moreover, Monsanto provided to the USDA essentially the same toxicity data as it provided to EPA's Office of Pesticide Programs.

With respect to the U.S. EPA (2008) finding of "likely to adversely affect" (LAA), the aquatic phases of the California Red-Legged Frog (CRLF) (Rana aurora draytonii), two points are key. First, the LAA was not based on direct toxicity for the aquatic life-stage, it was based on reduction of prey and habitat unique to the Red-legged Frog. The LAA finding for the terrestrial phase was via both direct toxic effects and indirect effects through prey and habitat loss (http://www.epa.gov/espp/litstatus/effects/redleg-frog/glyphosate/transmittal-ltr.pdf). Second, each listed species has its own life history, foraging behavior, diet, geographic range, and population distribution. A finding for the Red-legged Frog cannot be extrapolated to other species.

Comment Excerpt Text:
Monsanto's environmental analysis is incomplete and misleading, since they did not evaluate GM alfalfa's impact on fish and amphibians, nor accurately on soil erosion. Monasanto admits that glyphosate is slightly toxic to fishes and aquatic wildlife and that the surfactant POEA in GE alfalfa has even higher toxicity for fishes and aquatic invertebrates, which are the basis of fresh water food chains. While admitting the toxicity of Monsanto's GE alfalfa, they purposely didn't evaluate it's potential impacts on fishes and amphibians, BECAUSE THEY COULDN'T QUANTIFY THEM. Lack of quantifying data does not excuse Monsanto from doing research to find such data, rather this lack of quantifying infornation gives an even more urgent need to deny licensing this product, until it's toxic effects on aquatic invertebrates and fishes CAN be evaluated. (Comment Number: APHIS-2007-0044-8725-1)

Response: The two GE alfalfa strains which are the subject of this EIS are glyphosate-tolerant (GT) plants. That is, they can withstand spraying with glyphosate that would kill most other plants. The herbicide Roundup is a formulation of chemicals including the herbicide glyphosate and a surfactant. The GT alfalfa plants do not contain POEA and are not themselves toxic to fish or other aquatic life and cannot grow in surface waters. The Roundup formulations can be toxic to aquatic organisms depending on their composition, as discussed in section IV.C and appendix N of the DEIS.

Comment Excerpt Text:

Contrary to APHIS' assertions, aerial applications of glyphosate do not pose the only risk to plants. APHIS fails to consider the well-known sub-lethal effects of glyphosate on plants that impact reproduction therefore jeopardizing species survival. Reproductive problems and other impacts can occur at low doses of glyphosate, often lower than the EPA's application rates. The use of glyphosate-tolerant crop systems raises concerns about increased use of glyphosate and impacts on non target plants, many of which are T&E species (Comment Number: APHIS-2007-0044-9936-29)

Response: See the response to comments APHIS-2007-0044-10966-4 and 10966-5 for issue 4.1.2.

Comment Excerpt Text:
The risks of glyphosate herbicides to endangered plant and some animal species are documented in numerous studies. In 1996, The U.S. Fish and Wildlife service identified 74 endangered plant species believed to be at risk as a result of glyphosate use. (Comment Number: APHIS-2007-0044-9936-30)

Response: See the response to comments APHIS-2007-0044-10966-4, 10966-5, and 10966-6 for issue 4.1.2.

Comment Excerpt Text:
Even Monsanto acknowledges glyphosate's potential harm to endangered species. The company has a web-based tool called "Pre-Serve: Glyphosate Mitigation Instructions", which shows areas in the United States where threatened or endangered plant species may exist near agriculture. This web site advises growers on appropriate pattern and application rates of glyphosate to minimize risks to rare or endangered plant species. [Footnote 95 http://www.pre-serve.org/Pre-Serve-B02/, http://www.monsanto.com/responsibility/pre-serve.asp] (Comment Number: APHIS-2007-0044-9936-32)

Response: The DEIS acknowledged glyphosate's potential for harm to threatened or endangered species of plants near GT alfalfa fields in section IV.C.2. Discussion of the potential for glyphosate use on GT alfalfa to affect T&E species of plants has been added to section IV.C.2 of the FEIS, as described in response to comment APHIS-2007-0044-10966-13 for issue 4.1.2.

Comment Excerpt Text:
A 1986 EPA Guidance for the Reregistration of Pesticide Products Containing Glyphosate (EPA Case No. 0178), identifies three listed species that, according to EPA's consultation with the USFWS Office of Endangered Species, may be jeopardized by use of the compound (jeopardy being the highest level of effect under the Sec. 7 regulations). In particular, for use of glyphosate in a "crop cluster" in that document, the then-listed species jeopardized were Solano grass, the Valley elderberry longhorn beetle, and the Houston toad. (Each of those species is still listed.) EPA also stated that many endangered plants may be at risk from glyphosate. The EPA's 1993

Re-registration Eligibility Decision (RED) for Glyphosate, the most current registration for the compound, confirmed and expanded on this 1986 jeopardy opinion, stating:

The Agency does have concerns regarding exposure of endangered plant species to glyphosate. In the June 1986 Registration Standard, the Agency discussed consultations with the US Fish and Wildlife Service (FWS) on hazards to crops, rangeland, silvicultural sites, and the Houston toad which may result from the use of glyphosate. Because a jeopardy opinion resulted from these consultations, the agency imposed endangered species labeling requirements in the Registration Standard to mitigate the risk to endangered species. Since that time, additional plant species have been added to the list of endangered species. [Footnote 96 Online at www.epa.gov/oppsrrd1/REDs/old_reds/glyphosate.pdf , at p. 70.]

APHIS failed to consider the 1986 Guidance and the 1993 RED with respect to the threatened and endangered plants and animals they identified as potentially jeopardized by glyphosate use in conjunction with GT alfalfa, or to update the analysis to the current, greater number of potentially affected listed species. EPA's prior registration of these herbicides does not alleviate APHIS of its duty to comply with the ESA and NEPA. [Footnote 97 Wash. Toxics Coal. v. U.S. EPA, 413 F. 3d 1024 (9th Cir. 2005); Or. Envtl. Council v. Kunzman, 714 F.2d 901 (9th Cir. 1983).] The FIFRA registration process is very different than review pursuant to NEPA and the ESA. Section 7 of the ESA requires every Federal agency to conserve species listed as endangered or threatened. [Footnote 98 16 U.S.C. § 1536(a)(1).] It also mandates that "in consultation with and with the assistance of the Secretary," each agency shall "insure that any action authorized, funded or carried out by such agency . . . is not likely to jeopardize the continued existence of any endangered species or threatened species . . " [Footnote 99 16 U.S.C. § 1536(a)(2).]

In addition, APHIS relies on EPA's analysis of glyphosate's use in this new context without its own analysis even though EPA has made no determinations on the impacts on threatened and endangered species from glyphosate use in conjunction since 1993. In 1993, EPA named the Houston toad as jeopardized by glyphosate use in association with its use on crops, but the RED failed to even list the other two species that had been found to be in similar jeopardy as of 1986, the Solano grass and the Valley elderberry longhorn beetle. It also failed to even preliminarily list the many other potentially-affected species that were listed between 1986 and 1993, even though it acknowledged that many would be affected. [Footnote 100 EPA's September, 1993, Re-registration Eligibility Decision ("RED") for glyphosate (No. 738-R-93-014).] Glyphosate is currently undergoing re-registration by EPA. APHIS should consult with EPA as well.

Furthermore, changes to plant systems caused by glyphosate applications could indirectly impact threatened and endangered species by harming pollinators, limiting plant populations or otherwise impacting the food chain. APHIS disregarded such impacts based on the incorrect assumption that glyphosate is not likely to harm wild plants. (Comment Number: APHIS-2007-0044-9936-33)

Response: APHIS has expanded its discussion of the potential effects of glyphosate on wild plants, including T&E species, in sections IV.C.3 and in appendix N of the FEIS. The discussion includes studies of glyphosate toxicity on plant development Sections IV.C.2 and IV.C.3 of the

FEIS have been expanded to include discussion of potential for indirect effects on T&E species through changes in vegetation near GT alfalfa fields.

4.2 Issue 4.2 – Glyphosate and Other Herbicide Use and Comparative Toxicity

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Comment Excerpt Text:
chemicalWATCH Factsheet
GLYPHOSATE
(Comment Number: APHIS-2007-0044-0433-1)

Response: Information on the Glyphosate chemicalWATCH Factsheet is difficult to verify. Although the sheet includes a bibliography, studies supporting links to acute health effects and to Hodgkin's lymphoma are not cited. For responses to comments on the American Cancer Society 1999 report on non-Hodgkin lymphoma, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3.

The Factsheet citation for a 20 percent increase of glyphosate per year is from 1998 and, therefore, is out of date relative to sources cited in section IV.C.3 of the DEIS. The Web site link for reference [8]in the Factsheet for the Pesticide Action Network, cited for the statement that glyphosate has been known to persist in food products for up to two years, is no longer available. The web link for reference [21] in the Factsheet on the half life of glyphosate in water also is no longer active. The DEIS did cite data on glyphosate half lives in appendix N, section 3.1, table N-6.

In regard to the Factsheet claim of direct impacts of glyphosate use on insects, earthworms, fish, and birds and mammals, sections IV.C.2, IV.C.3, and appendix N of the DEIS described why these groups are not expected to be at risk of direct effects from glyphosate applications, which are regulated by the EPA.
Section IV.C.3 and appendix N of the FEIS includes an expanded discussion of toxicity of glyphosate in combination with water-soluble surfactants to frogs and other amphibians.

Comment Excerpt Text:
The biotech industry claim of reduced pesticide use has not happened. In fact the opposite has happened. "Independent reports from the US show that since 1996, GM corn, soybean and cotton have resulted in an increase in pesticide use of 55 million kilograms." (Mail &
Guardian online, January 10, 2006) (Comment Number: APHIS-2007-0044-10263-19)

Response: Because the news article cites unnamed independent sources from the United States, the validity of the studies supporting statements in the article cannot be verified.

Comment Excerpt Text:
6) There is no difference in toxicity to plants between different formulations of glyphosate and the acid itself.

Although APHIS did not find published reports, it is likely (based on claims of superior weed control made in advertisements for new formulations or against competing formulations) that Monsanto has tested their different formulations for weed-killing efficacy, as well as drift potential. These internal studies would be important in determining risk of injury to non-target plants, and it seems that APHIS should have access to them and report the findings in the DEIS. (Comment Number: APHIS-2007-0044-10966-10)

Response: APHIS is not aware of any Monsanto data or studies related to the weed-killing efficacy and drift potential for different formulations of glyphosate herbicides.

Comment Excerpt Text:
7) Exposure is entirely from drift, with no plant absorption from soil solutions or runoff.

APHIS does not adequately consider the possibility that glyphosate will move off-site via soil and water. They stress the tight binding of glyphosate to soil particles, on the one hand, and its rapid degradation by bacteria in soil on the other hand. They also state that conservation tillage, increased by RR alfalfa adoption, will further reduce the movement of glyphosate off-site via soil-particle-laden water runoff. Thus they conclude that wild plants will have little contact with glyphosate via soil and water. APHIS does not elaborate on the many studies (recently reviewed by Borggaard and Gimsing 2007) showing that glyphosate behavior in soil and water is quite varied, depending on soil type and structure, weather conditions before and after glyphosate application, extent of vegetation, previous management of the land (amount of phosphate fertilization, for example), water table, and other factors. In particular, APHIS ignores the contribution to soil and water of translocation of glyphosate into plant roots and subsequent release of glyphosate from the roots via exudation or root senescence (Laitinen et al. 2007). These exposures could contribute to the sub-lethal effects already discussed (Neumann et al. 2006; Tesfamariam et al. 2009, article no. 5 in European Journal of Agronomy, Vol. 31). (Comment Number: APHIS-2007-0044-10966-11)

Response: The DEIS, appendix N, indicated that movement of glyphosate off-site is possible, although glyphosate adsorbs strongly to soil, which inhibits further migration of the substance independent of soil particles. The chemical in soil is primarily degraded by soil microbes to aminomethyl phosphonic acid (AMPA), then to carbon dioxide. As discussed in the DEIS, appendix N, section 3, the half-life of glyphosate in laboratory studies was found to be two days (U.S. EPA, 1993, 2006A), but ranges from 1.7 to 197.3 days (typically less than 60 days) in agricultural soils depending on soil conditions, temperature, weather, and other factors (Giesy et al., 2000).
Although glyphosate strongly adsorbs to soil, it can migrate with suspended soil particles in runoff from rain events or in wind erosion at some points in alfalfa crop management or if poor agricultural practices are followed.
The DEIS appendix N, section 3.4, noted further that glyphosate is applied to the foliage of alfalfa, which is densely distributed, and direct soil contact is not expected unless a spill or recent rain event moves the glyphosate from the leaves to the soil. The possibility that glyphosate absorbed by plant leaves translocates to plant roots and contributes to glyphosate levels in soil

(Laitinen et al. 2007, cited by commenter) is now discussed in section appendix N, section 3 of the FEIS.

Section IV.C.3 and appendix N (section 3) of the FEIS includes an expanded discussion of possible glyphosate movement off-site by soil erosion and water runoff. See also response to comment APHIS-2007-0044-10170-4 under issue 8.1, impacts on soils, and the response to this comment (APHIS-2007-0044-10966-11) under issue 7.1, alfalfa production and farming practices.

Comment Excerpt Text:
8) Surfactants bind to soil and are not absorbed by plants other than by direct contact with leaves.

This assumption is based on looking at the behavior of one possible surfactant out of many possibilities. There is no reason given for assuming that other surfactants would behave similarly, and in fact, most of them are trade secrets and thus their properties are undisclosed (DEIS:25). Thus APHIS cannot assume that surfactants in drift have no effect on soil and water or absorption into plants. Monsanto's formulation component information should be available to APHIS for better risk assessments. (Comment Number: APHIS-2007-0044-10966-12)

Response: Section IV.C.3 and appendix N of the FEIS include an expanded discussion of the environmental fate and transport of water soluble surfactants. The EPA is considering surfactant evaluation for the reregistration of glyphosate-containing herbicides, due for completion in 2015 (U.S. EPA 2009).

Comment Excerpt Text:
The other assumptions used by APHIS in determining risk to plants also are flawed.

Briefly, here are a few other considerations regarding the remaining risk assumptions (APHIS assumption followed by my comment):

3) The ground application rate will be the maximum allowed on the label (1.55 a.e. lbs/A) whereas the aerial application rate will be a typical rate rather than the maximum allowed (0.77 a.e. lbs/A).
Although the aerial application rate may typically be half of the maximum allowed now, it will be legal to use the full rate, and no rationale was given for why applicators would choose the lower rate in the future.
4) Exposure from drift will be 1% of the application rate from ground equipment and 5% from aerial sprays.

These are commonly used drift calculations, but under some conditions, drift is likely to be higher even when directions are followed carefully. No discussion of real-life drift occurrences was included in the DEIS (number of reports, whether from ground or aerial sprays, estimate of how many incidents were not reported based on the number reported, and so on.) Although APHIS does not have the authority to regulate the use of glyphosate, any realistic measure of risk

related to Roundup Ready crops must thoroughly analyze actual drift experiences. (Comment Number: APHIS-2007-0044-10966-8)

Response: As farming profits are directly related to input costs, it is reasonable to expect that, as lower application rates remain effective, farmers growing GT alfalfa would continue to minimize the application of glyphosate in order to minimize costs and maximize profits.

The EPA is considering a spray drift buffer zone analysis in their ecological risk assessment, due for completion in 2015, to determine potential exposure reductions to nontarget aquatic and terrestrial plants (U.S. EPA 2009). Based on the conclusions of EPA's ecological risk assessment, the EPA will write label directions for glyphosate-containing herbicides. Users have the responsibility to account for local conditions when applying a glyphosate-containing herbicide.

Comment Excerpt Text:
For some reason, APHIS consistently ignores pesticide usage data collected by its sister agency, USDA's National Agricultural Statistics Service (NASS). This is quite surprising and unacceptable, given the fact that NASS is universally acknowledged to provide the most accurate and reliable pesticide information available in the U.S. As we will see, APHIS couples its neglect of NASS data with unfortunate reliance on data one to two decades old, on dubious "simulation studies" conducted by organizations funded by the biotechnology industry, and by use of a variety of illegitimate methods of its own.

CFS relies on NASS data for several reasons. First, NASS utilizes transparent, rigorous procedures and statistically valid sampling methods to deliver highly accurate pesticide data. Second, NASS has regularly collected pesticide usage data on the major crops for which glyphosate-tolerant (GT) versions are predominant (soybeans, corn and cotton) over the entire period of GT crop adoption, offering a consistent set of data that facilitates accurate, year-to-year comparisons. Finally, NASS data and methodologies are freely and publicly available, which allows for open review and criticism of any analysis utilizing them.

NASS's Advisory Committee on Agricultural Statistics, comprised of experts from academia and industry, had this to say in 2006:

"NASS employs rigorous methods to ensure that statistically representative samples are achieved…." thus ensuring "a high level of data reliability and accuracy, which are the greatest advantage of NASS data." [Footnote 1: USDA NASS (2006). "Meeting of the Advisory Committee on Agriculture Statistics (ACAS): Summary and Recommendations," February 14-15, 2006, USDA NASS, Appendix III, at: http://www.nass.usda.gov/About_NASS/Advisory_Committee_on_Agriculture_Statistics/advisory-es021406.pdf.]

NASS data are also extensively used by the U.S. Environmental Protection Agency, state pesticide officials, pesticide firms and independent analysts.

The same NASS Advisory Committee quoted above found fault with alternative, private sector pesticide data, finding it non-transparent and potentially based on faulty sampling techniques (e.g. overly small sample sizes). With reference to Doane, the major private-sector provider of pesticide usage information, the Advisory Committee found that:

"The proprietary agreements entered into by Doane subscribers extend well beyond prohibitions on data disclosure, to embargo revelation of the sampling and analytical procedures used to generate their data. Thus, it may be that a large number of the area wide estimates included in the Doane system are based on individual or statistically unrepresentative observations." [Footnote 2: USDA NASS (2006), op. cit., Appendix III.]

In other words, NASS is regarded by experts in the field as the authoritative source for pesticide usage information in American agriculture, while private sector companies may at times supply faulty pesticide data because of illegitimate (and secretive) techniques whose validity cannot be confirmed. (Comment Number: APHIS-2007-0044-11037-1)

Response: The DEIS used USDA NASS reports for information on agricultural practices whenever possible. Where the DEIS required analysis of data not available in NASS, other data sources were sought. APHIS acknowledges these comments as background information for the comments to follow.

Comment Excerpt Text:
Alfalfa farmers generally do not use herbicides on alfalfa, or only to a very limited extent. According to USDA's National Agricultural Statistics Service (NASS), universally acknowledged as the gold standard for pesticide usage information, just 7% of alfalfa hay acreage was treated with herbicides of any sort in 1998, while overall herbicide use on alfalfa was 1.468 million lbs. [Footnote 2: USDA NASS (1999). "Agricultural Chemical Usage: 1998 Field Crops Summary," USDA's National Agricultural Statistics Service, May 1999, pp. 9-10. On page 9, see U.S. figure under the Percent column for percent of national alfalfa acreage treated with herbicides. On p. 10, see the entry ("*" = less than one percent) for glyphosate. 1998 is the last year in which NASS surveyed alfalfa farmers for their pesticide usage practices. APHIS did not consult these NASS data, universally regarded as the highest quality data on national pesticide use, in the EIS. For more on NASS data as the gold standard for pesticide usage information, see Appendix 1.] Thus, just 1 of 14 acres of alfalfa hay was treated with weed-killing chemicals, while 13 of 14 acres were grown without them. EPA reports that 465 million lbs. of herbicides were applied agriculturally in 1998, so alfalfa's share of total herbicide use was just 0.32% (1.468/465). Given the fact that alfalfa ranks 4th in U.S. crop acreage (23.6 million acres in 1998), this is a remarkably small amount of herbicide. Please refer to Appendix 1 for discussion of the quality of these data sources on pesticide use versus those APHIS relies on in the EIS.

This paucity of herbicide use makes alfalfa unique among major field crops in mainstream American agriculture. Unlike alfalfa, the great majority of acreage of other major crops is heavily treated with chemical herbicides. Ever year, over 90%, and usually over 95%, of corn,

soybeans and cotton receive herbicides; these three crops received the bulk of the 465 million lbs. of herbicides that were applied in 1998.

Alfalfa is grown practically without herbicides because it is a perennial plant that grows vigorously in dense stands that crowd out weeds. As a perennial plant, it is grown for 3-5 years or sometimes up to 10 years without the yearly plowing or chemical burndown that is typical of annual crops like corn and soybeans. In an annual cropping system, weeds start off each year in a "cropless" field, with full access to the light, moisture and nutrients they need to thrive. Weeds that sprout early, with a head start on the crop plant, are thus much more problematic, while later-sprouting weeds are often shaded out and "outcompeted" by the crop plants. In contrast, a perennial like alfalfa survives the winter, and its thick stands give weeds little or no opportunity to compete for the life of the stand. For alfalfa, harvest is not a year-end prelude to death and dessication, as it is for annual crops, but rather a periodic mowing, which when conducted properly reinvigorates the stand. This is not to say that alfalfa is never infested with weeds, just that they are relatively insignificant in comparison weed competition in other (annual) crops. Unfortunately, APHIS gives the false impression throughout the EIS that alfalfa is an herbicide-intensive crop like corn or soybeans. This false impression sets up an equally false "need" for a pesticide-based weed control technology like Roundup Ready alfalfa. This false presumption of extensive herbicide use on conventional alfalfa also sets up thoroughly unrealistic and overblown estimates of the extent to which the RR alfalfa system will "displace" herbicides used on conventional alfalfa. (Comment Number: APHIS-2007-0044-11037-10)

Response: In regard to the recommendation to use NASS data for assessing pesticide use given the high quality, reliability, and accuracy of the data collection methods stated in the previous comment (APHIS-2007-0044-11037-1 above), the commenter acknowledges in this comment that 1998 was the last (or only) year that NASS surveyed alfalfa farmers for their pesticide use practices. The value of 22 percent from the Hower et al. (1999) study cited in the DEIS, appendix J, section 2.4, is a higher estimate; however, both estimates indicate that the majority of alfalfa acreage (78 to 93 percent) was not treated by herbicides in that time frame, and a similar proportion might still apply and continue to characterize alfalfa farming after the release of GT alfalfa. The commenter's point that in contrast to corn, soybean, and cotton, herbicides are applied to a small fraction of total alfalfa acreage is valid and consistent with information in appendix J of the DEIS.

In general, herbicides are not necessary for alfalfa used for grazing for the reasons listed by the commenter, whereas herbicides can be required for alfalfa to be harvested and certified as weed-free hay. As the commenter notes, herbicide-treated alfalfa crops accounted for a small fraction of total herbicides applied to crops (and total herbicide-treated agricultural lands) in 1998. Therefore, changing that fraction to GT alfalfa with glyphosate application would be a relatively small change in the total herbicide treated landscape, as discussed in section IV.C.3 of the DEIS. Conclusions in the DEIS do not rely on the presumption of extensive herbicide use on conventional alfalfa.

In regard to the commenter's cautions against using Doane Market Research data in the previous comment (APHIS-2007-0044-11037-1 above), it is a source used by Benbrook (2009) of the

Organic Center in evaluating changing patterns of planting herbicide-tolerant (HT) crops for corn, soy, and cotton for data that are not compiled by or available from NASS.

The DEIS used a study that provided data through 2002 (Gianessi and Reigner, 2006) showing that increased glyphosate use on alfalfa and across the major crops in the United States coincided with a reduction in the use of other herbicides and that this was independent of introduction of GT crops. The FEIS includes an expanded discussion of changes in glyphosate and other herbicide use in agriculture and on alfalfa in appendix N, section 1 and appendix J 2.5-2.7.

Comment Excerpt Text:
One obvious consequence of introducing the RR alfalfa system would be a substantial increase in the use of glyphosate, over already extremely high and growing levels. Glyphosate is (by far) the most heavily used chemical pesticide in the history of agriculture, due primarily to the widespread adoption of other RR crop systems. EPA's latest estimate for overall agricultural use of glyphosate in the U.S. is 135 million lbs. acid equivalents, [Footnote 6: EPA (2009). "Glyphosate Summary Document Registration Review: Initial Docket," Environmental Protection Agency, June 2009, p. 12. See also EPA (2008), both in supporting materials.] which translates to 182 million lbs. of the most commonly used isopropylamine salt of glyphosate, as found in many of Monsanto's glyphosate products, including Honcho brand herbicide (Figure 1).

The adverse consequences of unrestrained use of glyphosate with RR crop systems argues for great caution before any more RR crop systems, including RR alfalfa, are deregulated. These adverse consequences include a rapidly growing epidemic of glyphosate-resistant weeds; increased disease susceptibility and reduced nutritional content of major crops, stemming mainly from adverse impacts of glyphosate on soil microbiota; increased rates of cancer and possibly other diseases in farmers and farmworkers who use Roundup; and a possible role in the worldwide decline of amphibian populations. These important issues are discussed in detail in several documents included in the supporting materials. A documented overview can be found in the file entitled Glyphosate Registration Review – FINAL 9-21-09, which CFS submitted to the EPA in September of last year for the initial phases of its registration review of glyphosate, and which is included in the supporting materials submitted to this docket. We would add that the EPA last reviewed glyphosate in 1993, and that there has been an enormous increase in its use since that time, as well as a substantial amount of new research on the various adverse impacts of glyphosate and glyphosate-based herbicide formulations on the environment and the interests of agriculture. CFS believes it would be only prudent of APHIS to refrain from taking any action, such as deregulation of RR alfalfa, that promises to substantially increase the use of this herbicide, before EPA has the opportunity to review glyphosate's registration and impose any needed restrictions on its use. (Comment Number: APHIS-2007-0044-11037-18)

Response: Herbicide-treated alfalfa crops account for a small fraction (less than 5 percent, DEIS table N-2, for the years 1992, 1997, and 2002) of total herbicides applied to crops (and total herbicide-treated agricultural lands). Therefore, changing that fraction to GT alfalfa with glyphosate application would be a relatively small change in the total herbicide treated landscape, as discussed in section IV.C.3 and appendix N-1 of the DEIS.

In regard to comments on increasing glyphosate-resistant weeds, see the response to comment APHIS-2007-0044-11037-18 for issue 3.6. Regarding health impacts on farm workers, section IV.E.3.c and appendix M of the DEIS describe analyses showing how workers are not at risk from glyphosate due to the deregulation of GT alfalfa. Indeed, for both the public and workers, there likely will be an overall decrease in the use of other more toxic and persistent herbicides and a net decrease in risks to human health and the environment.

In regard to the comment that APHIS wait for EPA to finish its review of glyphosate registration, according to the 2009 EPA document cited by the commenter in Footnote 6, the review will not be complete until the year 2015.

Comment Excerpt Text:
While APHIS has generally failed to provide an adequate quantitative analysis of the likely impacts of the RR alfalfa system on herbicide use in general, or glyphosate in particular, there is one attempt at estimating glyphosate use. Assuming 90% adoption of the RR alfalfa system (that is, on 90% of the 2007 alfalfa acreage of 21.67 million acres), and assuming application of the highest allowable annual rate of glyphosate on GT crops of 7.32 lbs./acre/year, APHIS provides a high-end estimate of the “potential amount of glyphosate due to adoption of GT alfalfa” of 142,761,960 lbs. per year. [Footnote 7: EIS at N-17 to N-18.]

Figures for agricultural; industrial, comm’l, gov’t; and home & garden uses of glyphosate from EPA. For the years 1987 to 1995: "Pesticides Industry Sales and Usage: 1994 and 1995 Market Estimates," EPA, August 1997, Tables 8 & 9. For the years 1997, 1999 & 2001, see: "Pesticides Industry Sales and Usage: 2000 and 2001 Market Estimates," EPA, May 2004, Tables 3.6 to 3.8. Both available at: http://www.epa.gov/oppbead1/pestsales/. Each data point is the midpoint of the range (e.g. 27.5 for 25-30 million) given in the documents cited above. EPA figure for 2006 derived from EPA (2009). "Glyphosate Summary Document Registration Review: Initial Docket," June 2009, p. 12. See: http://www.regulations.gov/search/Regs/home.html#documentDetail?D=EPA-HQ-OPP-2009-0361-0003, which states that 135 million lbs. glyphosate acid equivalents are applied annually to agricultural crops in the U.S., based on data from Screening Level Estimates of Agricultural Uses of the Case Glyphosate, 11/26/08. Acid equivalents converted to the most common salt of glyphosate (isopropylamine) using 0.74 conversion factor to arrive at the equivalent figure for the isopropylamine salt of glyphosate (182 million lbs.) to facilitate comparison to prior years. EPA leaves unclear in which year this estimated 135 a.e./182 a.i. million lbs. of glyphosate were applied. Comparison of EPA’s figures for soybeans, corn and cotton in the Screening Level Estimates with the latest available from USDA NASS for soybeans (2006), corn (2005) and cotton (2007) suggests that EPA relied primarily on these USDA NASS data. We choose 2006 as the midpoint of this three year (2005-2007) range, and because soybeans, surveyed in 2006, receive the most glyphosate. See text for explanation as to why this figure likely underestimates actual glyphosate use, which CFS estimates at 210-220 million lbs. a.i. (iso.). Glyphosate use figures for soybeans, corn and cotton derived from USDA NASS Agricultural Chemical Usage reports for respective years, adjusted to reflect usage on 100% of crop acreage. See: http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1560.

Reference to Figure 1 (based on EPA's latest estimate of total glyphosate use in American agriculture) reveals that this amount of glyphosate applied to Roundup Ready alfalfa would exceed the amount of glyphosate applied to all agricultural crops combined (using EPA's acid equivalents estimate of 135 million lbs., and assuming APHIS's estimate is also in acid equivalent units). Frankly, we find this estimate excessive. Our own assessment (see Appendix 2) is based on a somewhat lower RR alfalfa adoption rate, and usage at less than the maximal allowable rates. According to this estimate, glyphosate use on Roundup Ready alfalfa would be more on the order of 30 – 70 million lbs, though with the important caveat that it will increase as time goes by, with the inexorable emergence of glyphosate-resistant weeds.

What is remarkable about APHIS's estimate above is that APHIS does nothing with it. It is a meaningless number-crunching exercize without consequence for its later analysis. (Comment Number: APHIS-2007-0044-11037-19)

Response: APHIS has updated appendix J of the FEIS to include an analysis of changes in herbicide use on alfalfa with the adoption of GT alfalfa. This analysis is based on industry predicted adoption rates.

Comment Excerpt Text:
Our other major source of pesticide usage data – the US Environmental Protection Agency – is also ignored by APHIS. EPA recently began its "registration review" of glyphosate – the first since 1993, and in this context has developed the latest estimates for agricultural use of glyphosate by crop, including alfalfa. EPA's figures are contained in the EPA document "Screening Level Estimates of Agricultural Uses of the Case Glyphosate," November 26, 2008. The USDA and the EPA data referred to in these comments are included in the supporting materials.

APHIS offers no serious quantitative assessment of the likely impact of introducing GT alfalfa on pesticide use. "No calculations or speculation on GT alfalfa's specific impact on herbicide usage have been published…."[Footnote 3: EIS at 170. repeated almost verbatim at N-17.] This is a startling deficiency, given the fact that GT alfalfa is engineered explicitly to alter herbicide usage practices; and that pesticide use is generally acknowledged to have adverse impacts on human health, the environment and farmer welfare; and that there is a real need to promote integrated pest (including weed) management to reduce the use of pesticides and the negative impacts to which they give rise. Instead, APHIS continually repeats the mantra that Roundup Ready alfalfa will or may reduce the use of non-glyphosate herbicides, but gives no quantitative analysis to back up these assertions. (Comment Number: APHIS-2007-0044-11037-2)

Response: As described in the response to comment APHIS-2007-0044-11037-19 for issue 4.2, appendix N, section 1 of the FEIS expands the assessment of glyphosate use changes that might follow deregulation of GT alfalfa to include several scenarios with different assumptions including those used by EPA; see also appendix J.

Comment Excerpt Text:

1) Arsenic-based herbicides make comeback to control GR weed caused by RR crop systems:
In 2006, the EPA decided not to reregister (i.e. prohibit all further uses of) arsenic-based herbicides. The EPA came to this decision because of concern that these organic arsenicals could contaminate drinking water supplies; wind up in meat and milk products derived from livestock fed cotton byproducts laced with arsenical herbicide residues; and impair the health of farmers and farm-workers who apply these chemicals. The EPA subsequently changed course and decided to reregister (permit continued use of) organic arsenical herbicides on cotton. The major reason for this about-face was the desperate need of cotton growers for effective herbicides to control an extremely damaging glyphosate-resistant (GR) weed known as Palmer amaranth. [Footnote 9: EPA Arsenic (2009a). "Amendment to Organic Arsenicals RED," Letter from EPA's Richard P. Keigwin, Director, Special Review and Reregistration Division, to Registrant, April 22, 2009;] GR Palmer amaranth first arose in 2005, and has since infested millions of acres of cotton- and soybean-growing land in the South and Midwest. The extremely rapid emergence of this GR weed since 2005 is directly attributable to the RR cotton and RR soybean systems, with their heavy and (at least initially) near exclusive reliance on glyphosate. While other uses of these arsenic-based herbicides will be phased out over the coming years, the exemption for continued use on cotton appears to have no time limit. [Footnote 10: EPA Arsenic (2009b). "Organic Aresenicals; Product Cancellation Order and Amendments to Terminate Use," EPA Notice, Fed. Reg. Vol. 74, No. 188, Sept. 30, 2009, pp. 50187-50194. Last page has exemptions for cotton.] No one predicted the emergence of this damaging weed, just as no one predicted GR kochia would emerge. This example illustrates the potential for harm to human health and the environment from use of a class of toxic, arsenic-based herbicides specifically for control of a noxious GR weed whose emergence is attributable to unregulated RR crop systems. (Comment Number: APHIS-2007-0044-11037-22)

Response: APHIS acknowledges the comment that GT weeds have emerged as the use of GT crops and glyphosate herbicides have expanded. Many species now considered to be GT weeds may have emerged from species of plants that were naturally resistant to glyphosate (GR plants). The need for organic arsenical herbicides to control Palmer amaranth in GT cotton fields, a GT weed that emerged round 2005, is an example of a specific weed problem in a specific agricultural crop. The emergence of GT Palmer amaranth weed likely resulted from extensive use of glyphosate on GT soybeans and cotton. EPA has restricted the use of arsenical herbicides to cotton, however, so this example is not directly relevant to GT alfalfa. Appendix N, section 1 of the FEIS expands the assessment of glyphosate use changes that might follow deregulation of GT alfalfa and also see appendix J.

Comment Excerpt Text:
2) Cocktail of seven herbicides recommended to control GR Palmer amaranth
Arsenic-based herbicides are not sufficient to control GR Palmer amaranth, however. In fact, leading weed scientists in Georgia, where GR Palmer amaranth is worst, have recommended an herbicide regime comprising 7 different chemicals as needed to control this noxious weed, as follows:

a) Pre-emergence: fomesafen, pyrithiobac, and pendimethalin
b) Post-emergence: glyphosate and metolachlor

c) Lay-by directed application: MSMA (monosodium methaneaersonic acid) and diuron. [Footnote 11: Webster, T.M. & L.M. Sosnoskie (2010). "Loss of glyphosate efficacy: a changing weed spectrum in Georgia cotton," Weed Science 58: 73-79.]

MSMA is one of the arsenic-based herbicides to which EPA has given a new lease on life to battle the noxious GR Palmer amaranth. (Comment Number: APHIS-2007-0044-11037-23)

Response: See the response to comment APHIS-2007-0044-11037-22 for issue 4.2 (directly above). Appendix N, section 1 of the FEIS expands the assessment of glyphosate use changes that might follow deregulation of GT alfalfa.

Comment Excerpt Text:
3) "Likely carcinogenic" corn herbicide poised for use in soybeans and cotton to combat GR weeds caused by RR crop systems
Monsanto recently registered a new formulation of the corn herbicide, acetochlor, for use in soybeans and cotton, explicitly to combat glyphosate-resistant weeds (e.g. GR Palmer amaranth and GR tall waterhemp) in those crops. [Footnote 12: Monsanto (2010). "Monsanto Company receives approval for new acetochlor herbicide formulation," Monsanto, Feb. 2, 2010. http://www.greenbook.net/viewStory.aspx?StoryID=1085, last visited 2/28/10.] Although acetochlor was the second most heavily used herbicide on corn in 2005 (over 32 million lbs. applied nationally), USDA NASS data show that essentially no acetochlor was used in cotton or soybeans in that year. [Footnote 13: USDA NASS (2006). "Agricultural Chemical Usage: 2005 Field Crops Summary," USDA NASS, May 2006, pp. 2, 19. Pesticide usage surveyed on 93% of corn acres (p. 2), to which 29.802 million lbs. were applied (p. 19). National use = 29.802/0.93 = 32.045 million lbs.] EPA has classified acetochlor as "likely to be carcinogenic to humans" based on increased incidence of lung tumors and histiocytic sacrcoma in mice, and increased incidence of nasal epithelial tumors and thyroid follicular cell adenomas in rats. [Footnote 14: EPA (2006). "Report of the Food Quality Protection Act (FQPA) Tolerance Reassessment Progress and Risk Management Decision (TRED) for Acetochlor," US EPA, March 2006, p. 4. http://www.epa.gov/oppsrrd1/reregistration/REDs/acetochlor_tred.pdf.] Chronic exposure to acetochlor has produced testicular atrophy, renal injury and neurologic movement abnormalities in laboratory animals. [Footnote 15: CDC (undated). "Acetochlor: Chemical Information," National Report on Human Exposure to Environmental Chemicals, Centers for Disease Control, http://www.cdc.gov/exposurereport/data_tables/Acetochlor_ChemicalInformation.html.] EPA believes exposure to acetochlor in drinking water and other sources is below levels of concern. Yet additional, and perhaps substantial additional use of acetochlor to combat GR weeds in two major crops (soybeans and cotton) where it had not been used before will likely increase human exposure to the chemical. Here too, GR weeds are the occasion for increased use of a carcinogenic herbicide that otherwise would not be deployed. (Comment Number: APHIS-2007-0044-11037-24)

Response: The registration of a new formulation of acetochlor on cotton and soybeans to combat GR or GT weeds was subject to review by the EPA as cited by the commenter. EPA limits pesticide application rates in the registration process to limit concentrations of the chemical (in this case acetochlor) in the environment to below levels considered adequately

protective of human health. The comment that registration of this new formulation might lead to substantial additional use of acetochlor is speculative. The comment also refers to total amounts nationwide and not concentrations of acetochlor in soil or water or on plants per unit area, the measure related to exposure levels and risk. See also the response to comment APHIS-2007-0044-11037-22 for issue 4.2.

Comment Excerpt Text:
4) Use of 2,4-D – component of Vietnam War defoliant Agent Orange – increases substantially in soybeans to combat GR weeds
When weeds evolve resistance to glyphosate, 2,4-D is one of the most commonly recommended supplements. As early as 2001, Ohio State University agricultural advisers recommended using a combination of 2,4-D, metribuzin and paraquat as pre-emergence chemicals to prevent the evolution of glyphosate-resistant marestail (horseweed) in Roundup Ready soybeans in Ohio. [Footnote 16: Loux, M. and J. Stachler (2001). "Is There a Marestail Problem in Your Future?" Crop Observation and Recommendation Network, Ohio State University Extension, April 2001. http://corn.osu.edu/archive/2001/apr/01-07.html#linkg.] In 2005, weed scientists in Tennessee noted that Palmer amaranth in the state survived applications of up to 44 ounces per acre of Roundup, and so recommended that farmers use additional herbicides such as 2,4-D, Clarity (dicamba), Gramoxone Max (paraquat) or Ignite (glufosinate). [Footnote 17: "Glyphosate-resistant Palmer Pigweed Found in West Tennessee," Farm Progress, Staff Report, September 23, 2005. http://nebraskafarmer.com/story.aspx/glyphosateresistant/palmer/pigweed/found/in/west/tennessee/8/394] In 2006, it was reported that farmers would rely increasingly on older herbicides such as 2,4-D, dicamba and paraquat to control glyphosate-resistant giant ragweed and other GR weeds. [Footnote 18: Roberson, R. (2006). "Pigweed not only threat to glyphosate resistance," Southeast Farm Press, Oct. 19, 2006. http://southeastfarmpress.com/news/101906-herbicide-resistance/.]

USDA NASS figures confirm that farmers are in fact using substantially more 2,4-D to combat GR weeds. From just 2002 to 2006, use of the chemical on soybeans increased from 1.39 to 3.67 million lbs., a more than 160% increase. 2,4-dichlorophenoxyacetic acid (2,4-D) is one of the oldest herbicides, and formed part of the Vietnam War defoliant Agent Orange. Ingestion or inhalation of 2,4-D has adverse effects on the nervous system – loss of coordination, limb stiffness, stupor, coma. A growing body of evidence points to 2,4-D as a carcinogen. Studies in the U.S., Italy, Canada, Denmark and Sweden link 2,4-D exposure to non-Hodgkin's lymphoma, a cancer of the immune system. Studies of farmworkers who handled 2,4-D in northern states reveal higher than normal rates of birth defects in their children. 2,4-D is also a mutagen and an endocrine disruptor, and is sometimes found contaminated with the highly toxic compound dioxin, which is highly carcinogenic, weakens the immune system, decreases fertility, and causes birth defects. 2,4-D is banned in Norway. [Footnote 19: Based on: Beyond Pesticides (2004). "2,4-D: chemicalWATCH Factsheet," Beyond Pesticides, 2004. http://www.beyondpesticides.org/pesticides/factsheets/24D_Jul04.pdf.] (Comment Number: APHIS-2007-0044-11037-25)

Response: The DEIS included consideration of 2,4-D as one of the herbicides that is used on alfalfa. Its use in millions of pounds on alfalfa in 2002 compared with its use in 1992 is a reduction of 47 percent (DEIS appendix N, table N-2). Although NASS data would be preferred if available on the use of different herbicides on alfalfa, those data are not available in the NASS databases. The DEIS therefore used data from Gianessi and Reighner (2006) rather than using no data.

As discussed in the response to comment APHIS-2007-0044-11037-10 for issue 4.2, and considering data presented in table N-2 of the DEIS, herbicide-treated alfalfa crops accounted for a small fraction of total herbicides applied to crops (and total herbicide-treated agricultural lands) in 1998 and from 1992 to 2002. That also would likely be true for glyphosate applications to alfalfa compared with glyphosate application to corn, soy, and cotton (see response to APHIS-2007-0044-11037-10 for issue 4.2). Therefore, potential changes in glyphosate application with deregulation of GT alfalfa would likely be a relatively small change in the total glyphosate-treated landscape, as discussed in section IV.C.3 and appendix N-1 of the DEIS. Potential for future increases of 2,4-D use in response to GT weeds in future GT alfalfa crops similarly is likely to be a small fraction of the likely ongoing increases in the use of 2,4-D in existing soy and corn cited by the commenter; see also appendix J 2.5-2.7.

As discussed in the response to comment APHIS-2007-0044-10966-4 for issue 4.1.2, EPA uses a registration process to regulate the sale, distribution, and use of pesticides in order to protect health and the environment under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). Thus EPA can mandate label restrictions and is nearing the end of its process of evaluating glyphosate for reregistration. Thus, EPA is responsible under FIFRA for review and registration of pesticides to ensure application rates, including those for 2,4-D, result in concentrations in the environment that do not exceed levels that might cause adverse environmental or human health effects. As discussed in response to comment APHIS-2007-0044-0352-1 for issue 6.3, where pesticides may be used on food or feed crops, EPA sets tolerances (maximum pesticide residue levels) for the amount of the pesticide that can legally remain in or on foods under the authority of the Federal Food, Drug, and Cosmetic Act (FFDCA). EPA must find that such tolerances will be safe, meaning that there is a reasonable certainty that no harm will result from aggregate exposure to the pesticide chemical residue. This finding must be made and the appropriate tolerance established before a pesticide can be registered for use on the particular food or feed crop in question.

Increases in total amount of a pesticide used nationwide (e.g., 1.39 to 3.67 million lbs) is not indicative of risk of exposure to levels that might harm health. Application rates per unit area are metrics that can be related to environmental concentrations, and therefore to risk of health effects.
APHIS acknowledges that the ecological Environmental Impact Quotient (EIQ) for 2,4-D, as listed in the DEIS table N-50, is higher than that of glyphosate (i.e., 40 compared with 33), but not as high as some other herbicides.
Regarding health effects of exposure to pesticides, including glyphosate and 2,4-D, see also the response to comment APHIS-2007-0044-0352-1 for issue 6.3. The web link noted in the comment, http://corn.osu.edu/archive/2001/apr/01-07.html#linkg is no longer active.

Comment Excerpt Text:
5) Supplemental herbicide recommended for use with glyphosate for "improved weed control" in Roundup Ready sugar beets

Just as APHIS wrongly assumes that glyphosate will displace all other herbicides in the RR alfalfa system, so one often encounters the same "Roundup only" claim with respect to the RR sugar beet system. Yet even though RR sugar beets have only been grown commercially for two years (introduced in 2008), already one major pesticide manufacturer is recommending supplemental use of an herbicide, known as "Upbeet" (triflusulfuron methyl), "for improved weed control in Roundup Ready sugar beets" – and in particular, to "provide improved control of wild buckwheat, common lambsquarter, common mallow, redroot pigweed, and velvetleaf." [Footnote 20: DuPont (2007). "DUPONT UPBEET HERBICIDE: UpBeet plus glyphosate for improved weed control in Roundup Ready Sugar Beets," 2(ee) Recommendation under FIFRA, 2007, expires 12/31/11.] Two of these weeds are naturally glyphosate-tolerant, meaning they become more prevalent members of the local weed community due to "weed shifts" in RR crop fields continually subjected to glyphosate applications over time. [Footnote 21: APHIS misunderstands a fundamental tenet of weed science in the EIS, the difference between species tolerance and evolved resistance. APHIS also wrongly excludes velvetleaf from the list of glyphosate-tolerant weeds that are problematic in alfalfa (see EIS at G-25, velvetleaf listing; and Hower et al (1999), op. cit., Table 29, p. 60, where velvetleaf is the 4th most problematic summer annual weed of spring-seeded alfalfa; and Tables 30 & 31 (pp. 63, 66), where velvetleaf is also listed as a weed in fall-seeded alfalfa and established alfalfa stands.] (Comment Number: APHIS-2007-0044-11037-26)

Response: The commenter observes that there already are weed problems in RR sugar beets, which have been planted in fields for only two years. Also as observed by the commenter, however, many plant species now considered weeds in GT crops were naturally resistant to glyphosate and have become more problematic in agriculture with "weed shifts" that have occurred over time with the increasing use of GT crops (e.g., corn, soybeans, cotton) sprayed with glyphosate, as described in appendix G, sections 4.1 and 4.2 of the DEIS. Mixtures of herbicides have been recommended for improved weed control where natural or developed glyphosate resistance of some weed species is an issue. In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for issue 3.6. GT velvet leaf was not included in the DEIS appendix G, but will be included as a problematicglyphosate tolerant and tolerant weed in alfalfa in the FEIS table G-7 and in the summary findings in FEIS section 4.4 of appendix G5. Velvet leaf was identified as a glyphosate-resistant weed in GT alfalfa crops for which control by a mixture of herbicides is recommended in appendix J, section 2.5 of the DEIS.

Comment Excerpt Text:
6) GR weeds driving increased use of premix herbicides and tank mixtures with multiple herbicides, to be used with multiple herbicide-resistant crops

Glyphosate-resistant weeds are such a serious problem that much of the research of agricultural biotechnology companies is geared toward development of crops with "enhanced" resistance to glyphosate; to non-glyphosate herbicides such as 2,4-D and dicamba (chlorophenoxy herbicides that are probable human carcinogens); and to multiple herbicides. These developments are described in Benbrook (2009) in the supporting materials. One example of a crop resistant to multiple herbicides is DuPont-Pioneer's Optimum GAT corn and soybeans, which resist applications of both glyphosate and certain classes of the large herbicide family known as ALS inhibitors. These new dual-HT crops are being sold together with premix herbicide products containing two and usually three herbicidal active ingredients, and marketed as a partial solution to weeds that have evolved resistance to glyphosate or to ALS inhibitors. For instance, Instigate herbicide contains rimulfuron and chlorimuron-ethyl, ALS inhibiting herbicides to handle glyphosate-resistant weeds, and the HPPD herbicide mestrione to control ALS inhibitor-resistant weeds. Of course, an increasing number of weed populations have developed dual-resistance to both glyphosate and ALS inhibitors, meaning that even this 3-in-one product will not be sufficient, and making it necessary for Dupont to offer the following recommendation:

"Tank-Mix Partners
Instigate™ demonstrated additional control of emerged weeds when tank mixed with herbicides such as 2,4-D, atrazine, glyphosate and glufosinate.
Instigate™ demonstrated additional residual weed control when tank mixed with herbicides such as atrazine, metolachlor and acetochlor." [Footnote 22: DuPont Instigate Herbicide (2008). Instigate is one of several "premix" herbicides being marketed for use with dual herbicide-tolerant, Optimum GAT corn and soybeans. Each comes with similar "Tank-Mix Partner" recommendations. EPA recently approved the registration petition for Instigate herbicide.]

Thus, farmers could easily use a total of 4-7 different herbicidal active ingredients (3 in one product, plus one to four tank-mix partners) in an effort to kill increasingly herbicide-resistant weeds. This is one of several pre-mix herbicide products sold specifically for use together with dual-herbicide-resistant Optimum GAT corn and/or soybeans. In each case, DuPont gives similar "Tank-Mix Partners" recommendations. (Comment Number: APHIS-2007-0044-11037-27)

Response: APHIS acknowledges the comment on multiple herbicide resistance and use of combinations of herbicides to control weeds. These comments apply to all GT crops, not just GT alfalfa. Discussion of trends in herbicide and glyphosate use has been expanded in appendix N, section 1 and appendix J 2.5-2.7 of the FEIS to include the most recent information. Discussion of tolerance to multiple herbicides is beyond the scope of this EIS.

Comment Excerpt Text:
Roundup Ready alfalfa system will increase use of toxic chemicals for eradication of volunteer RR alfalfa

Alfalfa stands grow dense and thick, with extremely deep roots. Removal is no easy task. This explains why many growers who use tillage have to make multiple passes, and why thorough removal of an old alfalfa stand is often accomplished with a combination of tillage and chemicals. [Footnote 24: U of Wy (2006). "Roundup Ready Alfalfa," University of Wyoming

Cooperative Extension Service, B-1173, February 2006, Table 3.] Even so, volunteer plants springing up in the following season's crop are to be expected, and may prove to be significant problems for many growers. Volunteer RR alfalfa has the potential to be a widespread problem, for instance in vegetable fields previously planted to alfalfa, [Footnote 25: Tickes, B. (2002). "Evaluation of Stinger (clopyralid) for weed control in broccoli," 2002 Vegetable Report, College of Agriculture and Life Sciences, University of Arizona.] just as volunteer RR corn is becoming a significant weed problem in RR soybean fields planted in subsequent years. As with alfalfa stand removal, if the volunteer alfalfa is Roundup Ready, then glyphosate is eliminated as an option for controlling it. As a result, there will be an increase in the use of the non-glyphosate herbicides listed above for stand removal, and/or others appropriate to the follow-on crop, to control volunteer RR alfalfa. APHIS gives a few examples of herbicide regimes that have shown promise in controlling volunteer RR alfalfa in a following season corn crop – but once again, as with alfalfa stand removal, fails to give any quantitative estimate of the increase in herbicide usage this would require:

"Additional data demonstrated that early postemergence applications of herbicides (applied during the stage between the emergence of a seedling, and the maturity of the plant) used to control weeds in corn (Harness XTRA (acetochlor + atrazine), Degree (acetochlor), and Degree XTRA (acetochlor + atrazine) applied in tank mixtures with broadleaf herbicides Banvel (dicamba), 2,4-D, Marksman (atrazine + dicamba) and Hornet (clopyralid + flumetsulam) effectively controlled GT alfalfa in a GT corn crop." [Footnote 26: EIS at 20.]

Thus, it appears that tank mixtures of up to 6 different herbicides will be applied to control RR alfalfa volunteers. Dicamba is a chlorophenoxy herbicide of the same class as 2,4-D, discussed above, and the State of California recently required both compounds be labeled as "probable human carcinogens." Acetochlor was described above.

Atrazine is a potent endocrine-disrupting compound that has been found to cause gonadal malformations in frogs at concentrations as low as 0.1 part per billion, and act as an endocrine disruptor in fish and reptiles as well. [Footnote 27: Hayes, T.B. et al (2006). "Characterization of Atrazine-Induced Gonadal Malformations in African Clawed Frogs (Xenopus laevis) and Comparisons with Effects of an Androgen Antagonist (Cyproterone Acetate) and Exogenous Estrogen (17ß-Estradiol): Support for the Demasculinization/Feminization Hypothesis," Environmental Health Perspectives 114 (Suppl. 1): 134-141.] A recent study demonstrated complete feminization and chemical castration of male African clawed toads from long-term exposure to just 2.5 parts per billion (ppb) atrazine, which is an environmentally-relevant concentration. [Footnote 28: Hayes, T.B. et al (2010). "Atrazine induces complete feminization and chemical castration in male African clawed frogs (Xenopus laevis), Proceedings of the National Academy of Sciences (Early Edition), www.pnas.org/cgi/doi/10.1073/pnas.0909519107.] Atrazine is a leading suspected culprit in the worldwide decline of amphibians, [Footnote 29: Biello, D. (2008). "World without Frogs: Combined Threats May Croak Amphibians," Scientific American News, October 30, 2008.] as are Roundup formulations with POEA (polyethoxylated tallowamine) surfactants (see supporting materials on atrazine as well as the studies by Dr. Rick Relyea on Roundup's toxicity to many species of frogs at quite low levels.

Atrazine is one of the most heavily used used corn herbicides, with lesser use in soybeans. In 2005, atrazine use in the U.S. totaled nearly 63 million lbs. on corn and soybeans: 62.29 million lbs. on corn and 0.61 million lbs. on soybeans. [Footnote 30: USDA NASS (2006), op. cit. For corn, 57.390 million lbs. (p. 19) reported on 93% of corn acreage (p. 2), for 57.390/0.93 = 62.29 million lbs. nationwide. For soybeans, 0.542 million lbs. (p. 97) on 89% of soybean acreage (p. 2) = 0.61 million lbs. nationwide.] Atrazine is one of the most common pesticide contaminants of ground and surface waters in the U.S. Atrazine has been demonstrated to induce breast and prostrate cancers in laboratory animals, [Footnote 31: Fan, W. et al (2007). "Atrazine-Induced Aromatase Expression Is SF-1 Dependent: Implications for Endocrine Disruption in Wildlife and Reproductive Cancers in Humans," Environmental Health Perspectives 115: 720-727.] and workers exposed to atrazine in manufacturing plants have substantially increased rates of prostate cancer, reinforcing the carcinogenic potential of this compound. [Footnote 32: Cox, C. (2002). "Group uncovers study linking atrazine with prostrate cancer," Journal of Pesticide Reform 22(2): Summer 2002.] Because of these health threats, the European Union banned atrazine in 2004. The U.S. EPA yielded to pressure from Syngenta and others, allowing atrazine use to continue despite its many harmful effects. [Footnote 33: LoE (2006). "EU on Atrazine," Living on Earth, PBS, transcript of interview with Tyrone Hays, April 21, 2006. http://www.loe.org/shows/segments.htm?programID=06-P13-00016&segmentID=1; Blumenstyk, G. (2003). "The Price of Research: A Berkeley scientist says a corporate sponsor tried to bury his unwelcome findings and then buy his silence," The Chronicle of Higher Education, October 31, 2003. http://chronicle.com/article/The-Price-of-Research/21691.] APHIS does not supply any estimate of the increase in the use of atrazine, acetochlor, monosodium methanearsonic acid, the chlorophenoxy herbicides 2,4-D and dicamba, clopyralid, picloram, or any other non-glyphosate herbicide that will be required for:

1) Removal of old stands of RR alfalfa
2) Eradication of Roundup Ready alfalfa volunteers in follow-on crops
3) Control of glyphosate-resistant weeds fostered by the RR alfalfa system, both independently of and in conjunction with existing RR crop systems, including RR soybeans, RR corn, RR cotton, RR canola, or RR sugar beets. (Comment Number: APHIS-2007-0044-11037-29)

Response: APHIS acknowledges the comment on volunteer GT corn becoming a weed in GT soybean fields and volunteer GT soybeans becoming weeds in GT corn fields. Section III.A.2.d of the DEIS acknowledged combination of herbicides that were effective in controlling GT alfalfa volunteers in a GT corn crop. Further discussion was provided in appendix J, section 2.5.1 of the DEIS on alfalfa stand removal and volunteer control. Herbicide use for stand removal occurs only once every 2 to 8 years (DEIS, appendix J, section 2.5.1). In regard to stand removal practices for GT alfalfa, see the response to comment APHIS-2007-0044-11037-28 for issue 7.1.
Concerning changing patterns of herbicide use overall, see the response to comment APHIS-2007-0044-11037-32 for issue 4.2. Discussion of trends in herbicide and glyphosate use is expanded in appendix N, section 1 of the FEIS and J 2-5-2.7to include the most recent information.

Comment Excerpt Text:

One source that APHIS does cite repeatedly deserves examination. This is a white paper – not peer-reviewed, not published in any journal – called "The Importance of Pesticides and Other Pest Management Practices in U.S. Alfalfa Production," published for USDA's The National Agricultural Pesticide Impact Assessment Program (NAPIAP) in 1999. [Footnote 4: Hower, A.A., J.K. Harper and R. Gordon Harvey (1999). "The Importance of Pesticides and Other Pest Management Practices in U.S. Alfalfa Production," prepared for The National Agricultural Pesticide Impact Assessment Program, USDA, NAPIAP Document No. 2-CA-99.] While this white paper has certain useful information, it has several disadvantages that make it less reliable than USDA NASS data. First, the NAPIAP is based on data from 1988 to 1992, while USDA NASS surveyed pesticide use on alfalfa in 1998, so the latter data are more recent. Second, the NAPIAP white paper is not based on real pesticide usage data collected from alfalfa farmers themselves. Rather, it is based on responses to questionnaires mailed to unnamed "state specialists," who were asked to supply opinions about pesticide use and other weed control methods, problematic weeds and weed control costs in alfalfa farming for an "average year" in the period from 1988 to 1992 (the questionnaires were mailed out in December 1993). [Footnote 5: Ibid at 7.] Not only are state specialists less reliable sources of information about pesticide usage practices than the farmers who actually purchase and apply those pesticides, the fact that these specialists were asked to supply opinions on these matters for "an average year" over a period stretching back six years must have made real demands on their memory; and calls into question the accuracy and reliability of the extremely nuanced data supplied in the course of the paper's 65 tables. Finally, we are a bit suspicious of the objectivity of a study that insists, in its very title, on the "importance" of pesticides in a crop in which farmers demonstrably find so little use for them. (Comment Number: APHIS-2007-0044-11037-3)

Response: Discussion of trends in herbicide and glyphosate use is expanded in appendix N, section 1 and appendix J 2.5-2.7 of the FEIS, where the commenter's points about the white paper are now discussed.

Comment Excerpt Text:
Critique of APHIS's Assessment of the Herbicide Use Impacts of Other GT Crop Systems

APHIS finds "scientific disagreement" and "controversy" [Footnote 1: EIS at 166, N-2, N-11.] regarding the important question of whether glyphosate-tolerant, Roundup Ready crop systems have increased or reduced overall herbicide use. Yet there is there no reason at all for doubt on this question. It is absolutely clear that glyphosate-tolerant crops have fostered substantial increases in overall and per acre herbicide use, as we document below.

APHIS's confusion on this matter has several sources, chiefly:

1) Unwitting reliance on decade-old data that no longer reflect current conditions in the rapidly changing dynamic of GT crop adoption, resistant weed evolution and herbicide use;
2) Misguided rejection of high-quality pesticide usage data from its sister agency, USDA's National Agricultural Statistics Service (NASS); [Footnote 2: EIS at N-2.] and
3) Uncritical reliance on bogus "simulation studies" by organizations representing the biotechnology-pesticide industry.

CFS relies on NASS data for several reasons. First, NASS utilizes transparent, rigorous procedures and statistically valid sampling methods to deliver highly accurate pesticide data. Second, NASS has regularly collected pesticide usage data on the major crops for which GT versions are predominant (soybeans, corn and cotton) over the entire period of GT crop adoption, offering a consistent set of data that facilitates accurate, year-to-year comparisons. Finally, NASS data and methodologies are freely and publicly available, which allows for open review and criticism of any analysis utilizing them.

NASS's Advisory Committee on Agricultural Statistics, comprised of experts from academia and industry, had this to say:

"NASS employs rigorous methods to ensure that statistically representative samples are achieved…." thus ensuring "a high level of data reliability and accuracy, which are the greatest advantage of NASS data." [Footnote 3: USDA NASS (2006). "Meeting of the Advisory Committee on Agriculture Statistics (ACAS): Summary and Recommendations," February 14-15, 2006, USDA NASS, Appendix III, at: http://www.nass.usda.gov/About_NASS/Advisory_Committee_on_Agriculture_Statistics/advisory-es021406.pdf.]

NASS data are also extensively used by the U.S. Environmental Protection Agency, state pesticide officials, pesticide firms and independent analysts.

The same Advisory Committee quoted above found fault with alternative, private sector pesticide data, finding it non-transparent and potentially based on faulty sampling techniques (e.g. overly small sample sizes). With reference to Doane, the major private-sector provider of pesticide usage information, the Advisory Committee found that:

"The proprietary agreements entered into by Doane subscribers extend well beyond prohibitions on data disclosure, to embargo revelation of the sampling and analytical procedures used to generate their data. Thus, it may be that a large number of the area wide estimates included in the Doane system are based on individual or statistically unrepresentative observations." [Footnote 4: USDA NASS (2006), op. cit., Appendix III.]

In other words, NASS is regarded by experts in the field as the authoritative source for pesticide usage information in American agriculture, while private sector companies may at times supply faulty pesticide data because of illegitimate (and secretive) sampling techniques. For these and other reasons, APHIS's criticisms of NASS data[Footnote 5: EIS at N-2.] are unfounded, and its confidence in private sector data misplaced, as explained further in Appendix 1.

Despite APHIS's dissatisfaction with NASS's pesticide reporting program, it reproduces a graph (Figure N-7, at N-17) based on NASS pesticide use data that first appeared in a USDA Economic Research Service publication (Fernandez-Cornejo 2006, Figure 3.3.3; APHIS neglected to record the source, which Fernandez-Cornejo cites as "USDA, NASS surveys"). [Footnote 6: It may well be that APHIS carelessly overlooked the fact that Fernandez-Cornejo (2006) used NASS survey data for this figure. Otherwise, it is difficult to explain how APHIS could criticize NASS data as

unreliable (p. N-2) and yet here utilize the same data to support its preferred conclusion that HT crops reduce herbicide use. A second possible explanation is that APHIS has a pervasive bias leading it to uncritically accept any study or secondary article or undocumented claim to the effect that HT crops reduce herbicide use, and condemn studies that reach the contrary conclusion, irrespective of the quality of data employed to reach these respective conclusions. Appendix __ explores the abundant evidence to support this latter explanation.] In Figure 3 below, we have used all available NASS data from 2003 to 2007 to update Figure N-7. One can confirm by inspection that all herbicide usage data points from 1995 to 2002 are the same in the two graphs (we exclude corn insecticide use). In Appendix 2, we describe the simple steps required to calculate the figures in Figure 3 from NASS data.

Although NASS does not break out herbicide use separately on GT versus conventional crops, any study purporting to do so must be consistent with NASS data. That is, if a study's conclusions are impossible or extremely difficult to explain in light of NASS data, such a study must be rejected, absent some very convincing explanation for the disparity. The study should also not be merely a number-crunching exercise, completely removed from on-the-ground farming reality. Instead, it should provide explanations for its results in terms of farmers' weed control challenges and their responses to these challenges, and how this dynamic changes over the time period covered by the study. Such explanations should be fact-based and quantitative whenever possible. This explanatory burden weighs more heavily on those whose conclusions do not comport with NASS data.

The figure below portrays the change in average herbicide use per acre per year[Footnote 7: Herbicide use per acre is preferred as a metric over total pounds of herbicide applied for the following reason. Total pounds applied to a crop in a given year depends in part on the number of acres planted, which can fluctuate, sometimes substantially, from year to year. The pounds per acre metric eliminates the effect of this arbitrary fluctuation and so provides an "acres-adjusted" measure of herbicide use to facilitate year-to-year comparisons of herbicide intensity in the U.S. from 1994 to 2005 (corn), 2006 (soybeans) and 2007 (cotton), based on all available NASS data. These are the three major crops with high adoption rates of glyphosate-tolerant versions, and the last years for which NASS data are available for each of them. GT versions were introduced by Monsanto in 1996 (soybeans), 1997 (cotton), and 1998 (corn). Figures 4, 5 and 6 portray the same average herbicide usage data separately for soybeans, cotton and corn, respectively. In addition, these figures plot adoption of HT varieties as a percentage of total crop acreage, in order to explore possible correlations between the two parameters.

Overall herbicide use on soybeans and cotton follow the same trend, and in fact are remarkably similar – slowly declining herbicide use in the first 5-6 years of GT crop adoption; a nadir in the year 2001 when HT varieties had reached roughly three-fourths of total crop acreage; and then, sharp, 50% spikes in herbicide intensity in the following 5-6 years. Herbicide use on corn generally fell in the first 5 years of HT corn adoption, bottoming out in 2002; and then increased slightly in 2003, remaining constant in 2005. HT corn was adopted more slowly than GT soybeans and HT cotton, with just 11% and 26% adoption in 2002 and 2005, respectively. (Comment Number: APHIS-2007-0044-11037-32)

Response: The DEIS used USDA NASS reports for information on agricultural practices whenever possible. Where the DEIS required analysis of data not available in NASS, other data sources were sought. An expanded discussion of trends in herbicide application rates in the United States is contained in appendix Jof the FEIS.

Comment Excerpt Text:
Of the many studies cited by APHIS on herbicide use and HT crops, Benbrook (2004) is the only one that both: 1) Comports with the NASS data presented above; and 2) Offers real-world farming explanations for the trends these data reveal. Dr. Benbrook has recently published another study on GE crops and pesticide use (Benbrook 2009) that employs the same methods as his earlier study, but extends the analysis through crop year 2008.

Benbrook (2004 & 2009) explains the reduction in herbicide use in the early years of GT crop adoption in the same terms as industry does. GT crops permitted field crop farmers to make much greater use of glyphosate, an extremely effective herbicide. In particular, RR crops' tolerance to glyphosate enabled farmers to apply the chemical "post-emergence" – that is, directly to the growing crop in order to kill nearby weeds – whereas prior to RR crops (i.e. and now with conventional crops), glyphosate use was/is limited to before planting or prior to seedling emergence to avoid crop damage. GT crops thus enabled farmers to better time their glyphosate applications to more efficiently kill weeds. This efficiency factor helped farmers kill more weeds with less herbicide than was possible with conventional crops in the first 3 years of GT crop adoption, resulting in slightly less herbicide use on GT crops relative to the conventional crop acres they displaced from 1996 to 1998.

The situation stayed relatively constant for the next two years, although the slight decline in herbicide use from 1996-98 from HT crops shifted over to a slight increase in 1999 to 2000. Two factors changed this situation. First, the dramatic upsurge in glyphosate use with Roundup Ready crops, as well as often exclusive reliance on glyphosate as the sole means of weed control, led inexorably to the rapid emergence of weed populations tolerant of or resistant to this chemical. This is the same principle by which bacteria evolve resistance to overused antibiotics. Resistant weeds, in turn, require higher doses or more applications of glyphosate to kill. In recent years, glyphosate use continues to rise, while aggregate non-glyphosate herbicide use remains constant. In some cases, increased rates of glyphosate are accompanied by higher doses of non-glyphosate herbicides as well (e.g. 2,4-D on soybeans).

The second factor involves the introduction of new, low-dose soybean herbicides for use on conventional soybeans. As RR crop adoption increased dramatically, use of glyphosate (a moderate- to high-dose herbicide) rose in tandem, and displaced the low-dose herbicides that would otherwise have been applied had those RR crop acres remained conventional. Together, these two factors are responsible for the herbicide-promoting impacts of HT crops over the past decade.

Beginning in earnest by 2001, GT crops have been responsible for a growing herbicide surplus relative to the hypothetical situation where they had never been introduced. Over the 13 year period from 1996 to 2008, GT crops are responsible for an additional 383 million lbs. of

herbicides applied. Significantly, 46% of this additional herbicide burden accrued in just the past two years – 2007 and 2008 – which reflects farmers' use of substantially greater amounts of herbicide to counter the accelerated emergence of particularly damaging glyphosate-resistant weed populations, such as GR Palmer amaranth that has exploded to infest millions of acres of cotton-growing land in the South, and the spread of GR marestail from southern and eastern states deeper into the Midwest. (Comment Number: APHIS-2007-0044-11037-33)

Response: An expanded discussion of trends in herbicide application rates in the United States is contained in appendix J, of the FEIS.

Comment Excerpt Text:
APHIS's main treatment of herbicide usage related to glyphosate-tolerant crops is found in Appendix N: page N-2 and Section 1.3, pages N-11 to N-18. Disjointed fragments appear in the cumulative impacts section as well (pp. 169 ff). The chief flaws in APHIS's treatment are its reliance on outdated studies with decade-old pesticide usage data that reporting on pesticide usage a decade or more ago; confusion of tendentious secondary literature for actual studies; reliance on unreviewed, bogus "simulation studies" that misrepresent pesticide use on GE and conventional crops; and an obvious and pervasive bias that leads APHIS to accept uncritically any study or secondary article that purports to show reduced herbicide use with HT crops.

APHIS describes a 2004 study by Dr. Charles Benbrook that found an aggregate increase in herbicide use of 138 million pounds due to the cultivation of GE herbicide-tolerant soybeans, corn and cotton over the nine years from 1996 to 2004. In other words, 138 million lbs. more herbicide were used than would have been the case had these HT crops not been introduced. Benbrook found that HT crops slightly reduced herbicide use from 1996 to 1998; but then stimulated a much greater increase in herbicide use from 1999 to 2004 (as portrayed in Figure N-1, p. N-12). Benbrook discusses two factors as being chiefly responsible for these findings. First, the rapid emergence of glyphosate-resistant weeds beginning in the year 2000, attributable to excessive reliance on glyphosate for weed control in Roundup Ready crop systems, led to increased herbicide application frequency and rates as more and more farmers were forced to respond to increasingly resistant weeds. Second, the introduction and greater use of low-dose soybean herbicides applied primarily to conventional soybean acres also widened the herbicide usage gap between conventional vs. Roundup Ready soybeans (i.e. glyphosate is a relatively high dose herbicide).
APHIS then cites a number of studies it claims contradict Benbrook's results and find lower herbicide use on HT crops, thus generating "controversy" (N-11) and "scientific disagreement" (p. 166). APHIS uses this controversy and disagreement as an excuse to avoid an assessment of the herbicide usage impacts of currently grown RR crops, and to avoid conducting a prospective assessment of the herbicide usage impacts of Roundup Ready alfalfa. Thus, it is very important to determine whether this supposed controversy has any merit, and what the true impact of RR crops has been.

In several cases, the conflict is only apparent. For instance, APHIS cites Heimlich et al (2000) as one of those studies that conflict with Benbrook [cited twice for different and conflicting statements]. Yet, examination of Heimlich et al (2000) reveals that the study's conclusions of

reduced pesticide use with GE crops (including HT crops) applies only to crop years 1997 and 1998. These are among the same years that Benbrook (2004) also found that GE crops reduced herbicide use. It is fairly clear that APHIS officers or consultants made this simple error because they simply never read Heimlich et al (2000).

The conflict with Benbrook (2004) is only apparent with a second report cited by APHIS as well – Fernandez-Cornejo (2006). This report, by an USDA Economic Research Service analyst, has no original research on GE crops and pesticide use. Instead, the author reiterates the conclusions of a decade-old study that compared pesticide use on GE vs. conventional crops from 1996 to 1998 – 8 to 10 years before the publication date. [Footnote 10: "The overall reduction in pesticide use associated with the increased adoption of GE crops (Bt cotton; and HT corn, cotton, and soybeans, using 1997/1998 data) also resulted in a significant reduction in potential exposure to pesticides. The decline in pesticide applications was estimated to be 19.1 million acre-treatments (Fernandez-Cornejo and McBride, 2002, pp. 26-28)." (p. 72) (emphasis added). Reference to Fernandez-Cornejo and McBride (2002) (p. 27) reveals that while most of the data are indeed for 1997/1998, the HT corn data is based on crop years 1996/1997.] Once again, Benbrook also found that GE crops reduced pesticide use in that time frame. However, such findings are completely useless in 2010. The rapidly evolving dynamic between increasing RR crop adoption and rising herbicide use and widespread emergence of resistant weeds has produced a an agronomic landscape that has altered dramatically for most American field crop growers since 1996.

Fernandez-Cornejo (2006) also states that "pesticide use on corn and soybeans has declined since the introduction of GE corn and soybeans in 1996" referring to a Fig. 3.3.3 (p. 72). APHIS reproduces this Figure 3.3.3 as Figure N-7 (p. N-17) in the EIS. The graph plots average herbicide usage from 1995 to 2001 (for cotton) or 2002 (for corn and soybeans), based on NASS data. [Footnote 11: APHIS neglects to include the information source in the EIS, but the original Figure 3.3.3 cites USDA NASS pesticide survey data. (We will come back to this point.)] For some unexplained reason, in this 2006 report, Fernandez-Cornejo failed to plot available NASS data for herbicide use on cotton and corn (2003, 2005) and soybeans (2004, 2005). The insistence on referring to outdated data and the curious reluctance to discuss recent data is puzzling, and positively misleading in an area that is changing so rapidly.

A third study cited by APHIS for the proposition that HT crops reduce herbicide use is Gianessi and Reigner (2006). This study, entitled "Pesticide Use in U.S. Crop Production 2002: With Comparisons to 1992 and 1997 – Fungicides and Herbicides," was written by employees or contractors of the pesticide lobby group, CropLife Foundation. Once again, APHIS gets it wrong. This study has nothing to do with GE crops, and Gianessi and Reigner say nothing about whether HT crops reduce or increase herbicide use. Instead, this publication is a collection of tables with figures that purport to give a broad-brush numerical overview of fungicide and herbicide use in the U.S. in 1992, 1997 and 2002, with the data broken down by crop, herbicide, state, etc. While a variety of sources are listed, Gianessi and Reigner fail to present any methodology. Interestingly, Gianessi and Reigner falsely claim that a widely used herbicde – metolachlor – was phased out in 2001, when USDA NASS data clearly show that it continued to be used in the millions of pounds each year, for some years afterwards. This is demonstrated in the supporting materials as well as NASS data.

APHIS refers to a fourth study as follows: “Trewavas and Leaver (2001) conducted an analysis which revealed that 3.27 million kg of other herbicides have been replaced with 2.45 million kg. of glyphosate in soybean fields in the US.” Over which years? How was this “analysis” conducted? Did GE soybeans have anything to do with this alleged change in herbicide use? We checked this article to seek answers, and found the following: 1) The findings quoted above are taken directly from Heimlich et al (2000) (discussed above), and so provides no new information to corroborate APHIS’s “less pesticide with GE crops” story line; 2) As noted above the results apply to crop years 1996 to 1998, and so do not conflict with Benbrook (2004); and 3) APHIS for some reason alters the lb. units used in Trewavas and Leaver (2001) to kilograms, perhaps to give the false impression that the reported results are indeed new rather than duplicative of Heimlich et al (2000).

In at least seven cases, it is clear that APHIS has not even taken the trouble to read the articles/studies it cites. Instead, APHIS has “lifted” citations for these seven works from a review article where the conclusion of each is briefly and uncritically described. Such third-hand reporting is a flagrant breach of scientific protocol. The legal equivalent would be for a witness to present second-hand hearsay (he said she said) as if it were his/her personal experience. It is no more permissible in science than in law. It is irresponsible to report the bare conclusions of a study one has not read, because one does so on faith, without having made a critical assessment of the validity of the study’s methodology, the assumptions upon which it is based, or possible errors. The fact that error is a huge and ineradicable part of scientific endeavor is implicit in the discipline of peer-review. When one uncritically cribs conclusions and citations at third hand, as APHIS has done here, it represents a betrayal of this core scientific principle. (Comment Number: APHIS-2007-0044-11037-35)

Response: Regarding the aggregate increase in all herbicide use in the United States as described in Benbrook (2004), the report has been updated (2009) and is included in an expanded discussion of trends in herbicide application rates in the United States in appendix N, section 1 and appendix J 2.5-2.7 of the FEIS. The FEIS also reflects corrections to the errors identified by the commenter.

Comment Excerpt Text:
USDA NASS Agricultural Chemical Usage reports are not based on opinions of specialists, who in our experience are often biased to favor more input-intensive practices, but rather on detailed surveys of individual farmers chosen so as to form a statistically representative picture of the pesticide usage practices of farmers in their state or region. The surveys are conducted by trained enumerators, and the results are carefully assessed as to their reliability. In 1998, USDA NASS collected 755 usable reports of pesticide usage from alfalfa hay farmers in 48 states across the country (p. 6), with appropriate weighting of numbers surveyed from each region according to its relative importance in alfalfa production: Western region (274); North Central region (317); Northeast (62); and South (102). The survey procedure and reliability assessment are explained on pages 125-26. The major result was that just 7% of alfalfa hay acres were treated with herbicides:

"Alfalfa Hay: Growers applied herbicides to 7 percent of their acres across the United States." (p. 3)

In contrast, according to the opinions of the unnamed state specialists consulted by questionnaire by Hower et al (1999): "an average of only 16.6% of the alfalfa hay acreage was treated with herbicides…"[Footnote 6: Hower et al, op. cit., p. 59.] – over twice as much as the 7% determined by NASS. APHIS mistakenly cites Hower et al (1999) as stating that 22% of alfalfa hay acreage was treated with herbicides[Footnote 7: EIS at 67-68. APHIS wrongly cites Hower et al as stating that "16.6% of total fields; 22 percent of acreage" of hay fields were treated with herbicides. Hower et al (1999) say nothing about "total field," but rather refer explicitly to 16.6% of hay acreage as being treated with herbicides, as quoted above.] – thus arriving at a figure more than three times as high as the NASS figure. This is by no means an insignificant error (or misrepresentation) on APHIS's part. It makes herbicide use appear to be more than three times more prevalent than it actually is, which as we will see fits a pattern of pervasive bias throughout the EIS. APHIS's intent is to make alfalfa seem to be a much more herbicide-intensive crop than it really is, in order to make it seem that the huge increase in glyphosate use with RR alfalfa would be offset by significant decreases in the use of other herbicides. As we shall see, this is not the case.

APHIS also refers to Wilke (1998) [Footnote 8: EIS at 61 and N-18.] as the source of the latest available estimate for the percentage of alfalfa hay acres treated with herbicides – 17% which is incorrect. Wilke (1998) quotes one of the co-authors of the Howe et al (1999) study we referred to above, R. Gordon Harvey, who is referring to the 16.6% figure found in that study for the "average year" between 1988 ad 1992. As we noted above, USDA NASS's 1998 figure of 7% of hay acreage treated with herbicides is 6-10 years more recent, as well as being more accurate and reliable. (Comment Number: APHIS-2007-0044-11037-4)

Response: Regarding the proportion of alfalfa acreage to which herbicides were or are likely to be applied, see the response to comment APHIS-2007-0044-11037-10 for issue 4.2. As stated in that response, the commenter's point that in contrast to corn, soybean, and cotton, herbicides have been applied only to a small fraction of total alfalfa acreage is valid and consistent with information presented in appendix J of the DEIS. Conclusions in the DEIS do not rely on the presumption of extensive herbicide use on conventional alfalfa. Appendix J of the FEIS discusses alfalfa adoption rates.

Comment Excerpt Text:
The EPA estimates that 200,000 lbs. a.e. glyphosate are applied to alfalfa nationwide. [Footnote 1: EPA (2008), op. cit. a.e. = acid equivalents, which represents the weight of glyphosate acid itself, excluding the weight of the salt that commercial formulations of glyphosate normally come with.] Two recent studies on glyphosate use and weed control with RR alfalfa funded in part by Monsanto are used below to estimate the likely increase in glyphosate use with introduction and varying degrees of adoption of RR alfalfa. These studies are included in the supporting material; McCordick et al (2008) is cited in the EIS.

McCordick et al (2008) conducted field studies in Michigan in 2004 and 2005 to compare the effects of different establishment and weed control methods on glyphosate-tolerant alfalfa production. Four glyphosate treatments of 0.8 kg a.e./hectare (= 0.71 lbs./acre) were applied over the course of the season, once roughly 5 weeks after seeding, then 7-10 days after each of three harvests. The total glyphosate applied for the season was thus 3.2 kg a.e./ha (= 2.86 lbs./acre). [Footnote 2: 1 kg = 2.2046 lbs.; 1 hectare = 2.4711 acres. Multiplication of the kg/ha figures by 0.8922 gives lbs./acre.] In the second study, Wilson and Burgener (2009) tested RR alfalfa for three years from 2005 to 2007 in Nebraska, using a number of different glyphosate application regimes involving one or two applications of 0.75, 1.12 or 1.50 lbs. a.e./acre glyphosate at different alfalfa growth stages. Seasonal application rates of glyphosate thus ranged from (1 x 0.75) to (2 x 1.50) = 0.75 to 3.0 lbs. a.e./acre/year. In both studies, glyphosate was compared to other weed control regimes (discussed further below). Finally, the theoretical, legally permissible, upper limit of glyphosate use on RR alfalfa (based on the current maximum label rate) is also modeled.

Below, we discuss nationwide use of glyphosate with several of the RR alfalfa system glyphosate regimens noted above, under each of three different adoption scenarios: 20%, 50% or 80% of total alfalfa acreage = Roundup Ready alfalfa. The figure we use for total alfalfa acreage (22.25 million acres) was derived by averaging the acreage of alfalfa harvested over the past decade (2000 to 2009), as reported by USDA NASS.

Glyphosate use varies quite widely under the different scenarios. At the low end, a single application per year of roughly half the maximum, single application label rate would mean 3.3, 8.3 or 13.3 million lbs. of glyphosate applied to RR alfalfa at 20%, 50% or 80% adoption rates, respectively. Relative to current annual nationwide use of glyphosate on alfalfa of 200,000 lbs. a.e. (= 0.2 million lbs), these scenarios yield 16-fold, 41-fold or 66-fold increases in glyphosate use, respectively.

At the high end, the maximal seasonal rate applied by Wilson and Burgener (2009) of 3.0 lbs. a.e./acre/year (2 application of 1.5 lbs./acre) would mean 13.3 million, 33.4 million or 53.4 million lbs. glyphosate a.e. applied at 20%, 50% or 80% RR alfalfa adoption, respectively. In this scenario, glyphosate use would increase by 66 times over current levels with just 20% of alfalfa acreage converted to the Roundup Ready alfalfa system. Glyphosate use would increase 167-fold or 267-fold over current levels in the 50% or 80% adoption scenarios.

Finally, given the current maximum label rates for use of glyphosate on RR alfalfa, it would be legally permissible to apply 26.5, 66.3 or 106.1 million lbs. a.e. of glyphosate to RR alfalfa, if adopted at the 20%, 50% or 80% level, respectively – yielding 130 to 530 times as much glyphosate as is currently applied to alfalfa. It is unlikely that this much glyphosate would ever be applied to Roundup Ready alfalfa, however; we report these figures merely to delineate the theoretical, legally permissible limits to glyphosate use in the Roundup Ready alfalfa system. [Footnote 3: With conventional alfalfa, the maximal single application rate of 1.55 lbs. a.e./acre is also the seasonal maximum, since only one application per year is permitted (at least for alfalfa that will be grazed or fed as forage). See Monsanto UltraMAX II label (2004), p. 11.]

In general, the amount of glyphosate applied with use of the RR alfalfa system will increase over time, with evolution of glyphosate-resistant weeds and weed shifts to more glyphosate-tolerant species. (Comment Number: APHIS-2007-0044-11037-5)
Response: Appendix N, section 1 and appendix J of the FEIS, includes an expanded analysis of glyphosate use changes that might follow deregulation of GT alfalfa to include several scenarios with different assumptions including those considered by EPA.

The appropriate comparison of expanded glyphosate use with deregulation of GT alfalfa is relative to total use of glyphosate on all GT crops, not relative to current glyphosate use on alfalfa, which is low as would be expected given the limited plantings of GT alfalfa in 2005. Consequences of glyphosate applications apply to agriculture throughout the United States (and elsewhere), not just to alfalfa.

In addition, adoption of GT alfalfa is most likely for the proportion of alfalfa acreage for which herbicides currently are applied. Thus, adoption rates of 50 percent or 80 percent for GT alfalfa are unlikely. According to the estimates of 7 to 22 percent of alfalfa being treated with herbicides at all (see the comment APHIS-2007-0044-11037-10 for issue 4.2), adoption rates of 20 percent to 25 percent GT alfalfa might be reasonable high-end scenarios.

Comment Excerpt Text:
To what extent would the 16- to several hundred-fold increase in glyphosate use with the RR alfalfa system displace use of other "more toxic," "more environmentally harmful," herbicides, as APHIS claims ad nauseum, without any serious quantitative analysis, throughout the EIS? The NASS and EPA alfalfa pesticide usage data that APHIS somehow neglected to consult provide the answer. Overall herbicide use on alfalfa in 1998 was 1.468 million lbs.; [Footnote 4: USDA NASS (1999), op. cit., p. 9. See figure in row "U.S." and column "1,000 Lbs" under "Herbicide."] if one subtracts the 0.2 million lbs. of glyphosate, that leaves roughly 1.3 million lbs. of non-glyphosate herbicides applied to alfalfa. Even the low-end scenario of glyphosate use with RR alfalfa was 3.3 million lbs., with more likely scenarios roughly ten times higher (see below). The idea of replacing just over a million lbs. of non-glyphosate herbicides with 10 to 20 to 30 million or more lbs. of glyphosate-based formulations makes sense only to those who understand nothing about this pesticide's toxicity, its numerous harmful effects on the interests of agriculture, human health and the environment.
The scenarios above give a very wide range of possible glyphosate use with the RR alfalfa system. How much glyphosate would actually be used? No definitive answer is possible, yet it was clearly incumbent on APHIS to carefully analyze this matter rather than merely throwing out a casual upper-bound estimate. (Comment Number: APHIS-2007-0044-11037-6)

Response: See the response to comment APHIS-2007-0044-11037-19 for issue 4.2. Appendix N, section 1 of the FEIS, has expanded the assessment of glyphosate use changes that might follow deregulation of GT alfalfa that was presented in the DEIS, to include several scenarios with different assumptions; see also appendix J.

Comment Excerpt Text:

An important factor that must be considered is that one substantial application of glyphosate is "built-in" to the RR alfalfa system – that is, necessary even in the event that a farmer doesn't have weed problems and otherwise wouldn't apply Roundup. According to the Monsanto label for several Roundup products:

"….up to 10% of the [RR alfalfa] seedlings may not contain a Roundup Ready gene and will not survive the first application of this product. To eliminate the undesirable effects of stand gaps created by this loss of plants, a single application of at least 22 fluid ounces per acre of this product should be applied at or before the 4-trifoliate growth stage." [Footnote 5: Roundup WeatherMAX label (2007), Section 12.1, Roundup Ready Alfalfa, p. 14. Virtually identical wording is found in the Honcho label (2007), Section 12.1, Roundup Ready alfalfa, p. 14.]

The recommended application rate for this purpose is 22 to 44 fluid ounces of Roundup WeatherMax, or 1 to 2 quarts of Honcho, both equivalent to a dose of 0.75 to 1.5 lbs. glyphosate a.e./acre. Thus, a farmer who wishes to avoid stand gaps in his/her RR alfalfa (which provide opportunities for weeds to invade the alfalfa stand, defeating the weed control purpose of the RR system) must make a quite early application of Roundup whether weeds are present or not. Reference to the scenarios in Table 1 shows that this "built-in" application by itself ensures that the RR alfalfa system will require from 3.3 to 13.3 million lbs. (if 0.75 lbs./acre are used) or from 6.6 to 26.6 million lbs. (if 1.5 lbs./acre) are used, depending on the RR alfalfa adoption rate.

For some growers, this application of glyphosate that is required to remedy defects in the RR alfalfa technology will do double duty for adequate, season-long weed control, at least in the short term. However, most growers will make at least one and in some cases several additional applications of glyphosate. This is because, generally speaking, somewhat later applications when the alfalfa seedlings are bigger provide more effective weed control than early treatments. Of the treatments tested by Wilson & Burgener (2009), the one that provided the best weed control was two applications of glyphosate (2 x 1.5 lbs. a.e./acre), one each at the four- and 16-trifoliate alfalfa growth stages. The second best treatment involved two treatments (2 x 1.12 lbs. a.e./acre) at the two- and eight-trifoliate stages. [Footnote 6: Wilson & Burgener (2009), Table 2. Note that the corresponding treatments in the paper, in kg/ha, are 2 x 1.25 and 2 x 1.68. We have converted units to lbs./acre, as in Table 1 of these comments.] Improved weed control with a second, later application is attributable to "catching" more weeds that have had the time to sprout since the earlier treatment. [Footnote 7: Many growers of other RR crops attempt to make do with one late or very late application of glyphosate, to both "catch" more weeds and economize. This popular practice greatly enhances the risk of glyphosate-resistant weed evolution.] The common use of a second application of glyphosate by RR alfalfa growers would correspond to the scenarios in Table 1 that project from 10 to over 50 million lbs. of glyphosate, depending on the adoption rate. Once again, this substantial amount of glyphosate could displace no more than just over 1 million lbs. of non-glyphosate herbicides. (Comment Number: APHIS-2007-0044-11037-7)

Response: See the response to comment APHIS-2007-0044-11037-19 for issue 4.2. Appendix N, section 1 and appendix J of the FEIS, has expanded the assessment of glyphosate use changes that might follow deregulation of GT alfalfa that was presented in the DEIS, to include several scenarios with different assumptions.

Comment Excerpt Text:
GE Alfalfa Will Increase Pesticide Use To The Detriment Of Human Health And The Environment

Although USDA acknowledges that the introduction of RR alfalfa will increase the use of the herbicide, Roundup, it claims that the increase would be insignificant and that Roundup would replace other, more toxic herbicides. They are wrong and evidence exists to the contrary.

The majority of GE crops grown today are RR and their widespread introduction on farms has vastly increased Roundup use, fostering an epidemic of Roundup-resistant weeds. To kill Roundup-resistant weeds requires higher doses of Roundup, often in combination with other even more toxic herbicides. Over the past 13 years, the planting of RR crops has significantly increased overall herbicide use on corn, soybeans and cotton -by 383 million pounds. [Footnote 19 http://truefoodnow.org/2009/11/17/new-report-reveals-dramatic-rise-in-pesticide-use-on-genetically-engineered¬ge-crops-due-to-the-spread-of-resistant-weeds/] The wholesale deregulation of RR alfalfa would only make matters worse by substantially increasing Roundup's use across the country.

As USDA's own studies show, the great majority of alfalfa is currently grown without the use of any herbicides at all. [Footnote 20 United States Department of Agriculture. Glyphosate-Tolerant Alfalfa Events J101 and J163: Request for Nonregulated Status. Draft Environmental Impact Statement—November 2009. Appendix J, J-25, EIS pp. 34 & 43.] Therefore, the planting of RR alfalfa would increase Roundup applications and exacerbate the resistant weed epidemic without displacing the use of other herbicides. It would also add a new toxic, Roundup herbicide burden to an environment where it that burden is currently non-existent.

Roundup has been associated with increased rates of several cancers in pesticide applicators (e.g. non-Hodgkin's and multiple myeloma), [Footnote 21 Hardell, L., & Eriksson, M. (1999) "A Case-Controlled Study of Non-Hodgkin's Lymphoma and Exposure to Pesticides," Cancer, 85(6), 1353–1360; Hardell L, Eriksson M, & Nordstrom M. (2002) "Exposure to pesticides as risk factor for non-Hodgkin's lymphoma and hairy cell leukemia: pooled analysis of two Swedish case-control studies," Leuk Lymphoma, 43(5), 1043-1049; De Roos, et al. (2003). "Integrative assessment of multiple pesticides as risk factors for non-Hodgkin's lymphoma among men," Occup Environ Med, 60(9); De Roos, A. J. D., Blair, A., Rusiecki, J. A., Hoppin, J. A., Svec, M., Dosemeci, M., Sandler, D. P., & Alavanja, MC .2005. Cancer Incidence among Glyphosate-Exposed Pesticide Applicators in the Agricultural Health Study. Environmental Health Perspectives, 113(1), 49-54.] and it is highly toxic to frogs at field-relevant concentrations. [Footnote 22 Relyea, R.A. (2005a) "The lethal impact of Roundup on aquatic and terrestrial amphibians," Ecological Applications 15(4): 1118–1124; Relyea et al (2005) "Pesticides and amphibians: The importance of community context," Ecological Adaptations 15: 1125-1134; Relyea, R.A. (2005b) "The lethal impacts of Roundup and predatory stress on six species of North American tadpoles," Archives of Environmental Contamination and Toxicology 48: 351-57.] The Environmental Protection Agency (EPA) is currently re-assessing the safety of

glyphosate, the active ingredient in Roundup, for the first time in over 15 years. USDA should wait for this new EPA assessment before it considers approving RR alfalfa.

USDA also has failed to assess the foreseeable impacts on organic farmers from pesticide drift that would result from the dramatic increase in Roundup used on Monsanto's RR alfalfa. This situation could cause the decertification of organic crops and impart serious economic losses for organic farmers. (Comment Number: APHIS-2007-0044-11689-11)

Response: Regarding the increase of overall herbicide use on corn, soybeans, and cotton by 383 million pounds estimated by Benbrook (2009) using NASS data, see the response to comment APHIS-2007-0044-11037-33 for issue 4.2. Appendix N, section 1 and appendix J of the FEIS includes an expanded assessment of glyphosate use changes that might follow deregulation of GT alfalfa.

In regard to links between glyphosate exposure and cancer, see the response to comment APHIS-2007-0044-10525-1 for issue 6.0. In regard to effects on frogs, the FEIS expands the discussion of toxicity of glyphosate in combination with water-soluble surfactants to frogs and other amphibians in section IV.C.3and appendix N.

With respect to the recommendation that APHIS postpone its decision until after the EPA Office of Pesticide Programs has completed its reassessment of glyphosate for its reregistration, the earliest the EPA assessment will be published is in 2015, or five years from now (http://www.regulations.gov/search/Regs/home.html#documentDetail?D=EPA-HQ-OPP-2009-0361-0003).

Regarding the impact on organic certification of glyphosate-based pesticide drift, organic certification typically depends on adherence to an approved organic system plan. However, impacts on production costs of any new measures required of non-GT and organic producers are analyzed in section 3.2.3 of appendix S of the DEIS. In addition, the analysis of impacts of deregulation to seed producers has been expanded in section IV.D.1.c of the FEIS.

Comment Excerpt Text:
Roundup Ready alfalfa is very important to the success and profitability of many of the farmer customers I work with. The technology has been proven to be environmentally safe with little to no threat of being reproduced through pollen transfer. An overwhelming majority of alfalfa cut and baled well in advance of pollen shed. Also, I am not aware of any alfalfa in the market that I work that is grown organically. I think the technology and use of Roundup Ready alfalfa is very important to the advancement of agriculture.

Attached file:
Matt Willard
Hubner Seed
330 Kormit Drive
Red Lion, PA 17356, US
February 9, 2010

To:
Docket Number: APHIS-2007-0044
Regulatory Analysis and Development
USDA PPD APHIS Station 3A-03.8
4700 River Road, Unit 118
Riverdale, MD 20737-1238

As a seed company professional, I support the deregulation of alfalfa engineered for tolerance to the herbicide glyphosate. The environmental impact statement prepared by the Animal and Plant Health Inspection Service in Docket No. APHIS-2007-0044 validates and ensures the safe production of glyphosate tolerant alfalfa.

Biotechnology-based breeding methods safely enhance and extend a crop's yield potential, feed value, adaptation, pest tolerance, environmental benefits, crop management and utilization options, as other biotech crops have demonstrated.

The overwhelming majority of alfalfa acres – 99.6 percent – produce only forage, which means farmers harvest their fields before alfalfa plants accept or produce pollen. More than 75 percent of alfalfa forage is used on the same farm where it is grown. Only 1 percent of U.S. forage is organically grown. Stewardship practices allow for the successful coexistence of organic, conventional and Roundup Ready alfalfa, allowing each market segment to be served.

A national alfalfa industry consensus plan for seed and hay industry coexistence and stewardship was adopted in June 2008 under the auspices of the National Alfalfa and Forage Alliance (NAFA). Coexistence plans for seed production and other markets are comprehensive and science-based. The NAFA best practices have been validated in two years of commercial seed production.

I urge the USDA to consider biotechnology's long history of success and allow alfalfa growers to join other American farmers in the benefits and new opportunities offered by biotechnology.
Sincerely,

Matt Willard
(Comment Number: APHIS-2007-0044-5277-1)

Response: APHIS acknowledges the comment on the feasibility of coexistence of conventional and GT alfalfa farming in the United States as adopted by the National Alfalfa and Forage Alliance (NAFA) in 2008.

Comment Excerpt Text:
I oppose deregulation of roundup ready alfalfa. The impact of genetically modified organisms on other plants, on soil, on animal and human metabolism and health has not been sufficiently studied to ensure safety. The effects of Glyphosphate or glyphosate have not been proven completely harmless to animals, humans, water, soil or other plants not intended for treatment. The acceptance by roundup ready plants of larger amounts of glyphosphate or glyphosate have

not been determined without a doubt to be safe for the consumer, the environment, or the farm laborer. (Comment Number: APHIS-2007-0044-7237-1)

Response: APHIS acknowledges the comment. In regard to uncertainty, see the response to comment APHIS-2007-0044-5569-1 for issue 4.0. In regard to glyphosate being harmful to humans and animals, see the response to comments APHIS-2007-0044-0278-1 for issue 6.0 and APHIS-2007-0044-0352-1 for issue 6.3.

Comment Excerpt Text:
2. APHIS appropriately references EPA's pesticide risk assessment process.

The process EPA uses for evaluating the potential health and environmental effects of glyphosate and every other registered pesticide, under either FIFRA or the FFDCA, is called risk assessment. See, e.g., Draft EIS at 91-92 (explaining EPA's risk assessment process). For human health, this includes a review of data that address potential exposure through consumption of food and drinking water as well as occupational and bystander exposure that might result from glyphosate use. For environmental risk assessment, EPA evaluates the potential effects of glyphosate use on: soil, surface water, groundwater, wildlife, and other non-target organisms such as birds, amphibians, mammals, soil microorganisms and beneficial insects, including bees. This review covers plants as well as animals, and includes endangered and threatened species.

The regulations and policies that implement FIFRA and the FFDCA are revised and updated as necessary to address new needs and the latest science and technologies. [Footnote 14: For example, EPA's risk assessment process includes the most current methodologies and techniques developed in compliance with the Food Quality Protection Act of 1996, Pub. L. No. 104-170, 110 Stat. 1489 (1996).] In 2009, EPA began a periodic registration review of glyphosate, mandated under FIFRA for all pesticides, to ensure that the product continues to perform its intended function without unreasonable adverse effects on human health or the environment. The registration review process is done transparently and the public has opportunities to comment at various stages. See Registration Review; Glyphosate Docket Opened for Review and Comment, 74 Fed. Reg. 36,217 (July 22, 2009).

The portions of the Draft EIS dealing with the safety of glyphosate could benefit from additional information regarding the risk assessments previously performed by EPA as part of the agency's comprehensive regulation of glyphosate. To that end, attached as Comment Appendix 4 is a detailed summary of the EPA's registration, reregistration, and tolerance-setting processes as related to glyphosate, along with technical corrections to information in the Draft EIS. (Comment Number: APHIS-2007-0044-7620-15)

Response: APHIS acknowledges the comment and reference to EPA's previous risk assessments related to glyphosate as part of its comprehensive regulation under FIFRA and FFDCA. Appendix N, section 1 of the FEIS expands the assessment of glyphosate use changes that might follow deregulation of GT alfalfa to include several scenarios with different assumptions including those considered by EPA; see also appendix J.

Comment Excerpt Text:
The USDA should have conclusive evidence that glyphosate is not transmitted to beef and dairy products through GE alfalfa prior to approving Roundup Ready alfalfa. (Comment Number: APHIS-2007-0044-7821-1)

Response: The discussion of studies that show that there is very little transfer of glyphosate residues from GT alfalfa feed to animal tissues in general (see DEIS appendix N, p. 4) and to beef and dairy products in particular has been expanded in appendix N, section 2.2 in the FEIS.

Comment Excerpt Text:
Roundup Ready alfalfa provides growers the ability to achieve dependable, cost-effective, and unsurpassed
broad spectrum weed control, including species that adversely affect hay quality, value, and stand longevity,
with less risk of crop injury and shorter pre-harvest interval than most herbicides used in conventional alfalfa.
Production of high-quality, weed-free conventional alfalfa hay requires skillful management and timely
herbicide application. Some herbicides for conventional alfalfa must be applied only when the crop is dormant
(limited opportunity for application) and often do not provide season-long weed control. Most herbicides
registered for postemergent application to weeds in conventional alfalfa control only grass or broadleaf weeds.
And other postemergent herbicides that control both grass and broadleaf species are expensive (e.g., imazamox,
Raptor®) or pose risks to workers during mixing and handling (e.g., paraquat, Gramoxone Inteon®). The
Roundup Ready alfalfa system is simpler, allows greater flexibility in the timing of low-cost glyphosate
herbicide applications, and improves stand establishment and longevity. Collectively, these advantages lead to
greater yield of high quality hay and higher profitability over the life of the stand.
History has shown that near exclusive use of any weed management practice changes the floral spectrum of
weed populations over time. Repeated use of herbicides with the same mode-of-action can lead to populations
of species (biotypes) that are resistant to those herbicides. The potential for weed resistance to herbicides is
common to all herbicides; not just glyphosate. The processes leading to weed resistance are understood and
science-based stewardship recommendations are increasingly being practiced by farmers who understand the
importance of weed resistance management. (Comment Number: APHIS-2007-0044-7944-2)

Response: APHIS acknowledges the comment on benefits of using GT alfalfa and science-based stewardship for weed resistance management.

Comment Excerpt Text:
All farmers know that unwanted weeds steal precious water and compete for essential nutrients from our respective crops. Prior to glyphosate-tolerant crops, farmers used a of five to seven different herbicides, which required precise timing in their applications to eliminate a broad spectrum of broadleaf weeds and grasses. Even after multiple applications of herbicides on our conventional sugarbeet crop, costly hand labor was often required - if it was available. These production methods were more difficult to manage, with higher economic costs, and higher yields were foregone due to competitive weed pressure. With low profit margins in the marketplace, many sugarbeet producers and their processing factories have been driven out of business. This has been a great loss to both our rural economy and of an important cropping option for growers. Glyphosate-tolerant sugarbeets are critically important to the future of the beet sugar industry. (Comment Number: APHIS-2007-0044-7953-1)

Response: APHIS acknowledges the comment on the utility of glyphosate-tolerant sugarbeets; however, the EIS addresses glyphosate-tolerant alfalfa only.

Comment Excerpt Text:
"In GT alfalfa, herbicides other than glyphosate combined with tillage are required to obtain 100 percent removal." Did this just contradict the statement that the use of GT alfalfa would decrease the use of other more toxic chemicals? I if you use this reasoning RR alfalfa will be spayed at least once as a seedling then to take it out it will have to be sprayed with a more toxic herbicide. Before RR alfalfa, a forage producer would only spray "22% of acreage" (page J-25) for weed control with a more toxic herbicide and then use glyphosate to take out the stand, with the RR alfalfa the forage producer will have to spray every seedling field with Glyphosate and then use the more toxic chemical to take out the stand. It seems to me this drastic change in cultural practices will lead to a 78% increase in the use of the more toxic herbicide. (Comment Number: APHIS-2007-0044-9547-2)

Response: The DEIS, section III.E.2.c does state that "In GT alfalfa, herbicides other than glyphosate combined with tillage are required to obtain 100 percent removal" in reference to taking out an alfalfa stand entirely. Total removal is only done at intervals ranging from 2 to 8 years, with 4 to 6 years being common.

Comment Excerpt Text:
The history of synthetic herbicide use extends to at least WWII, with new herbicide classes introduced at regular intervals since then. With each new chemical, there have always been shifts in weed composition and weeds which acquire resistance. Thus, it is important to emphasize that there is nothing unique about weed shifts and the development of resistance when it comes to

glyphosate. This is an issue faced by all herbicides, and there is no reason to single out glyphosate.
The best way to prevent weed shifts is to rotate herbicides. Already, the soybean and corn industries
are moving towards stacked herbicide resistance traits that will allow farmers to rotate herbicides.
It is inevitable that such stacked herbicide resistance traits will one day be bred into alfalfa, which
will add to the sustainability of herbicide use in alfalfa fields. It is equally crucial that the regulatory
approval process for new transgenic alfalfas does not become too burdensome, so as to provide disincentives to come out with additional resitances to provide rotations.
While it is generally acknowledged that glyphosate is a relatively benign in terms of its environmental impact quotient, it has been argued that as glyphosate loses its effectiveness due to
weed shifts and/or resistance, more toxic herbicides have to be used, thus obviating the benefits of
RR alfalfa in first place. This is a circular argument, as in this scenario, the worst thing that would
happen is that the herbicide usage in alfalfa would return to what it is now. In the mean time, farmers would have been denied the benefits of RR alfalfa, even if only for a few years.
(Comment Number: APHIS-2007-0044-9801-2)

Response: APHIS acknowledges the comment on managing weed shifts by developing stacked herbicide tolerance traits (i.e., tolerance to two or more herbicides) and then rotating herbicides.

Comment Excerpt Text:
APHIS claims that as GT alfalfa is adopted, glyphosate herbicide will replace other, more toxic forms of weed control currently used in alfalfa. (DEIS at 171). APHIS assumes that current forms of weed control are more toxic than glyphosate and that all conventional alfalfa growers regularly use large quantities of herbicides. However, as the agency's own studies show, the great majority of alfalfa is currently grown without the use of any herbicides at all. [Footnote 61 See USDA Agricultural Chemical Usage, 1998 Field Crop Summary, 1999).] In fact, only 7 percent of alfalfa hay farmers apply pesticides to their crops. [Footnote 62 Id. at 3.] Therefore, in contrast to APHIS' bald assumptions, GT alfalfa will dramatically increase Roundup use without significantly displacing other herbicides. [Footnote 63 For more information on pesticide usage in alfalfa, see Center for Food Safety's Science Comments submitted by Bill Freese.] The impact of this dramatic increase of the Roundup Ready crop system on the environment is a significant environmental impact. (Comment Number: APHIS-2007-0044-9936-18)

Response: See the response to comment APHIS-2007-0044-11037-10 for issue 4.2.

4.3 Issue 4.3 – Impacts on Plants

Comment Excerpt Text:

I have had trouble with the last rd alfalfa that was released. The trouble I had was the farmer had an airplane go in and spray his alfalfa with roundup, two (2) to three (3) weeks later I noticed my grain crop starting to look sick. I got ahold of the airplane personel and they came out to look but said the only way to get it taken care of was to get the state to go out and check the field for the damage. More days went by and they finally came and I took them to the field, by then the grain was brown and curled up and dead. He looked and then said he would have to check it out and take some samples to prove the damage. Between the time of the initial spray and now the test the field had been watered at least once and some of it twice. When the state finished they said they did not find round-up in the field. The rest of the 200 acre field was just fine except for this section of about 20 acres by the alfalfa field that had been sprayed.
If Roundup alfalfa is going to be released there better be some real stiff clauses that any damage to a bordering field will be 200% covered for crop and damages.
I just lost totally my crop and every thing because of too much red tape to go through to get the damages covered.
I am against Round-up alfalfa for this reason (Comment Number: APHIS-2007-0044-0452-1)

Response: APHIS acknowledges the comment and expresses concern regarding the commenter's loss of crop. However, this type of aerial drift could occur with any aerially applied herbicide, including an herbicide that is not specific to the deregulated GT alfalfa. Establishing cause and effect in single event situations is difficult, particularly if there is no residual evidence at the time of testing.

Comment Excerpt Text:
In the DEIS (p.119), APHIS stated that only 2% of glyphosate is applied from the air onto crops in the US, and extrapolates this figure to RR alfalfa. APHIS said impacts from aerial applications could be mitigated by label use restrictions requiring lower application rates in areas where T&E plants are found within a certain distance from alfalfa fields, but that APHIS cannot mandate label use restrictions (DEIS:119), and supporting documents mention that the lower application rates are unlikely to be commercially acceptable (Mortensen et al. 2008, p. 32).

Assumptions used by APHIS to determine risks to wild plants were flawed, and likely underestimated risks.

Of course, the assessment by APHIS is only as good as the assumptions upon which it is based, and aspects of the assumptions are invalid. Relevant scientific studies are minimized or ignored, making APHIS' analysis of risks to T&E wild plants inadequate.

The most important problems with the assumptions about risk to plants are the following:
1) APHIS does not take into account the well-known sub-lethal effects of glyphosate on reproduction that can affect survival of plant species. (APHIS assumption 1: Acute but not chronic risks are assessed for plants, and those considered are "phytotoxicity, survival, plant height, plant dry weight.)

2) These reproductive problems have been shown to occur in wild plants at concentrations of glyphosate much lower than the lowest NOEC used in the risk calculations. Therefore, APHIS

underestimates the risk to T&E terrestrial and semi-aquatic plants from adoption of RR alfalfa. (APHIS assumption 2: The lowest "no-observed-effect concentration" (NOEC) for glyphosate of 0.035 lb a.e/A, determined from a study of 10 crop plants and based on the 4 growth parameters, is representative of the effect of glyphosate on wild species and growth processes important for their evolutionary fitness.)

The data regarding sub-lethal glyphosate effects on plant reproductive success is reviewed, and added to by original research, in a key peer-reviewed scientific paper, not cited in the DEIS: Blackburn, L.G. and C. Boutin, 2003. Subtle effects of herbicide use in the context of genetically modified crops: a case study with glyphosate (Roundup®). Ecotoxicology 12: 271-285.

In fact, this research specifically addresses risk to the success of wild plants from drift levels of glyphosate related to increased use of glyphosate associated with RR crops, so its omission from the DEIS is puzzling – and a serious shortfall. The authors state: "The use of these new crops has raised concern about an increase in reliance on glyphosate for weed control with detrimental consequences on nontarget plants and habitats due largely to the broad spectrum nature of this herbicide. The objective of this paper is twofold: (1) to review the literature on the effect of glyphosate on seed germination and early seedling growth, and (2) to present the results of a new experiment with several crop and noncrop species. The attempt was made to build on past findings and to add to the knowledge base in an effort to move away from studies on crop plants such as soybean and grain by focusing mainly on noncrop plant species." (Blackburn and Boutin 2003, p. 272)

Past findings are that sometimes plants that have not suffered mortality after contact with glyphosate, and in fact may not have exhibited visible symptoms of injury at all, nevertheless produce fewer seeds or seeds that have problems with germination or vigor (references cited in Blackburn and Boutin 2003; Walker and Oliver 2008; Thomas et al. 2005). Also, plants that reproduce vegetatively from tubers or rhizomes sometimes show injury in the generation subsequent to actual glyphosate application or contact (Viator et al. 2008).

Specific, unique properties of glyphosate explain how it can affect subsequent plant generations. Glyphosate applied to leaves and stems translocates with photosynthates to the most rapidly growing tissues and organs of plants, such as developing flowers and seeds (Feng et al. 2003, Feng and Chiu 2005). In most plant species, glyphosate is not metabolized, and these plant parts not only accumulate the glyphosate but also are particularly sensitive to it (Feng et al. 2003, Chen et al. 2006). Therefore glyphosate can cause pollen sterility (Chen et al. 2006, US Patent 4,735,649), potentially resulting in fewer seeds; or can cause seeds that form to be less viable and vigorous[Footnote 2: APHIS commented on the sensitivity of germinating seeds to glyphosate, but these were seeds treated as they were germinating, rather than during development, and thus are exposed at a different stage and route than the seedlings impacted in the studies discussed in Blackburn and Boutin (2003). DEIS:N-7 states: "Glyphosate Terrestrial Plant Toxicity - Glyphosate is toxic to plants. The NOEC for seed germination in both monocots and dicots is 4.5 lbs a.e./acre application rate (USDA, 2003). The highest reported NOEC for growth is 0.56 lb a.e./acre (USDA, 2003). Therefore, glyphosate is much less toxic to germinating plants than it is to the foliage of growing plants."] (Thomas et al. 2005, Walker and Oliver 2008), probably because of damage to their meristems. Storage organs such as tubers and

rhizomes can also accumulate glyphosate resulting in reduced viability of the next season's individuals, again from damage to their buds when glyphosate is remobilized as they break dormancy (Viator et al. 2008). Different species of plants are more or less sensitive to glyphosate's sexual and vegetative reproductive effects, and the stage of development at which the plant is exposed to glyphosate influences the response, as well (Blackburn and Boutin 2003, Feng et al. 2003). Environmental conditions also determine how much glyphosate is required to have an effect (Yasuor et al. 2006). In many cases, drift levels of glyphosate have been shown to cause these effects (Blackburn and Boutin 2003). Thus sub-lethal doses of glyphosate can reduce the fitness of an affected plant species, reducing population levels in subsequent generations. Because other herbicides have different basic properties – for example, less efficient or no translocation to reproductive tissues, or metabolism within the plant resulting in less accumulation and persistence – the substitution of other herbicides by glyphosate is likely to have unique effects on plants, and preferentially affecting reproductive success at low rates may be one of these. (Comment Number: APHIS-2007-0044-10966-4)

Response: See the response to comment APHIS-2007-0044-10966-4 for issue 4.1.2.

Comment Excerpt Text:
APHIS did give an example of this phenomenon in the DEIS in a section on weed shifts in different rotations, but did not link it to impacts on T&E species, nor did they explain the basis for it. The description, though, is apt: "There was high variability in wild buckwheat between the [rotation] systems. Glyphosate is not very effective on wild buckwheat [plants], so the authors proposed that wild buckwheat seed production or viability may be restricted by glyphosate more than the wild buckwheat biomass. Therefore, after glyphosate application the plant may appear visually robust, but its ability to reproduce has been effected, so in following years less wild buckwheat is observed (Harker et al., 2005)." (DEIS:113, IV. Environmental Consequences, Weed Shifts in GT Alfalfa and GT Alfalfa Weed Management Options).

Blackburn and Boutin show that the same diminution of the "ability to reproduce" can also be caused by glyphosate in many cultivated and wild plants. In their literature review they cite 18 studies from 1972 (before glyphosate was commercialized) through 2000, including 13 species in 3 families. Most were of cultivated plants and prominent weeds. The lowest application rate shown to affect reproduction was 0.022 kg ai/ha, equivalent to 0.015 lb a.e./A, or about 1% of the maximum single application rate for RR alfalfa. (Campbell et al. 1998, as cited in Table 1; species was the grass Nassella trichotoma) Most experiments did not use such low rates so results cannot be compared to the environmental concentration assumptions used in the APHIS risk assessment.

In their own experiments, Blackburn and Boutin made a point of using drift levels of 1% and 10% of a fairly low field rate of 0.60 lb a.e./A, less than half the maximum allowed for RR alfalfa. They challenged 11 species – 8 of them wild weedy species - in 7 families to glyphosate applications at these rates, once, when the plants had developing seeds. There was a wide range of responses between species, but the most sensitive exhibited decreased germination and inhibited root and shoot growth of early seedlings even at the 1% rate (Blackburn and Boutin 2003, Table 3, p. 279). (Comment Number: APHIS-2007-0044-10966-5)

Response: See the response to comment APHIS-2007-0044-10966-5 for issue 4.1.2.

Comment Excerpt Text:
How does this change the risk assumptions made by APHIS?

APHIS assumes that the lowest NOEC for terrestrial plants is 0.035 lb a.e./A, based on plant height reduction in tomato (DEIS:118, "…ground application rates greater than or equal to 3.5 lb a.e./A", assuming 1% drift and using the NOEC of 0.035 lb a.e./A for tomato from Mortensen et al. 2008, p. 31).

The NOEC for reproduction ability from the most sensitive plants in the Blackburn and Boutin study is less than 0.006 lb a.e./A (calculated by me, from 1% of a 0.89 kg a.i./ha application rate), because these plants showed reproductive effects at the 1% drift simulation, which was the lowest rate tested. This number is almost 6 times lower than the NOEC of 0.035 assumed by APHIS based on Monsanto's research.

According to APHIS, the assumed Estimated Environmental Concentration (EEC) from drift following a ground application of glyphosate to RR alfalfa is 0.0155 lb a.e./A (Mortensen et al. 2008, p. 30), so using the APHIS NOEC number of 0.035 lb a.e./A, the Risk Quotient for ground applications is less than 1 and thus acceptable (Mortensen et al. 2008, p. 32). However, if the NOEC of less than 0.006 from the Blackburn and Boutin study is used instead, the Risk Quotient is unacceptable (much greater than 1) for any type of application considered.

Had APHIS taken into account relevant studies, they would have concluded that wild plants, including those that are threatened and endangered, are at risk from deregulating Roundup Ready alfalfa due to the direct effects of glyphosate.

This change in basic assumptions would alter the conclusions reached in the DEIS about impacts of RR alfalfa adoption on T&E plant species. Instead of being at risk from aerial applications only, ground equipment would also pose significant risks. In the DEIS, mitigation measures for reducing risk from aerial applications were enumerated, such as "maintaining the application rates below 3.5 lb a.e./A for ground-based application and 0.7 lb a.e./A for aerial application in the counties where listed species would be within 250 feet of GT alfalfa fields. The maximum single use application rate for ground and aerial applications of glyphosate on GT alfalfa is 1.55 lb a.e./A." (DEIS:163) However, with an NOEC below 0.006, the application rates would have to be less than 0.6 lb a.e./A using ground equipment and 0.12 lb a.e/A with aerial applications. These are not commercially acceptable rates for reliably killing most weeds. Thus, of the two alternatives under consideration by APHIS (DEIS:11-13), the only option to protect T&E terrestrial and semi-aquatic plants would be the "no action" alternative.

No studies are reported on the sensitivity to glyphosate of the 78 T&E plants determined to be at potential risk if RR alfalfa is granted non-regulated status. There is certainly more diversity within these species in growth habits, modes of reproduction, physiological characteristics and so on, than within the 10 crop plants used by Monsanto to determine the lowest NOEC. Also,

Monsanto did not include reproductive effects in their determination of NOEC values. Therefore, it is likely that the lower numbers obtained in the study by Blackburn and Boutin are more relevant to the RR alfalfa DEIS than are the numbers used by APHIS.

Another factor that has not been studied for the 78 at-risk species is the impact of being able to apply glyphosate during the entire RR alfalfa growing season. It is certain that these plants will have to potential to be exposed to glyphosate during more of their growth phases, including closer to or during reproduction, making them more vulnerable to adverse reproductive outcomes. In their discussion, Blackburn and Boutin say this: "It is difficult to predict how glyphosate exposure will change a plant community due mainly to the wide variation in maturation and growth patterns of the species present at the time of application. Noncrop species growing within crops or along field margins where they may be exposed to glyphosate through overspray or spray drift may be at different phonological stages that the crop in which or near which they are growing (Shuma et al.,1995). Some species may have mature seeds while others may have immature seeds and still others may not be reproducing yet. The future of the seeds could be affected, while in the cases where plants are not at a stage of reproduction, the death or declined vigour of the plant could result in no input of seeds for the next generation. Herbicide applications may reduce the production of viable seeds and thus reduce the establishment or replenishment of noncrop seed reserves in the soil (Baskin and Baskin, 1998)." Again, adoption of RR alfalfa will increase the likelihood that many stages of a particular plant will be contacted by glyphosate, causing a more varied and perhaps cryptic injury pattern, not seen until the next generation. This type of injury will be difficult to monitor and mitigate until it is too late for the T&A species affected. Only the "no action" alternative will protect these plants.

Impacts of the Roundup Ready alfalfa/glyphosate system on threatened and endangered species via indirect effects were not adequately analyzed in the DEIS.

The importance of indirect effects of glyphosate on plants was described by Blackburn and Boutin in their discussion on p. 283:

"The concern [about the effects of glyphosate on reproduction] does not only exist for abundance but also composition of plant species. Plants form the base of the community. Organisms from detritivores to large predators who prey upon species which eat plants will be affected by changes in the vegetation. There could also be a negative impact on the crop to which the herbicide is applied. Without the presence of certain plant species in the surrounding areas, important pollinators may not be present and thus there will be a decline in crop pollination success. The application of glyphosate to improve crop yields may be inadvertently having the opposite effect. Likewise, Liu et al. (1997) demonstrated that glyphosate increases the sensitivity of corn (Zea mays) to two fungus species (Pythium ultimum and P. sylvaticum) by suppressing the typical pathogen-induced lignification of tissues in roots which would normally act as a barrier to invasion…An increase in glyphosate use due to the increase of crop strains engineered to be tolerant to the herbicide (Shaner, 2000) will only increase the potential negative impacts of spray drift on the nontarget communities…" (Comment Number: APHIS-2007-0044-10966-6)

Response: See the response to comment APHIS-2007-0044-10966-6 for issue 4.1.2.

Comment Excerpt Text:
Indirect effects on threatened and endangered organisms that could result from glyphosate-induced changes in plant populations from adoption of RR alfalfa were dismissed based on the conclusion that drift levels of glyphosate would have no effect on non-endangered plants (Mortensen et al. 2008, p. 32). This analysis is inadequate because the same caveats of different sensitivities to glyphosate in different species and stages of the lifecycle hold for non-endangered plants, thus the potential for drift levels of glyphosate to affect their local populations was likely underestimated.

Anther indirect effect could be a decrease in the biodiversity of plants in the Roundup Ready alfalfa fields themselves, because according to the DEIS: 17, alfalfa is a habitat: "Because it is widespread and is typically grown as a perennial crop, alfalfa also provides important habitat for wildlife (Hubbard, 2008)". It is now grown as mixed-species forage on some farms, and this will be impossible with adoption of the RR alfalfa/glyphosate system.

Glyphosate use within the RR alfalfa field precludes cultural practices such as concurrent companion or nurse plantings of other crops (oats, for example), which also increase diversity within the field. This is mentioned in the DEIS:72, but not in relation to T&E species: "Another important difference is that non-GT crops cannot be used as companion crops for GT alfalfa. This difference is important for farmers that traditionally interseed companion crops like small grains (e.g., oats) with alfalfa; it does not affect farmers that plant pure alfalfa stands. Companion crops may possibly benefit stand establishment by weed control, increased forage yield during the seedling year, and wind and frost protection for young alfalfa seedlings (Orloff et al., 1997)."

These reductions in plant diversity within the alfalfa field are likely to change its value as a habitat for birds, insects and mammals. Areas that contain a number of different species are more productive, and more resilient in the face of stresses, further reducing the value of RR alfalfa as habitat compared to alfalfa managed with other species included (Tilman et al. 2001).

To the extent that glyphosate use increases in areas directly adjacent to RR alfalfa due to better crop safety relative to use of herbicides next to conventional alfalfa, plant diversity and thus suitability for habitat is likely to decrease as a result, as well.

It is interesting that Blackburn and Boutin bring up the issue of increased disease susceptibility triggered by glyphosate, because there is a growing body of evidence that not only plant defenses are hindered, but also the disease organisms themselves may be affected by glyphosate (see articles in European Journal of Agronomy, Vol. 31, listed in "References cited", for a recent compendium of peer reviewed papers of this topic). Obviously, diseases that increase and spread can affect other plants than those directly hit with glyphosate spray.

Most plants also require symbioses with microorganisms for optimal health. Some strains of nitrogen-fixing bacteria are sensitive to glyphosate, for example (Suwa et al. 2009, reviewed in Kremer and Means 2009, article no. 8 in European Journal of Agronomy, Vol 31).

APHIS does not adequately address the many studies that have shown glyphosate-induced changes in microbial functions or populations. Instead, APHIS cites studies showing no changes (DEIS:27). Threatened and endangered plants could be negatively affected by alterations in symbiotic or pathogenic microorganisms from glyphosate applications directly to their habitats, or to nearby areas. (Comment Number: APHIS-2007-0044-10966-7)

Response: See the response to comment APHIS-2007-0044-10966-7 for issue 4.1.2.

Comment Excerpt Text:
5) Impacts will be the result of single applications of glyphosate rather than cumulative from multiple applications during the year, because "glyphosate is not expected to accumulate to appreciable levels from one application to the next…" .

For reproductive effects – injury to pollen or developing seeds – cumulative effects from sequential applications are possible, particularly in species that have indeterminate flowering patterns. As the season progresses, new flowers form and go through their sensitive stages (Chen et al. 2006). Spraying later in the season in addition to earlier can thus add to the number of flowers or seeds on an individual plant that are injured. The same may be true of glyphosate effects in tubers and rhizomes that add new meristems over a long period of time. (Comment Number: APHIS-2007-0044-10966-9)

Response: APHIS has expanded its discussion of the potential effects of glyphosate on wild plants, including T&E species, in sections IV.C.2 and IV.C.3 and in appendix N of the FEIS. The discussion includes studies of glyphosate toxicity on plant reproductive endpoints.

Comment Excerpt Text:
Without a doubt the approval of Roundup Ready alfalfa as soon as possible would normally be an "automatic" for those of us who would like to plant the seed. I have 2,200 acres of alfalfa currently and I am reluctant to plant any new alfalfa until the reapproval of varieties resistant to Roundup for two solid reasons. First, the phenoxy's and other toxic chemicals necessary to rid the fields of our weed spectrum are ten-plus times more expensive than Roundup. More important to me is the toxicity of the alternatives to Roundup. Formulations of Butyrac, Rhomene, Paraquat, Velpar and Direx are sprayed each year on our farm in lieu of Roundup. The afforementioned chemicals are deadly and extraordinarily harmful to fish and wildlife...and humans. Our employees MUST wear Tyvek overalls, rubber boots, gloves, goggles and respirators while applying these highly toxic and corrosive chemicals. When spraying Roundup, long sleeves, gloves and goggles are required and it is not harmful to wildlife or fish or humans. This gentlemen and ladies is a slam dunk particularly when the cows and cattle are already eating corn and soymeal from Roundup Ready corn and soybeans.
I do hope that you might see why the argument delaying the reapproval of Roundup Ready is irrational, making no economic or environmental sense. I think we can all agree that humans are a huge part of the ecosystem. To allow toxic herbicides to be applied while the application of Roundup is denied does not make sense particularly when those presently sprayed are toxic to humans. (Comment Number: APHIS-2007-0044-1580-1)

Response: APHIS acknowledges the comment. As described in section IV.C.3 of the DEIS, use of GT alfalfa with glyphosate for weed control may result in reduced use of more toxic and persistent herbicides in those areas where farmers are supplying markets that require weed-free alfalfa.

Comment Excerpt Text:
With this huge quantity of Roundup dousing our soil and crops each year, it does seem only responsible to ask - is this chemical safe? Roundup is one of the less dangerous pesticides in the agricultural industry, but studies have shown toxicity effects on fish and amphibians, genetic changes in mammals, and a recent oncological study out of Sweden implicated Roundup in the development of non-Hodgkin's lymphoma. Other studies have linked Roundup to various cognitive disorders in children.
In addition to killing weeds, Roundup acts as a fairly broad spectrum biocide, affecting a large number of soil microbial species (Johal & Rahe 1988, Molec. Plant Pathol. 32:267-281). There are some fungal species though that resist the Roundup, and finding much reduced competition after application, they become dominant. Research from the University of Manitoba/Ag Canada ("Crop Production Factors Associated with Fusarium Head Blight in Spring Wheat in Eastern Saskatchewan", Fernandez, Sellesa, Gehlb, DePauwa and Zentner, Crop Science, 2005) and more recent work by USDA-ARS scientists (Glyphosate and glyphosate-resistant crop interactions with rhizosphere microorganisms, Kremer and Means, J Agronomy 2009) has shown that Fusarium in particular benefits and increases in the soil with Roundup use. Fusarium is a serious fungal plant pathogen that affects many crop species.

Recently, work in Missouri ("Glyphosate Effects on Diseases of Plants", Johal and Huber, European J Agronomy, 2009) showed how plants, when treated with Roundup, actually experience a chemical change that reduces their own immune defenses, making them much less able to resist fungal and insect attack. Soil applications of Roundup appear to first create a rhizosphere microbial community enriched with virulent athogenic species, and then weakens the crop plants to make them more susceptible to those pathogens.

In small grains, Fusarium causes headblight and scab. While these diseases do reduce yield and grain quality, they also often form tasteless, colorless mycotoxins (fungal toxins) that can be very poisonous to humans and to animals. At high concentrations, mycotoxin poisoning can cause hemorrhaging, abortion, kidney dysfunction, blindness and death in animals, but commonly, mycotoxin poisoning can be subclinical, with generalized symptoms such as immune suppression, reproductive abnormalities, increased susceptibility to other diseases, decreased milk production, poor feed intake and weight loss, and abnormal juvenile growth and development.

Indeed, some Fusarium toxins act as estrogens, feminizing males and causing female reproductive problems. The Manitoba research showed that wheat, grown after a crop of Roundup Ready soybeans, is much more likely to develop scab. This research should come as no surprise to many conventional wheat growers who have been spraying increasingly large doses of fungicides over the past few years to keep wheat scab from destroying their crops!

Mycotoxins are not just a problem in grains. Indeed, in Northeast, many farmers have learned that mycotoxins can equally be a problem in hay and baleage, infected in the field under cool wet growing conditions and then spread throughout the feed in storage. Increased incidence of mastitis, breeding difficulties, foot and other problems are often not quickly attributed the presence of mycotoxins in forage.
Recent reseach (J. Fox et, , 2007, National Academy of Science) has shown that soybeans, sprayed with Roundup to control weeds, produce beans with reduced nutrient content, especially lower protein. This appears NOT to be the result of genetic changes from the recombinant DNA. Instead, it appears that the Roundup suppresses the activity of Rhizobium bacteria on and in the soybean roots, impairing the plant's ability to fix nitrogen, an essential factor in protein synthesis. (Comment Number: APHIS-2007-0044-4924-2)

Response: In regard to potential human health effects of glyphosate, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0. As discussed in response to comment APHIS-2007-0044-10966-7 for issue 4.1.2 (last paragraph), and section IV.C.4, IV.G.1 and appendix J section 2.2.2 of the DEIS, some studies (in USDA FS, 2003) have shown an increase in microbial activity in soils subject to glyphosate application. The FEIS expands the discussion of glyphosate and plant susceptibility to disease in sections IV.C.3 and IV.G.1 and appendices J and N, including discussion of a study conducted by Powell and Swanton (2008) which concludes there is insufficient evidence to prove or disprove a link between glyphosate and crop diseases associated with Fusarium. The FEIS also includes an expanded discussion of glyphosate and nitrogen-fixing bacteria and other microbial communities in soils in the same sections. Section IV.C.3 of the FEIS, includes discussion of Fusarium–caused diseases in particular.

Comment Excerpt Text:
The use of GM alfalfa will only serve to increase the use of the herbicide glyphosate which is a chemical that is harmful to soil microorganisms. The chelating action of glyphosate makes the essential trace element manganese unavailable to plants. This in turn makes the plants produced under this system of production less nutritious for the livestock that consume them.
I am opposed to the approval and/or release of GM alfalfa. (Comment Number: APHIS-2007-0044-6789-1)

Response: The mode of action (MOA) of glyphosate as an herbicide is inhibition of the shikimate pathway essential for biosynthesis of aromatic amino acids and other aromatic compounds (discussed in DEIS section IV.C.4). With respect to the chelating action of glyphosate and plant nutrition, see the response to comment APHIS-2007-0044-9547-4 for issue 4.0.

Comment Excerpt Text:
Increased use of RoundUp. A number of studies have demonstrated that, after several harvests, RoundUp use increases dramatically when RR crops are planted. There is a growing body of evidence that both glyphosate and the adjuvant ingredients in RoundUp are harmful at very low levels to both humans [e.g. Relvea] and to wildlife – especially to amphibians [e.g. Benachour

and Seralini]. Increasing the amount of RoundUp sprayed on our farms is not something we should be encouraging. (Comment Number: APHIS-2007-0044-7408-4)

Response: In regard to the use of more Roundup after RR crops are planted, the FEIS includes an expanded discussion of changes in glyphosate and other herbicide use in agriculture with the expansion of GT crops in appendix N, section 1; see also appendix J. In regard to possible human health effects of glyphosate, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0 and the response to comment APHIS-2007-0044-0352-1 for issue 6.3.

The DEIS considered potential effects of increased use of glyphosate on wildlife and other organisms in sections IV.C.2, IV.C.3, and IV.C.5 and appendix N. The FEIS expands the discussion of toxicity of glyphosate and water-soluble surfactants to frogs and other amphibians in section IV.C.3 and appendix N.

Comment Excerpt Text:
A national alfalfa industry consensus plan for seed and hay industry coexistence and stewardship was adopted in
June 2008 under the auspices of the National Alfalfa and Forage Alliance (NAFA). Coexistence plans for seed
production and other markets are comprehensive and science-based. The NAFA best practices have been validated
in two years of commercial seed production.
I urge the USDA to consider biotechnology's long history of success and allow alfalfa growers to join other American farmers in the benefits and new opportunities offered by biotechnology. (Comment Number: APHIS-2007-0044-7520-4)

Response: APHIS acknowledges the positive comment of the efficacy of NAFA coexistence plans for GT and non-GT alfalfa seed production. As discussed in appendix V sections 5.5-5.11 of the DEIS, coexistence strategies (e.g. equipment sanitation, harvest management, field separation, contractual practices) can limit the occurrence of GE traits from non-GE alfalfa below seed certification thresholds (0.5 percent). Further discussion of coexistence is included in the response to comment APHIS-2007-0044-9720-1 for issue 4.0.

Comment Excerpt Text:
Contrary to APHIS' assertions, aerial applications of glyphosate do not pose the only risk to plants. APHIS fails to consider the well-known sub-lethal effects of glyphosate on plants that impact reproduction therefore jeopardizing species survival. Reproductive problems and other impacts can occur at low doses of glyphosate, often lower than the EPA's application rates. The use of glyphosate-tolerant crop systems raises concerns about increased use of glyphosate and impacts on non target plants, many of which are T&E species (Comment Number: APHIS-2007-0044-9936-29)

Response: See the response to comments APHIS-2007-0044-10966-4 for issue 4.1.2.

Comment Excerpt Text:
Most glyphosate-containing products are either made or used with a surfactant, chemicals that help glyphosate to penetrate plant cells.
Glyphosate-containing products are acutely toxic to animals, including humans. Symptoms include eye and skin irritation, headache, nausea, numbness, elevated blood pressure, and heart palpitations. The surfactant used in a common glyphosate product (Roundup) is more acutely toxic than glyphosate itself the combination of the two is yet more toxic.
Given the marketing of glyphosate herbicides as benign, it is striking that laboratory studies have found adverse effects in all standard categories of laboratory toxicology testing. These include medium-term toxicity (salivary gland lesions), long-term toxicity (inflamed stomach linings), genetic damage (in human blood cells), effects on reproduction (reduced sperm counts in rats; increased frequency of abnormal sperm in rabbits), and carcinogenicity (increased frequency of liver tumors in male rats and thyroid cancer in female rats).
In studies of people (mostly farmers) exposed to glyphosate herbicides, exposure is associated with an increased risk of miscarriages, premature birth, and the cancer non-Hodgkin's lymphoma.
Glyphosate has been called "extremely persistent" by the U.S. Environmental Protection Agency, and half lives of over 100 days have been measured in field tests in Iowa and New York.
Glyphosate has been found in streams following agricultural, urban, and forestry applications.
Glyphosate treatment has reduced populations of beneficial insects, birds, and small mammals by destroying vegetation on which they depend for food and shelter.
In laboratory tests, glyphosate increased plants' susceptibility to disease and reduced the growth of nitrogen-fixing bacteria. (Comment Number: APHIS-2007-0044-0352-1)

Response: Because specific sources were not cited by the commenter, the accuracy of comments regarding laboratory study findings of adverse effects cannot be evaluated. Regarding the commenter's concern about the glyphosate effects to human health, see response to comment APHIS-2007-0044-0352-1 for issue 6.3.
Glyphosate can persist in soils for only a couple days in some environments and more than 100 days in other locations; its persistence is variable depending on environmental conditions(see DEIS appendix J, section 2.2.2). Persistence is longer in colder climates, including Iowa and New York than in warmer climates and longer in anaerobic environments (e.g., anaerobic sediments) than in oxic ones (e.g., surface soils) (see DEIS table J-1).

Although there is evidence that glyphosate is toxic at varying concentrations to animals (see DEIS and FEIS section IV.C.3 and appendix N), and vegetation shifts can reduce the value of some areas as habitat to some species, demonstrations of reduced populations of animal species in response to glyphosate spraying are lacking. As noted in the response to comment APHIS-2007-0044-10966-7 for issue 4.1.2, the FEIS expands the discussion of glyphosate and plant susceptibility to disease in sections IV.C.3 and IV.G.1 and appendices J and N. The FEIS also includes an expanded discussion of glyphosate and nitrogen-fixing bacteria and other microbial communities in soils in the same sections.

Comment Excerpt Text:
RoundUp is extremely DANGEROUS!!
In studies of people (mostly farmers) exposed to glyphosate herbicides, exposure is associated with an increased risk of miscarriages, premature birth, and the cancer non-Hodgkin's lymphoma.
Glyphosate has been called "extremely persistent" by the U.S. Environmental Protection Agency, and half lives of over 100 days have been measured in field tests in Iowa and New York.
Glyphosate has been found in streams following agricultural, urban, and forestry applications.
Glyphosate treatment has reduced populations of beneficial insects, birds, and small mammals by destroying vegetation on which they depend for food and shelter.
In laboratory tests, glyphosate increased plants' susceptibility to disease and reduced the growth of nitrogen-fixing bacteria. (Comment Number: APHIS-2007-0044-0353-2)

Response: See the response to comment APHIS-2007-0044-0352-1 for issue 4.4.

Comment Excerpt Text:
As a conservationist, the statistics showing a five-fold increase in Round-Up usage at the introduction of a new RR crop is alarming. The surfactant in Round-Up has proven toxic to amphibians and pollinators, two integral components of healthy wetlands and prairies, their absence our Midwest canary in the coalmine. I am ashamed of my senators for such blatant disregard for the well-being of their constituents in their support of this movement, and consider their actions to be based on monetary gain, and egregious ad immoral. Their shameless promotion of GM organisms put us all in harms way and economically dependent on Big Ag. I stand against RR alfalfa (Comment Number: APHIS-2007-0044-0356-1)

Response: Because specific sources were not cited by the commenter, the accuracy of comments regarding a five-fold increase in use of Round-Up (time period not specified) and laboratory study findings of adverse effects on amphibians and pollinators cannot be directly evaluated.

Regarding toxicity to amphibians and pollinators, the FEIS includes an expanded discussion of toxicity of glyphosate and water-soluble surfactants to frogs and other amphibians in section IV.C.3 and appendix N.
With respect to pollinators, appendix O, section 1.7, of the DEIS summarized that after extensive review of the available data, Giesey et al. (2000) stated “Honey bees are not affected by glyphosate formulations, either by ingestion or direct overspray, at maximum use rates.” The lack of evidence linking honey bee colony collapse disorder (CCD) to glyphosate use is further described in the FEIS section IV.I.5.b and appendix O.

Comment Excerpt Text:
I am a hay farmer in North Central Iowa. I live in a region that has been converted from native habitats of prairie and wetland to fence row to fence row, erosion prone monoculture plantings of GM crops. I am direly concerned about the prospects of Round-Up Ready (RR) alfalfa - the impacts that would have on the health and well-being of my neighbors, the farmers, their

families, our local communities and economies. Big Ag bureaucrats do not stop to think about true environmental impact, soil health, sustainability of farm families and rural townships. Dollar signs drive this enterprise, not compassion. Studies show that nutritional value declines in GM crops; that the Cauliflower Mosaic Virus used in DNA recombination of RR crops is disruptive to the intestinal flora and reactivates other dormant pathogens in livestock; that the ability of RR legumes, of which alfalfa is, to fix nitrogen is compromised. This plays beautifully to those who profit on necessary chemical inputs to remediate compromised soil health. RR species have proven to be adeptly promiscuous in spreading their genetics, and if allowed will compromise all pure seed supplies of alfalfa in only a handful of years, and in turn put the entire organic dairy industry in jeopardy. As a conservationist, the statistics showing a five-fold increase in Round-Up usage at the introduction of a new RR crop is alarming. The surfactant in Round-Up has proven toxic to amphibians and pollinators, two integral components of healthy wetlands and prairies, their absence our Midwest canary in the coalmine. I am ashamed of my senators for such blatant disregard for the well-being of their constituents in their support of this movement, and consider their actions to be based on monetary gain, and egregious ad immoral. Their shameless promotion of GM organisms put us all in harms way and economically dependent on Big Ag. I stand against RR alfalfa (Comment Number: APHIS-2007-0044-0362-1)

Response: The commenter does not cite specific studies of reduced nutritional value of GM crops.
Regarding RR alfalfa, as stated in the DEIS section IV.C.1, RR alfalfa (also known as glyphosate-tolerant, or GT, alfalfa) and conventional alfalfa varieties appear to be compositionally and nutritionally equivalent with the exception of expression of the transgene protein (see DEIS appendices Q, U, and P). As discussed in the DEIS section IV.C.2, Combs and Hartnell (2007) found no statistically significant difference ($p > 0.05$) on milk production, milk composition, feed intake, and feed efficiency for dairy cows fed GT alfalfa compared with control alfalfa hay. Nor did they find any reports of effects of the CP4 EPSPS protein or gene consumption on nutritional characteristics of dairy cattle, livestock, or poultry. Appendix O, section 1.6, of the DEIS reported on detailed compositional analyses of conventional and GT alfalfa and found no differences for 35 nutritional components, including protein, fat, ash, moisture, fiber (acid and neutral detergent), amino acids, minerals, and carbohydrates (McCann et al., 2006; US FDA, 2004). Nor are GT alfalfa levels of lignin, coumestrol, saponins, and soluble forage proteins outside the range of levels found in conventional alfalfa varieties (OECD, 2005).

The Cauliflower Mosaic Virus (CaMV) promoter used in most GM crops was not used in developing glyphosate-tolerant (Roundup Ready) alfalfa ,rather, the figwort mosaic virus was used for the promoter (see DEIS, appendix P, section 3.1). Studies to date have not demonstrated transfer of complete promoter or other gene sequence of DNA into gut bacteria or animal intestinal tract, although fragments of DNA from transgenes in GMOs have been found in the gastrointestinal tract of animals and in human gut bacteria (see response to comment APHIS-2007-0044-11018-15 for issue 4.1.1).

The FEIS sections IV.C.3 and IV.G.1 and appendices J and N include an expanded discussion of glyphosate and nitrogen-fixing bacteria and other microbial communities in soils in the same sections.

For discussion of potential gene flow, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

For responses to the rest of the comment, see the response to comment APHIS-2007-0044-0356-1 for issue 4.4.

Comment Excerpt Text:
I live in North Central Iowa, teach at North Iowa Area Community College in a Health Program and am extremely concerned about the prospects of Round-Up Ready (RR) alfalfa and the impact it would have on the health and well-being of my family, my neighbors, and farmers. From my perspective, Big Ag bureaucrats do not stop to think about the true environmental impact, soil health, human health, and the overall health of all living things when making decisions about approving the use of a product such as this.
I agree with many of my friends and family who believe that dollar signs drive this enterprise, not compassion, and most certainly NOT a concern for human health.
There are studies which show that nutritional value declines in GM crops; that the Cauliflower Mosaic Virus used in DNA recombination of RR crops is disruptive to the intestinal flora and reactivates other dormant pathogens in livestock. RR species have proven to be adeptly promiscuous in spreading their genetics, and if allowed will compromise all pure seed supplies of alfalfa in only a handful of years. Round-Up has proven toxic to amphibians and pollinators, two integral components of healthy wetlands and prairies.
Then there is just what my logical cognition tells me to be concerned about, which is that the pesticides infused in these GMO products are NOT a good thing to have in our food system. We dont yet understand the full impact of how products such as RR crops can affect the health of all living things and until we understand, it would only make common sense to NOT allow their use. If you even suspected someone was poisoning you, would you just sit there and wait to see what the outcome might be?
I encourage that a decision be made based on the current research data and the potential for harm that products such as this could have. We need to consider what type of an environment we are passing on to future generations, one that is healthy or one that has been modified and compromises the health of all living things. I stand against RR alfalfa (Comment Number: APHIS-2007-0044-0382-1)

Response: APHIS acknowledges the comment. Concerning the nutritional value of GT alfalfa and cauliflower mosaic virus, see the response to comment APHIS-2007-0044-0362-1 for issue 4.4. Regarding impacts on amphibians, an expanded discussion of toxicity of glyphosate and water-soluble surfactants to frogs and other amphibians has been added to section IV.C.3 and appendix N of the FEIS. In regard to impacts on pollinators, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3 and the response to comment APHIS-2007-0044-2255-1 below for issue 4.4. Concerning not deregulating use of RR alfalfa until all uncertainties are settled, see the response to comment APHIS-2007-0044-5569-1 for issue 4.0.

Comment Excerpt Text:

RE: Roundup Ready Alfalfa.
In viewing the scientific data available, the roundup ready alfalfa presents a considerable concern to the environment inasmuch as the study period has not been of a sufficient amount of time to evaluate impact. That impact on ruminants, human consumption thereof and wildlife.
I am OPPOSED to this unnatural, somewhat freakish product being reintroduced without a ten to fifteen year impact study.
Thank you,
Michael Weitz
Commercial cattle and feed producer
(Comment Number: APHIS-2007-0044-0465-2)

Response: Concerning waiting for 10 to 15 years of study of potential impacts and from GT alfalfa, including study of existing GT alfalfa plantings before reaching a regulatory decision, see the response to comment APHIS-2007-0044-5569-1 for issue 4.0.

Comment Excerpt Text:
Harm to Wildlife
As with other herbicides such as Atrazine, the use of Roundup has been linked to the decimation of frogs worldwide [61]. This is truly unfortunate as it is estimated that a single frog can consume 10,000 garden/farm pests in a growing season [62].
A related issue is news that GM Bt (Bacillus thuringiensis) pollen, which Monsanto has engineered to be present in every cell of it's Bt crops, causes harm to non-target insects, e.g. harm to caddisflies harm to swallowtail butterflies harm to lacewings.
In 2001, Pioneer Hi-Bred, another biotechnology firm associated with Monsanto, developed a GM corn variety that contained two Bt toxins, Cry34Ab1 and Cry35Ab1, to kill corn rootworms. "The company asked university laboratories to test for unintended consequences on ladybugs. Scientists fed the corn to ladybugs and found that nearly 100% died after the eighth day in the life cycle. Pioneer forbade the scientists from publicizing the data. A scientist with the group who wants to remain anonymous said 'The company came back and said ‘you are under no circumstances able to publicize this data in any way’. Pioneer submitted data to the EPA showing no harm to ladybugs and received government approval to commercialize the corn in 2003. A Pioneer scientist says the commercialized variety contains a different genetic construct than the corn that killed the ladybugs. The EPA was told about the independently produced data, but did nothing, according to the anonymous scientist. The same scientist also says Pioneer’s data is flawed" [5]. Read the Nature Biotechnology article here [6] (Comment Number: APHIS-2007-0044-0933-10)

Response: The Internet link to endnote [61] is not functional, and many stresses are candidates for the worldwide reduction in frog populations (e.g., habitat loss and fragmentation, fungal and bacterial diseases, introduced predators, insecticides, herbicides, trematodes, ozone depletion, estrogenic chemical contamination, and others). Thus, Roundup has not been linked to the decimation of frogs worldwide.

The other comments relate to allegations from unidentified scientists regarding disclosure of testing results for GE crops designed to produce an insecticide, Bt toxin(s). An insecticide in a

GE crop might or might not affect nontarget insects. The subject of this EIS is GE resistance to an herbicide, which bears no relationship to GE Bt toxins expressed in plants and should not logically be connected with allegations from such unidentified sources.

Comment Excerpt Text:
One final comment I have is what will GMO alfalfa do to a cows stomach? We already know that the bacteria in nature have a tough time breaking down GMO residue from soybeans. The cows stomach is full of bateria to handle the digestion process. So if GMO alfalfa is going to be allowed can someone please answer that question for me first. (Comment Number: APHIS-2007-0044-11206-1)

Response: As discussed in DEIS section IV.C.2, Combs and Hartnell (2007) found no statistically significant difference ($p > 0.05$) in milk production, milk composition, feed intake, and feed efficiency for dairy cows fed GT alfalfa compared with control alfalfa hay. Those results indicate that the microbes in the gastrointestinal tract of cows and other ruminants are not affected significantly by GMO alfalfa (that is, alfalfa genetically engineered to be tolerant of the herbicide glyphosate).

Comment Excerpt Text:
Please do not approve non-regulated status for genetically engineered alfalfa (J101, J163).
A paper recently published in the International Journal of Biological Sciences found evidence of mammalian organ damage linked to GE corn--specifically Mon 810, Mon 863, NK 603, all produced by Monsanto. (http://www.biolsci.org/v05p0706.htm) (Comment Number: APHIS-2007-0044-11616-1)

Response: Of the three types of GE corn examined, Mon 810 and Mon 863 are insect resistant, and not tolerant of herbicides, and therefore not comparable with GT alfalfa. The study authors were reanalyzing study results reported by Monsanto; thus, there are no new data presented. The corn NK 603 was reported to be "modified to be tolerant to the broad spectrum herbicide Roundup and thus contains residues of this formulation." As noted by the study authors, the study design (10 rats per group for which biochemical parameters are measured only twice in 90 days) limits the power of the statistical analyses. The study authors could not change the study design limitations. They performed parametric statistical tests wherever initial tests indicated that the shape of the measurement distributions could not be distinguished from a normal distribution. That increased the "power" of their tests compared with nonparametric tests performed by Monsanto. The authors also noted that the endpoints measured were "signs of toxicity" that suggest additional testing is warranted, but do not provide "proof" that the corn NK 603 was toxic to the rats.

Comment Excerpt Text:
Please do not approve non-regulated status for genetically engineered alfalfa (J101, J163). I am writing, as a US citizen and mother of two children, to urge you to not deregulate genetically

engineered (GE) alfalfa. It is well documented that GE contamination will threaten export and domestic markets and organic meat and dairy products.
A paper recently published in the International Journal of Biological Sciences found evidence of mammalian organ damage linked to GE corn--specifically Mon 810, Mon 863, NK 603, all produced by Monsanto. (http://www.biolsci.org/v05p0706.htm). I am not only speaking for myself and family, but our community and friends are highly educated about sustainable agriculture and GE alfalfa and other foods are not acceptable. We and most of the families we know refuse to buy food products that have been genetically altered. This limits us to local food sources of known origin.
Again, please do not approve non-regulated status for genetically engineered alfalfa (J101, J163).

Response: Concerning potential threats to domestic markets for organic meat and dairy products, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding impact on United States export markets, see the response to comment APHIS-2007-0044-3404-1 for issue 5.4.

Concerning the recently published paper, see the response to comment APHIS-2007-0044-11616-1 for issue 4.4. APHIS acknowledges the market for non-GE foods.

Comment Excerpt Text:
I am opposed to the USDA approving the use of GM alfalfa. It threatens small farmers in favor of agribusiness. It impacts bee production and behavior. It is not well regulated and lets the burden of keeping organic farms organic fall with the organic farmers, not with the business that is using it.
It is a step in the wrong direction for our food sources, and our country, which was founded on the principal of government by the PEOPLE, for the PEOPLE, of the People:
Not government by the corporation, for the corporation, of the corporation. We are moving toward a "Corporist" society. Some might call it Fascism..... (Comment Number: APHIS-2007-0044-2255-1)

Response: Regarding potential impacts on organic farming, see the response to this comment APHIS-2007-0044-9882-1 for issue 5.0.

Regarding bees, the DEIS discussed possible direct impacts of GT alfalfa, including its pollen and seeds, on birds, insects, and other beneficial organisms in sections IV.C.1 and IV.E.2 (bees) and appendix O (bees). DEIS appendix O in particular examined several lines of evidence to investigate whether GT alfalfa could be related to bee colony collapse disorder and found no suggestion of a link (see DEIS appendix O, section 2.0). The DEIS appendix Q, section 4.2.7 discussed five studies of different types of arthropods exposed to GE corn containing the CP4 EPSPS protein that is carried by GT alfalfa, none of which indicated adverse effects. For bees, Boongird et al. (2003) found no effects on pollen harvest by worker bees and no effects on survival and development of honey bee eggs, larvae, or pupae when exposed to GT corn pollen during and after pollination.

Comment Excerpt Text:
First, genetic modification of any living thing wherein foreign DNA from another organism is forcibly implanted into another organism of a completely different species violates the most fundamental laws of the natural world as we know it. The process of genetic modification as previously described is something that would never happen under natural breeding conditions. The audacity of anyone to claim that genetic modification would have no significant impacts on the environment to say nothing of the effects on the animal, insect or human populations is beyond belief. While many will say that alternative breeding technologies have enabled great trait advancements in animals and humans such as artificial insemination (AI) and embryo transfer (ET), these technologies do not combine DNA from one species with the DNA from another or alien species to form an entirely new organism that has never existed before. These "new" organisms express their genes differently than the animals or plants that have been bred for thousands of years, sustaining our planets population. While there is abundant research illustrating the properties of traditionally bred plants and animals, there is virtually no research showing that genetically modified (GM) alfalfa is as safe as traditionally bred alfalfa. Genetically modified alfalfa has only been around for just a very short time and although the environmental impact statement (EIS) states that there are no significant health or environmental risks, the brevity of the research with no long-term testing on animals, insects, or humans cannot possibly support the conclusion that GM alfalfa should be released on a wide scale. Is it prudent to massively disseminate a product that replicates itself when the long-term effects are still unknown? More especially, what will be the effects on children who are highly sensitive to fundamental changes in their diet?
Second, as mentioned in the previous paragraph, the EIS states there are no significant deleterious effects on livestock when genetically modified alfalfa was fed to dairy cows. How long was this study conducted? Certainly studies over four or five years may only show acute effects on living organisms that consume such a product, but there appears to be a lack of long-term research showing the same null effects on animals, insects, or humans either directly consuming or indirectly consuming the product of genetically modified alfalfa. Also and perhaps most importantly, who funded the research to show that there were no significant effects from feeding GM alfalfa - Monsanto? The more I dig into this issue, the more I find that Monsanto scientists did the research with virtually no government co-testing to ensure that Monsanto's findings were true and unbiased. Certainly if this is the case with GM alfalfa, there is a huge lack of oversight on the part of APHIS and the USDA to allow a corporation to certify their own product as safe without any third party verification of the results. (Comment Number: APHIS-2007-0044-3548-1)

Response: As discussed in the response to comment APHIS-2007-0044-0278-1 for issue 6.0, section IV.E of the DEIS provides an extensive analysis of potential adverse health effects and concludes that the current weight of evidence from similar GE crops such as GT wheat, GT soybean, GT corn, GT cotton, and GT sugarbeet suggests that the transgenic CP4 EPSPS protein present in GT alfalfa poses negligible risk to humans, livestock, and wildlife. Most studies available in the scientific literature support the view that food from GT crops is substantially equivalent to nontransgenic crops. Section IV.E of the DEIS also provides an extensive analysis of glyphosate herbicide use—which might increase in response to the availability of GT alfalfa—and concludes that the use of this herbicide does not appear to result in adverse health effects.

Concerning the brevity of research on GT alfalfa (and other GT crops), see the response to comment APHIS-2007-0044-0465-2 for issue 4.4. Concerning independent testing of GT alfalfa Monsanto has provided its original biological data along with its analyses to EPA and USDA. Independent researchers are free to reanalyze data published by Monsanto, which when available, are examined by APHIS. APHIS also uses journal articles published in peer-refereed journals, as well as secondary literature, before making decisions about granting nonregulated status to new products of biotechnology.

As discussed in the response to comment APHIS-2007-0044-0278-1 for issue 6.0, section I.B of the DEIS describes how three federal agencies are responsible for regulating biotechnology in the United States: USDA's APHIS, the U.S. Department of Health and Human Services' Food and Drug Administration (FDA), and the Environmental Protection Agency (EPA). The APHIS Biotechnology Regulatory Service's (BRS) mission is to protect America's agriculture and environment using a dynamic and science-based regulatory framework that allows for the safe development and use of genetically engineered organisms. FDA is responsible for ensuring the safety and proper labeling of all plant-derived foods and feeds, including those developed through genetic engineering such as glyphosate-tolerant alfalfa. EPA uses a registration process to regulate the sale, distribution, and use of pesticides to protect health and the environment. This registration process includes the registration of pesticides that are produced by organisms developed using techniques of modern biotechnology. Thus, the three agencies are responsible for regulating biotechnology in the United States.

Comment Excerpt Text:
With this huge quantity of Roundup dousing our soil and crops each year, it does seem only responsible to ask - is this chemical safe? Roundup is one of the less dangerous pesticides in the agricultural industry, but studies have shown toxicity effects on fish and amphibians, genetic changes in mammals, and a recent oncological study out of Sweden implicated Roundup in the development of non-Hodgkin's lymphoma. Other studies have linked Roundup to various cognitive disorders in children.
In addition to killing weeds, Roundup acts as a fairly broad spectrum biocide, affecting a large number of soil microbial species (Johal & Rahe 1988, Molec. Plant Pathol. 32:267-281). There are some fungal species though that resist the Roundup, and finding much reduced competition after application, they become dominant. Research from the University of Manitoba/Ag Canada ("Crop Production Factors Associated with Fusarium Head Blight in Spring Wheat in Eastern Saskatchewan", Fernandez, Sellesa, Gehlb, DePauwa and Zentner, Crop Science, 2005) and more recent work by USDA-ARS scientists (Glyphosate and glyphosate-resistant crop interactions with rhizosphere microorganisms, Kremer and Means, J Agronomy 2009) has shown that Fusarium in particular benefits and increases in the soil with Roundup use. Fusarium is a serious fungal plant pathogen that affects many crop species.

Recently, work in Missouri ("Glyphosate Effects on Diseases of Plants", Johal and Huber, European J Agronomy, 2009) showed how plants, when treated with Roundup, actually experience a chemical change that reduces their own immune defenses, making them much less able to resist fungal and insect attack. Soil applications of Roundup appear to first create a

rhizosphere microbial community enriched with virulent athogenic species, and then weakens the crop plants to make them more susceptible to those pathogens.

In small grains, Fusarium causes headblight and scab. While these diseases do reduce yield and grain quality, they also often form tasteless, colorless mycotoxins (fungal toxins) that can be very poisonous to humans and to animals. At high concentrations, mycotoxin poisoning can cause hemorrhaging, abortion, kidney dysfunction, blindness and death in animals, but commonly, mycotoxin poisoning can be subclinical, with generalized symptoms such as immune suppression, reproductive abnormalities, increased susceptibility to other diseases, decreased milk production, poor feed intake and weight loss, and abnormal juvenile growth and development.

Indeed, some Fusarium toxins act as estrogens, feminizing males and causing female reproductive problems. The Manitoba research showed that wheat, grown after a crop of Roundup Ready soybeans, is much more likely to develop scab. This research should come as no surprise to many conventional wheat growers who have been spraying increasingly large doses of fungicides over the past few years to keep wheat scab from destroying their crops!
Mycotoxins are not just a problem in grains. Indeed, in Northeast, many farmers have learned that mycotoxins can equally be a problem in hay and baleage, infected in the field under cool wet growing conditions and then spread throughout the feed in storage. Increased incidence of mastitis, breeding difficulties, foot and other problems are often not quickly attributed the presence of mycotoxins in forage.
Recent reseach (J. Fox et, , 2007, National Academy of Science) has shown that soybeans, sprayed with Roundup to control weeds, produce beans with reduced nutrient content, especially lower protein. This appears NOT to be the result of genetic changes from the recombinant DNA. Instead, it appears that the Roundup suppresses the activity of Rhizobium bacteria on and in the soybean roots, impairing the plant's ability to fix nitrogen, an essential factor in protein synthesis.
(Comment Number: APHIS-2007-0044-4924-2)

Response: See the response to comment APHIS-2007-0044-4924-2 for issue 4.3.

Comment Excerpt Text:
Dear USDA,
Please do not allow genetically engineered (GE) alfalfa, or any other GE products, to be fed to cattle. GE seeds are "Roundup Ready" and carry contaminates into the foods we eat. Roundup has glyphosate which is linked to non-Hodgkins lymphnoma (Journal of the American Cancer Society). The American Chemical Society reports that glyphosate damages and kills human cells. In light of such research, I hope you will ban the use of GE seeds and Roundup herbicide in all food products, including foods being fed to cattle and other animals that are used for food production.
Kindest regards,
Patty Finnegan
(Comment Number: APHIS-2007-0044-5280-1)

Response: Regarding potential effects of glyphosate on humans and animals, see the response to comment APHIS-2007-0044-4924-2 for issue 6.0 and the response to comment APHIS-2007-0044-0352-1 for issue 6.3.

Comment Excerpt Text:
I have been long concerned about GE crop contamination for its real threat to the purity and safety of our food system. Now that the USDA has acknowledged that GE contamination in alfalfa will adversely impact the organics industry and all affected please rule to forbid GE alfalfa production.
I feel strongly that the contamination of organic alfalfa, or any organic crop, from GE spores should be a top USDA priority in a world that suffers one ecological blow after another at the hands of big business. Please stand up for REAL food.
Any animal the eats GE grains or grasses passes something of them on through their meat or milk, making its way into thousands of consumer products. Consumers who are educated on this matter have long said keep GE ingredients out of my food, and so far only by purchasing organics has this been possible. But it's clear that organic crops and animals that eat them are threatened each time another GE crop gets planted.
Please support a true food economy and don't allow GE alfalfa to become another conquest by the biotech industry and another nail in the coffin of TRUE FOOD that feeds, nourishes and protects...naturally (Comment Number: APHIS-2007-0044-5281-1)

Response: Regarding adventitious presence of GE alfalfa in organic and conventional alfalfa production, our analysis of relevant information did not state that GE alfalfa will adversely impact the organics industry. As discussed in appendix V sections 5.5–5.11 of the DEIS, coexistence strategies (e.g., equipment sanitation, harvest management, field separation, contractual practices) can limit the occurrence of GE traits from non-GE alfalfa below seed certification thresholds (0.5 percent).

The protein produced by GT alfalfa, CP4 EPSPS, has been found in some plant food products (e.g., wheat, bread) derived from GT soy and GT corn monitored in Australia (see DEIS appendix Q, section 2.1.1.3). However, as described in section IV.E of the DEIS, the current weight of evidence from similar GE crops such as GT wheat, GT soybean, GT corn, GT cotton, and GT sugarbeet suggests that the CP4 EPSPS protein poses negligible risk to humans, livestock, and wildlife. Most studies available in the scientific literature support the view that food from GT crops is substantially equivalent to nontransgenic crops.

As described in appendix Q, section 2.1.1.4 of the DEIS, fragments of DNA can be absorbed from the gastrointestinal tract by livestock that consume GT crops, and fragments of both species normal and transgenic DNA gene can be absorbed from the GI tract (study by Sharma et al., 2006). However, also as stated in the DEIS appendix Q, section 2.1.1.4, there is no evidence to suggest that recombinant DNA would be processed in the GI tract in any manner different from endogenous feed-ingested genetic material (DEIS, page Q-13). As of 2007, no recombinant DNA sequences had been found in any organ or tissue sample from animals fed GE plants (Flachowsky et al. 2007; see DEIS appendix Q, section 2.1.1.4). The discussion about

transmission of DNA sequences from transgenes is expanded in the FEIS in section IV.E.2 and appendix Q, section 2.1.1.4.

Comment Excerpt Text:
Genetically Engineered, Glyphosate-Tolerant Alfalfa (GEGT Alfalfa) should not be approved for the following reasons:
Environmental Impact: Alfalfa relies on open pollination by bees. Evidence strongly suggests that GEGT Alfalfa will cross pollinate with other alfalfa crops despite intended protections. (note actual cases reported of cross contamination). While it has been argued that GE traits themselves will not show up in beef and dairy end-products, a survey of milk products sold in stores in Italy (screening of 60 samples of 12 different milk brands) demonstrated the presence of GM maize sequences in 15 (25%) and of GM soybean sequences in 7 samples (11.7%). Also, research shows that glyphosate-tolerant forage (which therefore contains residues of glyphosate) fed to mammals has negative/toxic effects on animal blood, kydney and liver function after feeding for only five to fourteen weeks (de Vendmois JS, Roullier F, Cellier D, Sralini GE. A Comparison of the Effects of Three GM Corn Varieties on Mammalian Health. Int J Biol Sci 2009; 5:706-726. Available from http://www.biolsci.org/v05p0706.htm) These effects would be introduced into the human food chain as well as impacting the food chain and health of cervids and other wild foraging animals.
I believe GE is crossing the line. even if just a grain! Serious business (Comment Number: APHIS-2007-0044-5313-1)

Response: As described in appendix Q, section 2.1.1.4 of the DEIS, only one of many experiments examining livestock and their products (milk and eggs) has demonstrated that fragments of DNA, including both species—normal and transgenic, can be absorbed from the gastrointestinal tract of pigs that consume GT. However, also as stated in the DEIS, there is no evidence to suggest that recombinant DNA would be processed in the GI tract in any manner different from endogenous feed-ingested genetic material (see DEIS page Q-13). As of 2007, no full recombinant DNA sequences had been found in any organ or tissue sample from animals fed GE plants (Flachowsky et al. 2007; DEIS appendix Q, section 2.1.1.4). The discussion about transmission of DNA sequences from transgenes is expanded in the FEIS, section IV.E.2 and appendix Q, section 2.1.1.4.

Concerning the recently published paper cited by the commenter, see the response to comment APHIS-2007-0044-11616-1 for issue 4.4.

Comment Excerpt Text:
I always buy organic milk because I do not want any GMOs in it.
Do not allow roundup-ready alfalfa. It will contaminate the pastures where the cows producing my organic milk feed.
You are not working for Monsanto. You are working for me. I am a citizen of the United States. If you don't do what I tell you to do, I will fire you (Comment Number: APHIS-2007-0044-5316-1)

Response: Genetically modified organisms are degraded in the gastrointestinal tract of livestock that feed on them, and only small fragments and chemical substances are absorbed into the body of the livestock (see DEIS appendix Q, section 2). Thus, GMOs are not transferred into milk. Regarding the movement of transgenes into organic crops where dairy cows graze for organic milk production, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0

Comment Excerpt Text:
Agriculture is not the only winner from this fantastic technology, wildlife also benefits. We live on the edge of the foothills of the Pryor Mountains. During the winter most all forage is covered up with snow. Prior to planting roundup ready alfalfa on the edges of our farm limited wildlife was in this area. This past weekend we counted over 110 deer grazing on our third cutting alfalfa that was left standing. It is interesting to observe that while there is other hay fields available, the wildlife seem to congregate on the roundup ready fields. In addition, pheasants have made their home along the ditches and fence rows providing many urban friends with hunting opportunities. (Comment Number: APHIS-2007-0044-5334-1)

Response: APHIS acknowledges the comment that some wildlife (e.g., deer) feed on Roundup Ready alfalfa and some inhabit transitional habitats (e.g., pheasants).

Comment Excerpt Text:
We should be getting rid of genetically engineered products altogether, not having more of them! Genetically modified foods result in modifications in whatever person or animal eats them. So if we give genetically modified feed to animals, it WILL impact their health and potentially their DNA. If we then proceed to eat those animals, or foods (like milk, eggs) produced by those animals, then we can be affected by the genetic modifications.
Eating organically produced foods has become very important to me, in our society where chemical and hormone contamination of foods has become rampant. Genetic modifications are even WORSE contaminants.
Genetic modifications can potentially cause permanent damage to any plants, animals, foods, . . . and people who are exposed to them. We have no way of predicting how these genetic modifications may someday spread in unexpected ways.
Please block approval of genetically engineered alfalfa. (Comment Number: APHIS-2007-0044-5386-1)

Response: As discussed in sections IV.C.5 and IV.E of the DEIS, there is no evidence that GM foods modify humans or animals. See also the response to comment APHIS-2007-0044-5313-1 for issue 4.4.

Comment Excerpt Text:
Roundup Ready® alfalfa delivers quality forage and hay that is comparable to conventional varieties, with fewer weeds and proven feed safety. It improves the opportunity for high quality and Certified Weed-Free hay. (Comment Number: APHIS-2007-0044-5588-4)

Response: APHIS acknowledges the benefit to growers of Certified Weed-Free hay of RR alfalfa.

Comment Excerpt Text:
"As a result of evaluating the toxicity of 4-glyphosate (G)-based herbicides in Roundup formulations from 10(5) times dilutions on 3 different human cell types there was total cell death within 24 hours. Cell death occurred through an inhibition of the mitochondrial succinate dehydrogenase activity and there was necrosis and apoptosis.
"This work clearly confirms that the adjuvants in Roundup formulations are not inert. Moreover, the proprietary mixtures available on the market could cause cell damage and even death around residual levels to be expected, especialIv in food and feed derived from R formulation-treated crops. " [Emphasis added] (Comment Number: APHIS-2007-0044-5604-2)

Response: The experimental results noted by the commenter are not immediately relevant to environmental applications of herbicides. Cell death from direct exposure of human cells in vitro to an herbicide does not indicate the potential for harm from environmental applications of the herbicide. In vitro exposure lacks several processes that could prevent cell exposure in vivo (i.e. ,in the whole animal by normal exposure routes), including environmental degradation after application, degradation in the acidic environment of the gastrointestinal tract, barriers to absorption by the gastrointestinal tract epithelium, and detoxification by the liver before the blood is distributed to the body. Surfactants if applied directly to cells in vitro can affect cell membrane integrity but a variety of organismic and tissue barriers likewise normally protect cells from such exposure.

Comment Excerpt Text:
On page xv the statements are made “GT alfalfa is not toxic to animals...”. I find this reasoning unsatisfactory, because, as APHIS itself notes in the EIS, the herbicides intended to be used with these GT strains of alfalfa contain undisclosed surfactants. On page 64 the statement is made, “While surfactants are typically classified as “inert” components in herbicides, they are not toxicologically inert and in many cases they are found to be more toxic than the herbicide itself. USDA-FS, 2003)”. And on page 29, in regards to the water flea, “...glyphosate formulations are several orders of magnitude more toxic than technical glyphosate.” That this greater toxicity applies to more than just that particular species is borne out by comments on page 28 as follows: “...amphibians exhibited greater sensitivity to Roundup® formulations than to glyphosate tested as an acid or IPA salt.” and “In general, the glyphosate formulations (herbicide plus other chemicals) were more toxic to fish than technical glyphosate (herbicide only). The increased toxicity is due to the presence of a surfactant in glyphosate formulations...” This variability of toxicity seems to have been left out of APHIS's line of reasoning when it makes the statement on page xv that “Due to the use of glyphosate on GT alfalfa, overall glyphosate use may increase in alfalfa production, but such an increase should be not be a significant impact on the environment...” and on page xiii that “granting nonregulated status to glyphosate-tolerant (GT) alfalfa lines J101 and J163 will not result in significant impacts to the human environment.” According to USDA-APHIS Regulations and Assessments Title 40, the definition of human environment (USDA-APHIS Regulations and Assessments Title 40

http://www.aphis.usda.gov/regulations/compliance/environmental_quality_1508.shtml) includes the definition of effect, which states “Effects and impacts as used in these regulations are synonymous. Effects includes ecological...aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative.”
It is reasonable to assume that commercial products containing surfactants of unknown, but reasonably considerably toxic, surfactants shall be used in conjunction with GT alfalfa (as opposed to glyphosate in isolation) based on the comment, “While additional glyphosate products may be used, five products are recommended for use on GT alfalfa. The five herbicides are Monsanto products and include: Honcho®, Honcho Plus®, Roundup Original MAX®, Roundup WeatherMAX®, and Roundup Ultra MAX II®.” found on page 63.
This is significant, because the EIS also acknowledges on page xvi that “the net effect on alfalfa production with the increased adoption and planting of GT alfalfa should be some increased use of the less toxic glyphosate with a decreased use of more toxic herbicides.” as well as pages 61 that there is reason to expect that use of such products will increase in response to the deregulation of GT alfalfa (“A few studies have claimed that the volume of herbicide use is greater due to GT crops...”) and 62 (“Gianessi and Reigner (2006) noted that an increase in glyphosate usage coincided with a decrease in total amount of herbicide usage by 61 million pounds (of active ingredient) between 1997 and 2002. Much of this reduction occurred in cotton and soybeans, where several herbicides were replaced by glyphosate.”) and the afore-quoted statement from page xv to similar effect.
In light of the forgoing, it is very difficult to accept the statement made on page xiii that “The APHIS Biotechnology Regulatory Service’s (BRS) mission is to protect America’s agriculture and environment using a dynamic and science-based regulatory framework...”, especially when considering the aforementioned definition of the term “human environment”. Despite the USDA-APHIS's indemnifying disclaimer delineating its particular area of responsibility as well as its compliance with CEQ requirements, APHIS's declaration that GT alfalfa presents “no significant impact on the human environment” (page xv) is clearly incompatible with the statements acknowledging that the use of unknown and very probably considerably toxic substances in the production of food destined for human consumption, may, as a direct result of deregulation, increase. It is unreasonable that such an increase could not have an impact of considerable significance on the human environment, and that therefore either the alternative of deregulation must in good conscience be postponed until the composition of the herbicides in question are fully disclosed and have been demonstrated to pose no significant risk to the human environment or else rejected altogether in favor of continued regulation. To do otherwise clearly violates USDA-APHIS's own mission statement. (Comment Number: APHIS-2007-0044-6240-2)

Response: APHIS acknowledges the comment and that glyphosate is more toxic to amphibians and other aquatic animals in combination with a surfactant than without. The FEIS expands the discussion of toxicity of glyphosate in combination with water-soluble surfactants to frogs and other amphibians in section IV.C.3 and appendix N.

Comment Excerpt Text:
The use of GM alfalfa will only serve to increase the use of the herbicide glyphosate which is a chemical that is harmful to soil microorganisms. The chelating action of glyphosate makes the

essential trace element manganese unavailable to plants. This in turn makes the plants produced under this system of production less nutritious for the livestock that consume them.
I am opposed to the approval and/or release of GM alfalfa. (Comment Number: APHIS-2007-0044-6789-1)

Response: Concerning the chelating action of glyphosate, see the response to comment APHIS-2007-0044-9547-4, discussion of mode of action of glyphosate, for issue 4.0. Regarding the nutritional value of GT alfalfa, see last paragraph in the response to comment APHIS-2007-0044-0362-1 for issue 4.4.

Comment Excerpt Text:
First of all, I am not against the use of genetic engineering to alter the plant for production and quality benefits. I am against the insertion of the Round-up Ready gene into alfalfa and the deregulation of Round up Ready alfalfa. The main reason for this is the effects that glyphosate is having on the microbial populations in the soil and the unknown long term affects on production agriculture. The changes of the microbial populations could possibly lead to changes in mineralization of nutrients in the soil. Glyphosate applications are also increasing plant deficiencies in transitional metal micronutrients in the plant such as manganese, zinc, and iron. My occupation is a crop consulting agronomist who supplies services on 12-15000 acres per year. My statements are based on research that I have read or heard of from Dr. Huber and Dr. Kremer. (Comment Number: APHIS-2007-0044-6959-1)

Response: Regarding the possible effects of glyphosate on plant nutrient availability in soils, including the transitional metal micronutrients, see the response to comment APHIS-2007-0044-10170-4 for issue 8.1.

Comment Excerpt Text:
C) Recent studies show that while specific chemicals do not independently cause Colony Collapse Disorder (CCD) glyphosate, along with other chemicals (fungicides, bonding agents for herbicides, and and a host pesticides) has been found in the wax of beehives. These chemicals can react in a binary fashion in ways not intended. (Comment Number: APHIS-2007-0044-7018-1)

Response: Chemical interactions in the environment can happen where not expected. Further discussion of honey bee colony collapse disorder (CCD) with respect to glyphosate use is provided in FEIS section IV.I.5.b and appendix O.

Comment Excerpt Text:
GM crops are implicated in declining fertility rates and suspected in bee colony collapse. I am not interested in Monsanto's spin on what it perceives the public interest is. Monsanto is not improving God's alfalfa, it is improving its own profits (Comment Number: APHIS-2007-0044-7025-1)

Response: APHIS acknowledges the comment, but as discussed in DEIS appendix O, evidence available to date does not link GT crops to bee colony collapse disorder.

Comment Excerpt Text:
GE crops endanger not only other crops because of seed dispersal but because they can cause mutations in insects, making them harder to eliminate. GE should be renamed Greedy Enterprises. (Comment Number: APHIS-2007-0044-7127-1)

Response: The subject of this EIS is a set of two GE strains of herbicide-(glyphosate)-tolerant alfalfa, not GE crops that produce an insecticide. Because the commenter did not cite specific sources, the basis for the comments cannot be evaluated.

Comment Excerpt Text:
I have been informed that GM (Genetically Modified) Alfalfa is about to be released. DO NOT allow this!
1) The long term effects of GM plants have not been proven as safe. On the contrary there are studies that indicate the offspring of GM fed animals are stunted even if they survive to be born. Animals fed GM grain in Germany have sickened and died. (Comment Number: APHIS-2007-0044-7149-1)

Response: Because the commenter did not cite specific sources, the basis for the comments cannot be evaluated. The subject of this EIS is a set of two GE strains of herbicide-(glyphosate)-tolerant alfalfa, not GM crops in general, which can have a variety of traits.

Comment Excerpt Text:
Genetically engineered alfalfa would be the first perennial GM crop, and would result in a huge increase of toxic RoundUp in the environment. It would expose livestock widely to both genetically engineered genes and pesticide residues. It would especially affect cows and horses--their health, their reproduction, and their byproducts, particularly milk. (Comment Number: APHIS-2007-0044-7281-1)

Response: Because the commenter did not cite specific sources, the basis for the comments cannot be evaluated. As discussed in the response to comment APHIS-2007-0044-0278-1 for issue 6.0, section IV.E of the DEIS provides an extensive analysis of potential adverse health effects and concludes that the current weight of evidence from similar GE crops such as GT wheat, GT soybean, GT corn, GT cotton, and GT sugarbeet suggests that the transgenic CP4 EPSPS protein present in GT alfalfa poses negligible risk to humans, livestock, and wildlife. Most studies available in the scientific literature support the view that food from GT crops is substantially equivalent to nontransgenic crops. Section IV.E of the DEIS also provides an extensive analysis of glyphosate herbicide use—which might increase in response to the availability of GT alfalfa—and concludes that the use of this herbicide does not appear to result in adverse effects in birds or mammals. No adverse effects have been reported for horses or cattle that consume GT crops with possible glyphosate residues (see DEIS section IV.C).

Section III.D of the DEIS describes the FDA conclusion that the CP4 EPSPS protein produced by GT alfalfa lines J101 and J163 is biochemically and functionally equivalent to CP4 EPSPSs produced by other GT crops, and to the family of EPSPS proteins that naturally occur in crops and microbiologically based processing agents that have a long history of safe consumption by humans and animals. As noted on page N-4 of the DEIS, U.S. EPA (2006c) also noted that studies with lactating goats, laying hens, rats, rabbits, and cows fed a mixture of glyphosate and its metabolite AMP indicated that there was very little transfer of residues from feed to animal tissues and no bioaccumulation.

Comment Excerpt Text:
It would especially affect cows and horses--their health, their reproduction, and their byproducts, particularly milk. (Comment Number: APHIS-2007-0044-7287-2)

Response: See the response to comment APHIS-2007-0044-7281-1 for issue 4.4.

Comment Excerpt Text:
Has an independent scientist not employed or paid by Monsanto, done nutrition tests of GE alfalfa to see if a large sample of dairy cows, beef cows and horses will eat it when given an alternative of non GE alfalfa? Another test that should be done by an independent scientist is to feed dairy cows for 6 months with the normal percentage of their feed as GE alfalfa compared to a control group of cows eating nonGE alfalfa. Those cows must then be tested for physiological funcitons, hormone levels and presence of cancers. Monsanto can not be trusted to do such tests with a large enough sample, for a long enough period of time, to demonstrate safety and nutritional integrity of GE alfalfa. (Comment Number: APHIS-2007-0044-8725-5)

Response: APHIS acknowledges the comment on testing GT alfalfa. Concerning independent testing, see the response to comment APHIS-2007-0044-3548-1 for issue 4.4. See also the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
I am submitting my reason to NOT approve of "Roundup Ready" alfalfa:
Globally, honey bees and other pollinating insects are declining at a rapid rate. We don't really know why - but we DO know that this decline truly affects the world's food supply. Biocides of all sorts have been shown to decimate "untargeted" life forms both directly, as poisons, and indirectly, by unraveling part of the biosphere - think house of cards or knitted garment. Pollen does not confine itself to man-made boundaries. Bees also do not confine themselves to mandated boundaries; Queens fly at least a mile away during their mating flight, and workers fly up to two miles during the honey flow. Not all bees are trucked from place to place; many are kept in urban and rural backyards. (Comment Number: APHIS-2007-0044-9269-1)

Response: Regarding potential effects of GT alfalfa and its pollen or nectar on bees, as discussed in the response to comment APHIS-2007-0044-2255-1 for issue 4.4, investigation of several lines of evidence as presented in appendix O of the DEIS did not indicate a link between the two. Regarding potential effects of glyphosate use on GT alfalfa, see the response to comment APHIS-2007-0044-5329-1 for issue 4.0.

Comment Excerpt Text:
Genetically engineered alfalfa would be the first perennial GM crop, and would result in a huge increase of toxic RoundUp in the environment. It would expose livestock widely to both genetically engineered genes and pesticide
residues. It would especially affect cows and horses--their health, their reproduction, and their byproducts, particularly milk (Comment Number: APHIS-2007-0044-9300-1)

Response: See the response to comment APHIS-2007-0044-7281-1 for issue 4.4.

Comment Excerpt Text:
The real concern I see for GMO alfalfa is that the nation's milk supply will be produced with GMO alfalfa and all of the tons of forage consumed will have received glyphosate or Round Up. It will be virtually impossible to guarantee a mother that her baby is not receiving milk produced from GMO forage -- nearly all of which was sprayed directly with Round Up before harvest. As with the case of GMO soybeans and corn, only the plants are sprayed with Round Up (prior to seed development) so the actual grain-- the corn and soybean seeds are not physically sprayed but are then utilized as feedstuffs. However, with alfalfa the whole plant is utilized for feedstuffs with the potential contaminants both genetically in the plant and also the potential residual effects of the glyphosate chemistry on the plant itself.
If GMO alfalfa is approved for widespread use, it will be impossible for a mother to provide GMO and Round UP-free milk for her baby.
This puts our nation's milk supply at extreme risk for contamination!
Please do not support the commercialization of GM Alfalfa. (Comment Number: APHIS-2007-0044-9504-1)

Response: With alfalfa, the whole plant is used as animal feed. Deregulation of GT alfalfa does not mean that all alfalfa farmers will purchase and use GT alfalfa and glyphosate. The majority, 78 to 93 percent, of alfalfa fields are likely not to be planted with GT alfalfa or be treated with any pesticides (see the response to comment APHIS-2007-0044-11037-10 for issue 4.2) because alfalfa is a perennial and densely growing plant that naturally suppresses weeds in most settings. Moreover, weed-free forage is not required for dairy farming. Thus dairy products from cows fed conventional alfalfa without pesticides should continue to be available.

Comment Excerpt Text:

The real concern I see for GMO alfalfa is that the nation's milk supply will be produced with GMO alfalfa and all of the tons of forage consumed will have received glyphosate or Round Up. It will be virtually impossible to guarantee a mother that her baby is not receiving milk produced from GMO forage -- nearly all of which was sprayed directly with Round Up before harvest. As with the case of GMO soybeans and corn, only the plants are sprayed with Round Up (prior to seed development) so the actual grain-- the corn and soybean seeds are not physically sprayed but are then utilized as feedstuffs. However, with alfalfa the whole plant is utilized for feedstuffs with the potential contaminants both genetically in the plant and also the potential residual effects of the glyphosate chemistry on the plant itself.
If GMO alfalfa is approved for widespread use, it will be impossible for a mother to provide GMO and Round UP-free milk for her baby.
This puts our nation's milk supply at extreme risk for contamination! Not to mention the strain on our healthcare system from the fallout (Comment Number: APHIS-2007-0044-9527-1)

Response: See the response to comment APHIS-2007-0044-9504-1 for issue 4.4.

Comment Excerpt Text:
Please do NOT lift the ban on Monsanto's genetically modified (GM) "Roundup Ready" alfalfa. This GMO would have disastrous effects on US and global agriculture. Genetically engineered alfalfa would be the first perennial GM crop, and would result in a huge increase of toxic RoundUp in the environment. It would expose livestock widely to both genetically engineered genes and pesticide residues. It would especially affect cows and horses--their health, their reproduction, and their byproducts, particularly milk.
Alfalfa pollen is carried far and wide by the wind and bees, so the presence of GM alfalfa in the environment would contaminate organic alfalfa, rendering organic dairy impossible. Consumers who eat alfalfa sprouts would be exposed directly, as well as those who eat meat. (Comment Number: APHIS-2007-0044-9534-1)

Response: See the response to comments APHIS-2007-0044-11206-1 (first GM perennial crop) and APHIS-2007-0044-7281-1 (effects on cows and horses and milk) for issue 4.4. Regarding organic dairy farming, see the response to comment APHIS-2007-0044-9504-1 for issue 4.4.

Regarding human exposure via alfalfa sprouts, as discussed in the response to comment APHIS-2007-0044-9547-4 for issue 4.0, the DEIS (section III.C.2.c) reported that GT-alfalfa (and glyphosate) will not be used to produce alfalfa sprouts which might be consumed by humans as stipulated in signed agreements between Monsanto/Forage Genetics International (FGI) and purchasers of GT alfalfa.

Comment Excerpt Text:
I am a beekeeper in northern New Mexico. The practice of introducing farming methods requiring additional chemical applications such as insecticides and weed killers as is planned by this measure is irresponsible and totally undesirable.
Bees commonly harvest nectar and pollen for about a 2 mile radius, covering many hundreds if not thousands of acres in doing so.

Bees, both kept and natural are far too stressed as it is now contributing to the current historic low levels of working bees and hives.
Continued destructive pressure on bees and beekeeping will be disastrous to the environment and ultimately severely diminish the availability of abundant, affordable, food.
Do not pass or allow this practice to continue(glyphosate-tolerant Alfalfa) it is unnecessary and irresponsible (Comment Number: APHIS-2007-0044-9623-1)

Response: Regarding potential effects of GT alfalfa and its pollen or nectar on bees, as discussed in the response to comment APHIS-2007-0044-2255-1 for issue 4.4, several lines of evidence presented in appendix O of the DEIS did not suggest a link. Regarding potential effects of glyphosate use on GT alfalfa, see the response to comment APHIS-2007-0044-5329-1 for issue 4.0.

Comment Excerpt Text:
I am a beekeeper who lives in an agricultural community and am very concerned about the effects of GMO alfalfa introduction to my valley. From what I have read in the research, there is a high potential that there are possible detrimental, and indeed, life threatening hazards facing my bee colonies when exposed to bacterial toxin in crops. Our hives are already threatened enough by pesticides, climate change, diseases, and other unknown environmental pressures. As pollinators are so important to the livelihood of farmers, why wouldn't farmers take into consideration the potential harm of their crops on pollinators? Please consider the plight of the honeybee and those who keep them when deciding on this important environmental decision (Comment Number: APHIS-2007-0044-9836-1)

Response: As discussed in response to comment APHIS-2007-0044-5338-1 above under issue 4.0, appendix O of the DEIS presents the many studies that have examined GT crops in relationship to bees, and none provided evidence that could link the CP4 EPSPS enzyme or GT alfalfa, including its pollen and nectar, to impairment of bees and bee colonies or colony collapse disorder. There also is no scientifically plausible mechanism of toxicity of the CP4 EPSPS protein for animals (see DEIS appendix O, section 1.7).

5.0 Issue 5 – Socioeconomic Impacts

Comment Excerpt Text:
Like many in the agricultural community, I too support Roundup Ready Alfalfa for the obvious advantages to growers such as convenience, profitability and sustainability, etc... I am from a long lineage of farmers and grew up on a farm myself here in Southwest Idaho; new technologies have always been readily adopted on our farm and especially when there are benefits to growers like in the case of Roundup Ready alfalfa. Yet, my support goes beyond the obvious reasons of yield, safety and profitability; I also support RRA and other technologies like it for a reason that is even more fundamental -competition. Agriculture like any other industry in the world depends on innovation and technology, and glyphosate tolerant alfalfa is a part of that agricultural trend towards innovation so that our countrys growers can continue to compete in a global market. If glphosate tolerant alfalfa is negated in our market place it is possible that so too will other similar types of innovations. Other countries, such as China, are well aware of these technologies and are nearly capable of bringing them to market and might do so if we do not. So in many ways, agricultural technology and innovation hinge on Roundup Ready Alfalfa. I truly hope that Roundup Ready Alfalfa is approved as it has been proven by the scientific community not to be harmful to the health of humans or animals, but if not allowed to come to market, it will prove to be harmful to the future of American agriculture and those growers eager to usher in the future of agriculture so that we might provide food, fuel and fiber for the world.
Respectfully Submitted,
Kirk Whittig
(Comment Number: APHIS-2007-0044-0389-1)

Response: APHIS acknowledges the comment. The impacts of not deregulating GT alfalfa on U.S. competitiveness, as reflected in U.S. international trade, are recognized in the DEIS under the analysis of the No Action Alternative.. Regarding impacts on human health and animals, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3.

Comment Excerpt Text:
I am a dairy nutritionist for Land O'Lakes Purina Feed and I am in favor of the deregulation of alfalfa engineered for the tolerance to the herbicide glyphosate. This technology helps improve alfalfa yields (biomass) per acre and increases the productive life of the stand resulting in a smaller carbon footprint than tranditional alfalfa. As a nutritionist when you are able to feed more dairy quality alfalfa, which Roundup Ready Alfalfa will help produce higher quality hay due to less weeds, you do not have to feed as many purchased commodities helping to improve a dairy producers profitablity and at the same thime helping them rely less of products produced and shipped across the country (higher carbon footprint). Less total herbicide can be used over the life of a Roundup Ready Alfalfa stand due to the effective remove of weeds early in the growth of the stand when Roundup is used. Roundup has been around for over 30 years and is a safe herbicide for dairy producers to use. Again these are the reasons why I am in favor of the deregulation of alfalfa engineered for the tolerance to the herbicide glyphosate. Thank you
(Comment Number: APHIS-2007-0044-0398-1)

Response: APHIS acknowledges the comment. Regarding the economic impacts on dairy producers, see the response to comment APHIS-2007-0044-9882-1for issue 5.0. Regarding impacts on yields, see the response to comment APHIS-2007-0044-0933-14 for issue 3.7. Impacts on climate change are addressed in section IV G of the DEIS. APHIS expanded this section in the FEIS to consider the details presented in comments on the DEIS.

Comment Excerpt Text:
Ensuring the use of Glyphosate-Tolerant Alfalfa is one of the most important things we can do as a society. Fewer trips through the field reduce fuel consumption, and a lack of residual activity allows for flexibility in planning crop rotation. Studies of other herbicide-resistant crops also show that they reduce water use, facilitate conservation tillage, prevent stream sedimentation from field runoff and contribute to a lower carbon footprint. Also, reducing herbicide use benefits the environment and a grower's profitability. In 2006, it is estimated that corn and cotton growers using Roundup Ready technology saved more than $250 million and $228 million, respectively. We need to get this done, and we need to get it done NOW (Comment Number: APHIS-2007-0044-0612-1)

Response: APHIS acknowledges the comment. Regarding impacts on yields, see the response to comment APHIS-2007-0044-0933-14 for issue 3.7. Impacts on climate change are addressed in section IV G of the DEIS. APHIS expanded this section in the FEIS to consider the details presented in comments on the DEIS.

Comment Excerpt Text:
Dear USDA Staff,
All of us understand your job is not easy. We want to feed many people in the world. We already can; yet many are still malnourished. Not because they simply ate very little but because it was so processed and unlike what it really was to begin with.
My father farmed almost every year of his life, I witnessed and heard often how companies like Monsanto dominated the source of seeds, I hear how they are monopolizing the seed sourcing almost like a Microsoft and the Windows system. This parallel cannot be ignored purely on a business model much less on a science model of cross contamination to organic foods.
WE CANNOT let the capitalistic model of decision making over rule the values of organic farming. Example, I recently read valid information on A1 and A2 bovine dairy farming in New Zealand and Austrailia. If a gene mutation like A1 can cause so much chronic human illness, then why are we entertaining accepting GM products without restrictions? I am not sure if it is possible to mandate enough distance for pollen to not co-mingle with organic crops. Even if you could agree on a distance between crops it doesn't matter. Organic farmers find that if the balance of insects are present the crops can succeed. Specific farming practices reduce weed pressure.
Man's ability to create highly sophisticated products and interventions does not always pay off in the end when it comes to nature. I personally have gone to eating a much higher content of raw food in my diet and am feeling better than I have in a long time. I have chronic illnesses related to Hashimoto Thyroiditis like asthma and reflux. The less we humans process and monkey around with the original genetic make up of plants and animals the better.

I have studied science and sustainability at Rochester Institute of Technology in the last four years and appreciate science immensely so the above statement is not made lightly. If you allow GE alfalfa, there is no turning back (Comment Number: APHIS-2007-0044-0837-1)

Response: Regarding impacts on market seed concentration and competition, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0.
Regarding impacts on food, see the response to comment APHIS-2007-0044-0837-1 for issue 6.1.
In regard to the gene flow of non-GE or organic alfalfa with GT-alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
2. Avoidance costs

The cost of any proposed separation buffers must be the responsibility of the company claiming proprietary ownership of GT alfalfa seed and any GT alfalfa farmer, since they are the aggressors seeking to disturb the environmental status quo and creating potentially disastrous impacts on others. It is a basic precept of corporate law that the "polluter pays."

In "Avoidance Costs" [S-30], however, APHIS suggests that famers who choose to grow non-GT alfalfa may plant "buffer zones" as barriers around their fields, require "testing for GT alfalfa traits in alfalfa seeds used for production," or by moving to another location ("relocating to non-deregulated areas") to protect themselves.

This is a direct contradiction of APHIS' own stated primary mission: "Protecting American agriculture is the basic charge of the U.S. Department of Agriculture's Animal and Plant Health Inspection Service."

Such recommendations also conflict directly with: "One of Aphis' many functions is to regulate genetically engineered (GE) organisms … that might pose a plant pest risk."

Indeed, when APHIS advises non-GT alfalfa farmers to take specific (and inherently costly) measures to protect their fields from the threat of GT alfalfa, APHIS clearly is acknowledging harm and acknowledging that such GT alfalfa is a pest.

The extreme recommendation that a farmer move his farm confirms that GT alfalfa and non-GT alfalfa cannot "coexist" in any equitable way.

Any protocol for coexistence must include provisions requiring the polluter to pay for resulting costs imposed on others. (Comment Number: APHIS-2007-0044-11328-1)

Response: APHIS acknowledges the comment. The passages cited from appendix S of the DEIS are not recommendations but rather a description of possible responses from organic farmers to GT alfalfa deregulation. Section 4.3 of appendix S of the DEIS notes that "movement of GT alfalfa into non-GT alfalfa fields would be considered an externality in economics: a cost to third parties of producing GT alfalfa that is not being internalized in the cost of production of

GT alfalfa," and explicitly recognizes this cost as a potential distributional and social impact of GT alfalfa deregulation. The possible responses from organic farmers to GT alfalfa deregulation and the related costs are determined by the markets served by those farmers and are unrelated to the determination of whether GT alfalfa is a plant pest risk. In regard to the plant pest risk determination, see response to comment APHIS-2007-0044-9936-38 for issue 11.16. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
3. Domestic Economic Environment at Risk

Discussion of "Domestic Economic Environment at Risk – Organic Alfalfa" [III, Affected Environment, 48] draws a misleading distinction between organic and conventional yields and pricing.

"Prices and quality requirements are significantly different between organic and non-organic alfalfa hay ... The value-added price per ton for certified organic alfalfa hay is, on average, 18 percent greater than conventional hay…"

The EIS also states, [S-25]

"we .. assume there is some demand for GE-free alfalfa. Although we have not found much evidence of this demand in analyzing the domestic market, we expect this will be the case of export markets."

And, in S-32,

"we found no evidence of a domestic GE sensitive market for conventional alfalfa…"

It is not adequate for the EIS to claim there's little or no evidence of a well-known fact in the U.S. food industry. That is, increasing U.S. manufacturer sensitivity to GE ingredients based on consumer sensitivity. An increasing number of non-organic products bear labels that say "Non-GMO soy," "Non-GMO canola," "Non-GMO cornstarch," etc. A few years ago, such labels did not exist.

Such non-organic Non-GE declarations are numerous and growing in number, especially with The Non-GMO Project gaining traction. It has published the first national standard for 1) Non-GMO tolerance levels, 2) "Best Practices" for food producers to screen out sources of GMO contamination, and 3) testing of ingredients throughout the supply chain of enrolled products. The Project is based on growing consumer demand for non-GMO foods.

Partners in The Non-GMO Project include United Natural Foods, Inc, the nation's primary "natural" (and organic) food wholesaler/distributor with sales of $3.3 Billion in 2008; the Independent Natural Foods Retail Association, with more than 70 member grocery retailers; the National Cooperative Grocers Association, with more than 140 retail grocery members in 32

states with sales totaling over $1 billion; Whole Foods, the dominant natural and organic food retail chain with sales of $8 Billion in 2008; and a growing list of non-organic (and organic) food manufacturers.

Many products involved in the Project, and many food manufacturers considering enrollment in the Project rely on conventional, non-GE crops and livestock feed, such as alfalfa. They earn value-added pricing at the retail level.

The EIS fails to acknowledge and calculate the economic value of "Identify Preserved" non-GE corn and soy ingredients. Their price premiums are well established. Price premiums apply to every crop where GE varieties are commercialized.

Given higher prices commanded by non-GE crops in the food supply chain, the EIS erroneously assumes that GT-alfalfa is "higher quality." The EIS considers only the amount of non-alfalfa material in the hay in determining "quality" but that is just one measure and one not considered significant by the consumer market.

The EIS equates GT-alfalfa as "conventional" and that also is a flawed assumption. PCC Natural Markets currently is in discussions with the Country Natural Beef (CNB) ranching cooperative about securing non-GE feed for the beef "finishing" process. The finishing rations would include non-GE alfalfa and non-GE corn. CNB represents more than 100 ranching families across the U.S. West and Hawaii, with sales of more than $38 million in 2007.

We also are in discussions with Pure Country Farms in Ephrata, Wash. to promote its current non-GE feed status to shoppers. We are confident that when shoppers know the hogs are raised on non-GE fee, sales of these pork products will increase.

If GT alfalfa (or any other GE crop) truly was "higher quality" as the EIS argument assumes, then GE crops would command price premiums. That is a judgment not based in market realities as we experience it.

The market does not perceive any GE crop — not one — as "higher quality" earning a premium.

The EIS fails to assess the impact on "quality" adequately. (Comment Number: APHIS-2007-0044-11328-1)

Response: Regarding demand for alfalfa with no presence of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding the treatment of alfalfa quality as related to weed content, this is a standard market practice as described in appendix S of the DEIS and is independent of the existence or not of niche markets for GMO free crops.

Comment Excerpt Text:
4. Economic impact

The EIS acknowledges that deregulation of GT-alfalfa will hurt conventional and organic alfalfa farmers. This means we, as a retailer, also could and likely would be hurt by deregulation.

Commercialization of GT alfalfa in the U.S. and the contamination of non-GT alfalfa would undermine the integrity of our supply chain and damage trust in our business model as a purveyor of "natural" food. It would hurt the 1,000 employee families who depend on the viability of our business.

We have built our business with dairy and meat products raised on both conventional and organic hay as feedstock. Our customer is the natural foods customer and they are very sensitive to GE issues in both conventional and organic foods. They call and e-mail, asking for clarification on whether specific foods were raised on GE crops. For example:

" … Does the (Draper Valley/conventional) chicken feed contain pesticides and GE crops? If so, will PCC consider taking a stand against selling food which supports these industries?…I have sadly realized how food/health concerns are now beyond antibiotics, hormones and pesticides … GE corn and soy compound the food choices I make…"

" … GE contamination is a huge reason I buy organic despite its price, to show with my dollars that I don't like GE food or pesticides." – J. Lehto

PCC Natural Markets also sells four (4) dietary alfalfa supplements, often used as a natural diuretic and detoxifying agent. Customers demand supplements labeled non-GE, and prefer to purchase U.S. products over foreign imports.

Given concerns about the trial plantings of GT alfalfa, we purchase some alfalfa products from New Zealand, where GT alfalfa is prohibited. This means a loss of income for U. S. farmers, and also the products cost more for consumers.

Agriculture and the food industry are the largest employer and the greatest source of revenue in Washington state – more than Microsoft and Boeing combined.
Loss of the alfalfa export market would impact our state treasury, already crippled by a $3 billion budgetary shortfall this year. The value of our hay crop per ton is high, compared to the national average.

The EIS rightly acknowledges that GT alfalfa seed and hay is likely to be rejected — or will be rejected — by export markets, including Japan, Korea and Taiwan. Washington state's alfalfa exports to these countries that are GE-sensitive would be jeopardized if GT alfalfa were to be deregulated. The act of deregulation alone would cast sufficient doubt on the purity of all U.S. alfalfa, costing all farmers and others in the value chain.

According to Shewmaker et al (2006) [III "Affected Environment" a. Alfalfa Seed and Forage Farming, 4. "Social Environment at Risk"],
"The export market helps support and stabilize domestic forage prices in the Pacific Northwest…" and, according to a National Alfalfa and Forage Alliance document addressing coexistence in the alfalfa export markets (2007), the export hay market is of key importance to

certain producers in Washington…"and coexistence strategies for minimizing comingling between GT and non-GT alfalfa may be effective." (Comment Number: APHIS-2007-0044-11328-1)

Response: Regarding demand for alfalfa with no presence of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding the impact on organic an conventional markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding impact on U.S. trade, see the response to comment APHIS-2007-0044-3404-1 for issue 5.4.

Comment Excerpt Text:
5. Consumer sensitivity to GE content in food

In III, Affected Environment, (2) Consumer sensitivity to GE content in food, APHIS's assessment is completely inadequate. It also apparently is cherry-picking data.

The EIS, for instance, cites on page 58 a 2004 study [(Noussair et al, 2004]:

> "There seems to be no estimate available of consumer demand for GE-free food products."

But it fails to cite one of the USDA's own reports, "The First Decade of Genetically Engineered Crops in the United States /EIB-11, Economic Research Service, 2006:

> "In the United States … the data show that manufacturers have been active in creating a market for GE free foods. From 2000 to 2004, manufacturers introduced over 3,500 products that had explicit non-GE labeling …This is in addition to organic foods." (Dimitri and Greene, 2002).

The EIS, in mentioning the Hallman et al (2003) study [PUBLIC PERCEPTIONS OF GENETICALLY MODIFIED FOODS: A National Study of American Knowledge and Opinion] also asserts on page 60:

> "one half of U.S. residents surveyed approved of plant-based genetic engineering …"

But in fact, the Hallman-Aquino study cited by the EIS found that support for GE foods had slipped between 2001 and 2003. In 2001, 59% of Americans said they thought GE foods would make their lives better. In 2003, only 39% had a similar response. A full third (35%) in 2003 felt it would make their quality of life worse.

The EIS also fails to acknowledge that:

> "Less than half (45%) believe it is safe to consume GM foods (another 18% say they don't know), and in a separate question, only 44% disagreed that eating GM foods would be harmful to their health.

However, they also seem concerned about other potential unintended consequences related to the technology. Almost two-thirds (62%) feel "serious accidents involving GM foods are bound to happen" and 54% feel "GM food threatens the natural order of things."

The EIS fails to acknowledge that more than two-thirds (65%) agreed with the statement, "I would be unhappy if I were served genetically modified food in a restaurant without knowing it."

When Hallman and Aquino asked respondents directly whether or not they would like to see GM foods labeled, 94% said they did favor such labels, an increase from 2001.

Hallman and Aquino say,

> "This apparent overwhelming support for additional information on food labels suggests that Americans wish to retain "consumer sovereignty;" the right to make food choices based on their own values (Thompson, 1997). When asked how a GM food label would affect their purchasing decisions, more than half (52%) said it would make them less willing to purchase the product … only 4% said they would be more willing to buy a product labeled as genetically modified."

It is unacceptable that APHIS chooses to present excerpts of studies, such as Hallman and Aquino, that, by omission, are incomplete and suggest favorable consumer support for GE foods when, in fact, the Hallman/Aquino findings demonstrate the opposite.

The EIS cites Lusk and Rozan (2005) and as finding "U.S. consumers more receptive to GE foods than their European counterparts, although a preference for non-GE foods remains…"

However, the EIS fails to acknowledge that Lusk and Rozan found,

> "… consumers wish to avoid GMO foods, not only for health reasons, but also for environmental and/or religious reasons, ethical or other non-safety issues…"

APHIS also failed even to mention, for instance, a more recent 2007 study published in AgBioForum, the Journal of Agrobiotechnology and Management and Technology [Esposito and Kolodinsky, University of Vermont]. It found:

> "58.8% of Vermonters are, to some degree, opposed to the use of GMOs in commercially available food products. Females tend to be more wary of GMO use in food products, with 65% of the females (compared to 51.2% of the males) expressed some opposition to GMOs in food products…."

And, "respondents were in most agreement that the company selling GM seeds should be held liable for spreading GM pollen to organic non–GM crops (72.4%), as well as farmers using GM seeds (64.5%). There was also a strong consensus that organic farmers should not bear liability for GM seed spread (81%). Respondents

> viewed government as a culpable party, with type of government mattering: more than half the respondents (54.4%) agreed that the U.S. government (specifically the Department of Agriculture) should bear legal liability for the spreading of GM pollen to organic, non-GM crops."

In another example, the EIS cites Fernandez-Cornejo and Caswell, 2006:

> "Several studies have argued that even with the negative opinions Americans express about biotechnology in surveys, there has been little apparent effect on sales of food items that contain or are raised on GE ingredients or feeds."

However, the same Fernandez-Cornejo and Caswell study also says,

> "In most of these studies (table 5), consumers indicated that they were willing to pay more on average for GE-free foods or to avoid foods containing GE ingredients. However, in many of the studies, at least some consumers did not require a discount to buy foods containing GE ingredients, while some expressed that they would not be willing to buy foods containing GE ingredients at all."

Indeed, APHIS' citations on consumer sensitivity appear not to represent fully or accurately the studies' findings.

Furthermore, the studies themselves do not read like independent studies. Some of the ones cited seem to have been designed to assess strategies to encourage greater consumer receptivity.

These are serious flaws in the EIS assessment of consumer sentiments. They raise questions about the accuracy of the way other studies are interpreted and represented in this EIS. (Comment Number: APHIS-2007-0044-11328-1)

Response: APHIS analyzed the sources cited and revised the FEIS to incorporate the evidence on a growing demand for products free of genetically engineered content. The impact of deregulation of GT alfalfa on organic and conventional markets under the scenario of a decreased demand with GT alfalfa deregulation was presented in appendix S of the DEIS.

Comment Excerpt Text:
Please read on to see DAMAGES of $1650 per animal to me. I want to express my OPPOSITION to allowing Glyphosat-Tolerant Alfalfa to be unlieashed on America. To say that it's release would "not damage" anything, or that it doesn't threaten such damage is incorrect. In fact, under the National Organic Policy, use of genetically modified products/hay is strictly forbidden for organic producers. Therefore, even an accidental contamination (from pollen drift or any other cause) would DAMAGE ME. The damage would occur when my cattle eat even one bite of a load of contaminated (by pollen drift or any other reason) alfalfa hay that tests positive for genetic modification. And I do buy alfalfa hay. This would mean that ALL my organic cattle and calves would be disqualified from organic status. For finished, ready-to-slaughter animals, this would mean a reduction in value of the animals from $2500 to around

$850 each. THAT IS $1650 of DAMAGE PER ANIMAL for me at current prices! I'll be happy to prove it to you upon request. Moreover, it would force me to liquidate my whole herd, at commodity prices, and force me start all over again. (Comment Number: APHIS-2007-0044-1522-1)

Response: Regarding the impact of unintended presence of genetically modified material in organic products under the National Organic Policy, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
RRA WOULD BE A GOOD PRODUCT TO HAVE ON THE MARKET BOTH ECONOMICALLY AND MARKET WISE.I WOULD USE IT TO BENEFIT MY PRODUCT. WEED CONTROL WOULD BENEFIT BY ADDING MORE TONS TO EACH CUTTING. (Comment Number: APHIS-2007-0044-2203-1)

Response: APHIS acknowledges the comment. The DEIS supports your comments regarding the economic benefits for of GT alfalfa, as discussed in chapter IV and appendix K of the DEIS. In regard to the effect of weed control, see the response to comment APHIS-2007-0044-11037-10 for issue 7.2.

Comment Excerpt Text:
Oppose approval of genetically engineered alfalfa.
Organic consumers strongly care about genetically engineered alfalfa (and soybeans, corn, etc):
- Contaminating natural crops, and entering into the human food chain,
- Devaluing or destroying the marketability of food crops,
- Adding increased glyphosate pesticide toxicity to the environment and food chain,
- Causing serious disease to humans (link between glyphosate and non-Hodgkins lymphoma: Journal of the American Cancer Society).

Only Monsanto profits from genetically altered seeds/plants; we the people suffer the consequences. (Comment Number: APHIS-2007-0044-2207-1)

Response: Regarding the preference of organic producers and consumers for products free of genetically modified material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding the impact on downstream food crops (dairy, meat), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding impacts on human food and human health, see the response to comment APHIS-2007-0044-2207-1 for 6.1, and 6.3. In regard to impacts on the environment, see the response to comment APHIS-2007-0044-0402-1 for issue 6.3. In regard to genetically engineered content in the food chain, see the second paragraph of the response to comment APHIS-2007-0044-5219-1 for issue 4.0.

Comment Excerpt Text:
I am concerned about allowing GE alfalfa into production. Genetic drift poses substantial risk to any Organic or Non GE producer's ability to remain indenpedant from this technology. Please

consider the economic impacts on small producers. (Comment Number: APHIS-2007-0044-2214-1)

Response: Regarding the impact on small producers, see the response to comment APHIS-2007-0044-4913-7 for issue 5.1. Regarding gene flow, see the response to comment APHIS-2007-0044-2214-1 for issue 3.4.

Comment Excerpt Text:
This new patent does nothing that to give free hand to a company to achieve monopoly to cultivation of this plant and to bully farmers that would consider otherwise. We are too far here to speak of pesticide free cultivation of this plant which in any underdevelopped country is one of the species that does not need even once manual or chemical measures to contain weeds. (Comment Number: APHIS-2007-0044-2225-3)

Response: APHIS acknowledges the comment. Although APHIS recognizes that new technologies developed and owned by a private firm have the potential to lead to increased market concentration when introduced in the market, introduction of new technologies or increased market concentration do not in themselves lead to unfair competition. Fair competition and business practices are enforced through United States anti-trust laws and institutions and are beyond the scope of this EIS.

In regard to the geographic variability of weed control, see the response to comment APHIS-2007-0044-11037-10 for issue 7.2.

Comment Excerpt Text:
It is of critical importance to me that genetically engineered alfalfa stay out of my food chain. I am an organic food buyer and consumer and will refuse to buy any products that have been exposed to glyphostate no matter at what point in their production. Ranchers who raise Organic meat will have a difficult time purchasing alfalfa for their herds if "roundup ready" alfalfa pervades the market. Please do not go forward with this plan. Francie Greth Peto (Comment Number: APHIS-2007-0044-2228-1)

Response: Regarding the preference of organic producers and consumers for products free of genetically modified material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding the impact on downstream food crops (dairy, meat), see the response to comment APHIS-2007-0044-9882-1for issue 5.0.

Comment Excerpt Text:
The use of genetically modified alfalfa will facilitate future improvements in the feeding and pest management characteristics of alfafla - to the benefit of our livestock producers. (Comment Number: APHIS-2007-0044-2240-3)

Response: Regarding the impact on downstream markets (dairy, meat), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the evolution of glyphosate-resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for issue 3.6.

Comment Excerpt Text:
I am very concerned about the approval of another GE crop in our country. Research has shown that GE crops cross polinate with standard varities and have even contaminated Mexican Land Race crops which are vital to the world food supply security. GE cross polination also allows Monsanto to allege patent infringement on farmers whose standard crops become contaminated unintentionally. In many past cases regarding GE corn, these lawsuits have led to the farmer going out of business in order to settle or pay legal fees. GE crops are also an untested biological phenomenon. Rising numbers of people experience food allergies and sensitivities, and GE crops may be partially to blame.
Finally, GE crops are unnecessary. The number of organic farms is growing nation wide. The world wide demand for organic, non GE crops is huge. Other countries are not interested in importing GE crops and Americans are demanding more and more organic foods. Now is the time to stand with the people and say no to GE alfalfa. Don't let Monsanto further contaminate our earth's food supply. (Comment Number: APHIS-2007-0044-2251-1)

Response: Regarding gene flow due to pollen transfer and seed purity, see the response to comment APHIS-2007-0044-2251-1 for issues 3.1 and 3.3.Regarding the legal liability for unintentional presence of GE content in non-GE crops, see the response to comment APHIS-2007-0044-6376-1 for issue 5.1.
Regarding human food and human health, see the response to comment APHIS-2007-0044-2251-1 for issue 6.0. Regarding the preference of organic producers and consumers for products free of genetically modified material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on international trade, see the response to comment APHIS-2007-0044-3404-1 for issue 5.4.

Comment Excerpt Text:
Don't deregulate GM alfalfa. I don't want it. At the very least, protect all farmers who wish to grow non-GM crops. Your job is to protect farmers, not Monsanto. (Comment Number: APHIS-2007-0044-2264-1)

Response: APHIS acknowledges the comment. Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
the fact that we should de-regulate alfalfa - it should be ILLEGAL -
Alfalfa is the fourth largest crop in the country, and a major part of beef and dairy cow feed. Even though over 80% of alfalfa grown doesnt even need herbicides, Monsanto introduced its genetically engineered (GE) Roundup Ready version and it was approved for commercial use by

the USDA in 2005. Just one problem the USDA didnt bother to conduct an environmental assessment before deregulating Monsantos RR alfalfa like they were supposed to.
In 2006 the Center for Food Safety sued the USDA and won in federal court RR alfalfa was banned until the USDA did an environmental impact statement (EIS).
"Now the USDA has drafted its EIS, and it basically says that Monsantos seed contracts are sufficient to prevent GE contamination (unfortunately, the bees that carry alfalfa pollen for miles havent signed Monsantos contracts) and that consumers dont care about the contamination of organic and conventional non-GE alfalfa anyway. (Trust me, we consumers care - the fact is, ppl in this country don't all know about GM foods - bc it seems to be some dirty secret.)
"And dont worry about the farmers, especially in Washington state, who export to foreign countries who want nothing to do with GE crops. Theyll get by, somehow. Oh, and dont worry about the increasing resistance of "super-weeds to Roundup, owing to its overuse..."
when are we going to put a stop to this craziness and let our food be pure and unadulterated, bc the likes of future illness will depend on whether we continue to allow this crappy feed and food. (Comment Number: APHIS-2007-0044-5224-1)

Response: Herbicide use in conventional alfalfa is greater for seed fields than for hay fields and varies with region, weed spectrum and farmer preferences as described in appendix J of the DEIS. In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for issue 3.1. Regarding the preference of organic producers and consumers for products free of genetically modified material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on international trade, see the response to comment APHIS-2007-0044-3404-1 for issue 5.4. In regard to the evolution of glyphosate-resistant weeds due to more glyphosate use, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6.

Comment Excerpt Text:
Please regulate the genetic modification of alfalfa to ensure that the organic alfalfa and related industries are not affected in any way. As a small, organic farmer, I have invested a lot of resources in the transition from conventional to organic farming. For these efforts to be adversely affected in any way by the practices of surrounding farmers is not only undesirable but fundamentally unfair. The threats posed by genetically engineered alfalfa are different from the usual threats posed by the conventional farming practices of our neighbors. It is not reasonable or practical to contend that I, the organic producer, will be able to take practicable steps to protect my crop from the contamination threat of nearby genetically modified alfalfa. (Comment Number: APHIS-2007-0044-5234-1)

Response: Regarding the economic impacts on non-GT and organic alfalfa producers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the impact on small producers, see the response to comment APHIS-2007-0044-4913-7 for issue 5.1.

Comment Excerpt Text:
Tell USDA You Will Reject GM Contaminated Alfalfa and Alfalfa-Derived Foods
o USDA claims that consumers will not reject GM contamination of organic alfalfa if the

contamination is unintentional or if the GM material is not transmitted to the end milk or meat product. Tell USDA that when you buy organic milk, you want to know it comes from cows that did not eat any GM alfalfa, does not contain any BGH, and was not exposed to any other genetically modified organism.
? Tell USDA to Protect All Farmers Who Wish to Choose to Grow Non-GM Crops
o Although USDA says it supports of all types of agriculture, the agency refuses to consider any future for alfalfa that would include protections from contamination for organic and conventional farmers and exporters.
? Tell USDA That Protecting Farmers is Its Job and that Relying Solely on Monsantos Business as Usual Best Practices Ensures Widespread GM Contamination
o USDA claims that Monsantos seed contracts require measures sufficient to prevent contamination, and that there is no evidence to the contrary. In the lawsuit requiring the EIS, the Court found that GM contamination had already occurred in the fields of several Western states with these same business-as-usual practices in place! The EIS itself acknowledges that GM contamination may happen. In general, where other GM crops were approved without restriction, contamination of organic and conventional seeds and crops is widespread and has been documented around the world.
That GM Alfalfa Would Significantly Increase Pesticide Use and Thereby Harm Human Health and the Environment
o USDA admits, correctly, that introduction of Roundup Ready alfalfa will increase Roundup use. However, USDAs claims that the increase is not significant and that Roundup will replace other, more toxic herbicides are flat-out wrong. The agencys own studies acknowledge the great majority of alfalfa is currently grown without the use of any herbicides at (Comment Number: APHIS-2007-0044-5235-1)

Response: Regarding gene flow and seed purity, see the response to comment APHIS-2007-0044-5235-1 for issue 3.0. Regarding weed control and the use of Roundup, see the response to comment APHIS-2007-0044-5235-1 for issue 7.2. Regarding consumer preferences and impact of unintentional adventitious presence on organic certification, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Not enough research has been done on genetically engineered alfalfa to deregulate it. There is no reason to think that these modifications would not spread to surrounding fields. The US needs to stop trying to answer every problem with a new technological fix. Genetic engineering is not a long-term solution to our problems.
I will do everything I can, as a consumer, to avoid GMOs and to provide my family with food that is natural (Comment Number: APHIS-2007-0044-5239-1)

Response: In regard to adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). Regarding the comment on research, see the response to comment APHIS-2007-0044-5239-1 for issue 6.0. Regarding the preference of organic producers and consumers for products free of genetically modified material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Please do not approve a nonregulated status for genetically engineered alfalfa. It will contaminate organic and other seed stock. We do care about the source of our food and knowing that it is organic or other. This will make your job more difficult in the future, because popular culture is moving toward more "natural" and "organic" food. If this is allowed to go unregulated and contaminate other crops (and thus livestock that feed on it), you will not be able to control the labeling and categorization of the food. The USDA will be held responsible for that task. Thank you for your consideration (Comment Number: APHIS-2007-0044-5247-1)

Response: Regarding seed purity and gene flow, see the response to comment APHIS-2007-0044-5247-1 for issue 3.0. Regarding the preference of organic producers and consumers for products free of genetically modified material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
I am a consumer of organic products and you bet I am against GE alfalfa and the use of Glyphosate. In fact I'm against GE alfalfa, GE corn and GE soybeans and all the herbicides and pesticides that are used with them. These genetically engineered "plants" of questionable nutritive value should be treated as invasive pollutants and be eliminated. They may be serving to make profits and market dominance for their creators but they are contaminating natural, organic food supplies for the rest of us. The use of herbicides and pesticides (1) are increasing with GE plantings, and, (2) have known serious health consequences. Put the health and food safety of people over the profits of corporations. Do not approve GE alfalfa. And then ban GE corn, GE soy, GE sugar beets and the use of Roundup (glyphosate). (Comment Number: APHIS-2007-0044-5260-1)

Response: Regarding the preference of organic producers and consumers for products free of genetically modified material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to nutritive value of GT alfalfa, see the response to comment APHIS-2007-0044-11037-18 for issue 6.3. In regard to increased use of pesticides, see the response to comment APHIS-2007-0044-0402-1 for issue 6.3. Regarding human food and health effects, see the response to comment APHIS-2007-0044-5260-1 for issue 6.0.

Comment Excerpt Text:
With all that we know about the potential health and horticultural effects of pesticide use, it's unnecessary to be genetically re-designing crops in order to allow an herbicide manufacturer to increase usage of their own product. Glyphosate is not as non-toxic and degradable as is promoted by its manufacturers many studies have found this. With the awareness of the benefits to the environment and health of both humans and animals of organic and more sustainable agricultural methods, let's go forward, not backward. If we're going to pad someone's pockets, lets help an industry headed in a healthier direction, and not threaten their livelihood (crop interbreeding/unfair competition). I'm a concerned consumer and an organic gardener. It's

possible to exist and grow without glyphosate. Invest in the promotion of knowledge, not already wealthy corporations (Comment Number: APHIS-2007-0044-5261-1)

Response: Regarding human food and health effects, see the response to comment APHIS-2007-0044-5261-1 for issue 6. In regard to impacts on human health and animals, see the response to comment APHIS-2007-0044-0402-1 for issue 6.3. In regard to impact on seed market concentration and competition, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0.

Comment Excerpt Text:
I'm writing to say that I once purchased meat from large-scale CAFO in my local grocery supermarkets. No longer do I purchase meat from these kinds of places. There are many reasons for this, but the one at hand today is the genetic modification of grains that are fed to animals.
-GMO fed animals produce potential unforeseen problems for generations of animals and humans that eat these animals.
-GMO feed limits the ability of small and large farms to compete unless they too use GMO feed for their livestock. In essence, forcing them to change their unique operation to one just like every other.
-This leads to Monsanto having control over the entire seed distribution business. Doesn't sound too competitive to me. It sounds like a monopoly.
-This will also mean the increased use of toxic pesticides, which is already a problem. See the Gulf of Mexico dead zone for details.
Please reconsider this EIS (Comment Number: APHIS-2007-0044-5264-1)

Response: Regarding biological impacts, see the response to comment APHIS-2007-0044-5264-1 for issue 4.0.
In regard to impacts on human health and animals, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3. Regarding the economic impacts on non-GT and organic downstream markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding impacts on market seed concentration and competition, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0. Regarding increased use of pesticides, see the response to comment APHIS-2007-0044-0402-1 for issue 6.3.

Comment Excerpt Text:
As a consumer and a friend of small farmers, healthy food, sustainability and economic opportunities for small farmers are my concerns. Your agency needs to be protecting small farmers and the health of our environment and thus all of us. Do not approve roundup Ready alfalfa (Comment Number: APHIS-2007-0044-5268-1)

Response: See the response to APHIS-2007-0044-4913-7 for issue 5.1.

Comment Excerpt Text:
Dear USDA,

We are opposed to glyphosate-tolerant alfalfa. Our first concern is the negative impact this GMO-alfalfa will have on organic milk production. It will curtail effective organic production as the 10's of millions of organic consumers define it and expect it. This leads into our second concern, which is genetic purity and ownership. Pollen drift will be a huge issue. Bees pollinate alfalfa -- and they will not stay within one field. As a result, modified alfalfa pollen will mix with original public-domain strains. Given alfalfa is a perennial crop and a stand has variable aged plants, who owns the mixture of plants? The owner of the trait or the farmer who was the unintended recipient of the unwanted pollen on his/her volunteer plants? The legal record for such issues suggests traditional - and especially organic - farmers will be penalized to the point of being forced out of business. This is entirely inconsistent with USDA's 160 year-old national mandate.

Our final point is there are agronomic reasons to NOT release a GMO-version of this plant. Traditional alfalfa breeding as funded by USDA continues to result in significant increases in yield. The payoff is far more than in corn, say. Many farmers are not currently adequately fertilizing alfalfa for phosphorus, potassium and micronutrients. Those nutrients limit its yield -- not weeds. So, why modify it for a specific herbicide? Especially why modify it to handle a herbicide given alfalfa requires bees to pollinate it and increased reliance on a herbicide will result in an unintended reduction in bee viability. We realize in theory a herbicide has no impact on an insect. But the peer-reviewed literature shows herbicides consistently impact animals and the ecosystem. Isn't that why EPA regulates them? Finally, how will the subsequent crops be established? I guess deep fall plowing to eliminate volunteer alfalfa? Erosion will skyrocket!
Sincerely,
Lee Lori Burras
(Comment Number: APHIS-2007-0044-5274-1)

Response: Regarding the impact on downstream markets (dairy, meat), see the response to comment APHIS-2007-0044-9882-1for issue 5.0. Regarding gene flow and seed purity, see the response to comment APHIS-2007-0044-5274-1 for issue 3.0. Regarding the legal liability for unintentional presence of GE content in non-GE crops, see the response to comment APHIS-2007-0044-6376-1 for issue 5.1 .Regarding the economic impacts on non-GT and organic alfalfa producers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding biological impacts, see the response to comment APHIS-2007-0044-5274-1 for issue 4.0. Regarding land use and production practices, see the response to comment APHIS-2007-0044-5274-1 for issue 7.0.

Comment Excerpt Text:
As a horse owner that deals with cancer issues I am very concerned about the potential of GE alfalfa. I personally feed my horses and myself organic products, so would be highly upset if this becomes the standard. Please consider this opinion (Comment Number: APHIS-2007-0044-5285-1)

Response: Regarding the impact on organic markets, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding the impact on human health and animals, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3.

Comment Excerpt Text:
Unless there's a Federal law to protect the growers of non-GM produce from being sued for "patent violations" when Monsanto's GM pollen contaminates their non-GM fields AND unless that same federal law allows the owners of non-GM fields to turn around and sue Monstanto and the growers growing GM foods for contaminating their fields with their toxic GM pollen.
As long as there is a risk of cross contamination between Monsanto's (or any other big agrabusiness) GM alfalfa and the non-GMO alfalfa grown in the same area, the GM alfalfa should not be allowed to be planted. It is the government's job to protect the small farmers from food contamination, not the large agri-businesses "patent violations". (Comment Number: APHIS-2007-0044-5293-1)

Response: APHIS acknowledges the comment. Regarding the legal liability for unintentional presence of GE content in non-GE crops, see the response to comment APHIS-2007-0044-6376-1 for issue 5.1.

Comment Excerpt Text:
To whom it may concern:
Please do NOT approve roundup ready alfalfa, as this would severely affect the integrity of organic alfalfa and the organic industry as a whole. Another industry affected will the the export hay market, as most importing countries will not accept gm crops.
Please consider dropping this very bad idea of approving gm alfalfa.
Thank you very much,
Joe Klein
MOSA Organic Inspector and consumer (Comment Number: APHIS-2007-0044-5304-1)

Response: Regarding the preference of organic producers and consumers for products free of genetically modified material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on international trade, see the response to comment APHIS-2007-0044-3404-1 in issue 5.4.

Comment Excerpt Text:
The deregulation of genetically-engineered alfalfa poses a great risk to consumer freedom, the environment, sustainable farming and the growing market for clean and wholesome meat and milk products. Please protect our health and put it first, not big business farming (Comment Number: APHIS-2007-0044-5307-1)

Response: The environmental consequences of GT alfalfa deregulation are analyzed in section IV of the DEIS. Section IV D of the DEIS addressed consumer preferences and impacts on markets and has been expanded in the FEIS to address comments received. Regarding presence of genetically engineered content in the food chain, see the second paragraph of the response to comment APHIS-2007-0044-5219-1 for issue 4.0. Regarding the impact on downstream markets (dairy, meat), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
I would like to voice my opinion that I strongly oppose the USDA approving Montsano's genetically engineered "Round-up Ready" Alfalfa. I believe genetically modified food is wrong and that corporate mega-monsters like Montsano are corrupting our food supply. Before we know it, the only Alfalfa that you will see is the GE sort. I don't want to drink milk of cows that ate this, as I'm sure you won't be able to link my cancer to it later on. They must be stopped!!! Our health and the planet's health should be more important then their company's profits (Comment Number: APHIS-2007-0044-5308-1)

Response: Regarding the impact on downstream markets (dairy, meat), see the response to comment APHIS-2007-0044-9882-1for issue 5.0. Regarding the impact on human health, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
I never eat genetically modified food if I can help it, and I am not alone.
I'm writing to strongly urge the USDA against the request for nonregulated status of genetically engineered alfalfa. Multiple studies have shown that GE crops predictably and aggressively cross-contaminate non-GE crops, such as organic crops. APHIS recognizes this fact (as evidenced by comments under Socioeconomic Impacts, page xvi of the Executive Summary), yet fails to place value on the desire of organic consumers to avoid consumption of GE crops. The argument that consumers appear not to care about consumption of GE foods (page S-15) is both circular and ridiculous when combined with the staunch refusal of the USDA to enforce labeling of GE foods, which would in fact give consumers the information required to demonstrate such a preference. It's like blindfolding a man and then concluding that he doesn't care where he steps. The statement that nonregulation of GE alfalfa will hurt the organic industry and small farmers, coupled with a lack of any proposed remedy, indicates a strong and disturbing anti-organic and anti-small-farming stance by the USDA. The shift from smaller farms to larger farms is in itself damaging to the economy. If you don't believe that, take the recent trouble in the financial sector as a parallel. Larger banks (farms) means a larger impact when one goes out of business, which in the end is bad for consumers and the economy.
The food economy is shifting to local food from small farms. This shift creates food security and economic development. Agribusiness sees the writing on the wall and is willing to do anything to remove the added value from consciously purchased food.
No one I know is willing to eat genetically modified food.
Everyone I know will move their purchasing dollars accordingly to avoid as much GE material as possible (Comment Number: APHIS-2007-0044-5424-1)

Response: In regard to the deregulation of other genetically engineered crops, see the response to comment APHIS-2007-0044-9936-10 for issue 11.1. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). Regarding the preference of organic producers and consumers for products free of genetically modified material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on market seed

concentration and competition, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0.

Comment Excerpt Text:
I am constantly educated to the fact that private, independent business is the backbone of our economy. Given this truth, it would, in my opinion be folly to release Roundup Ready Alfalfa. If Roundup Ready Alfalfa were released, would trying times ensue for independent seed dealers? You can bet they would!
I firmly believe that the future success of our economy lies with the ongoing success of independent business, not with conglomerates such as Monsanto. I say NO to the release of Roundup Ready Alfalfa. (Comment Number: APHIS-2007-0044-7694-1)

Response: See the response to comment APHIS-2007-0044-2225-3 for issue 5.0.

Comment Excerpt Text:
The USDA advertises its basic mission as protecting American agriculture and claims to take into account the interests of all types of agricultural enterprises, including organic, conventional and GM. However, if APHIS deregulates the production of these two GM alfalfa varieties, the likelihood of contamination is a virtual certainty. The opportunity for farmers to produce organic alfalfa, or conventionally-grown alfalfa that is free of glyphosate-tolerant genes, will steadily deteriorate. There are no protections from GM-contamination for farmers and exporters. The potential economic harm that will result from market loss is a serious issue that was not given adequate consideration in the EIS. (Comment Number: APHIS-2007-0044-8978-4)

Response: In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).
Regarding impacts on market seed concentration and competition, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0.

Comment Excerpt Text:
While USDA claims to support the of GM crops with conventional and organic crops, the lack of enforceable protections render the concept of meaningless. USDA does have the authority to impose protective measures that would include restrictions on use, geographic limitations, and planting isolation distances. The all or nothing approach of the USDA left any potential options to protect farmers unanalyzed. It is absolutely critical that the USDA protect all farmers. (Comment Number: APHIS-2007-0044-8978-5)

Response: APHIS is responsible for regulating the introduction of genetically engineered (GE) organisms that are known to, or could, pose a plant pest risk. If APHIS determines that the article is unlikely to pose a plant pest risk, APHIS may approve the petition, the regulated article may be granted deregulated status, and then APHIS is divested of regulatory authority over this GE organism.

An additional alternatives has been added to the FEIS that as not considered in detail in the DEIS. This alternative was added in response to comments on the DEIS. It uses mandatory measures which impose isolation distances and geographic restrictions to address concerns with gene flow and maintaining commercial no detect GE seed supplies. This alternative is intended to more fully examine the potential impacts on non-GE farmers. A full description of this alternative is included in chapter II of the FEIS.

Comment Excerpt Text:
A 2009 study showed that, over the last 13 years, Roundup Ready crops have dramatically increased herbicide use by 383 million pounds! (Comment Number: APHIS-2007-0044-9240-4)

Response: In regard to increased herbicide use, see the response to comment APHIS-2007-0044-0402-1 for issue 6.3.

Comment Excerpt Text:
The draft EIS is defective in analyzing the socioeconomic impacts of GE alfalfa. The effect on combined forage and seed producers, harvesters, honey producers, seed cleaners, seed and equipment dealers, forage and seed domestic industry, organic growers, and more is not analyzed. Myself and others provide forage to critically short regions of the country, quite often. GE alfalfa would have a very negative impact. (Comment Number: APHIS-2007-0044-9391-2)

Response: Regarding the socioeconomic impacts of GE alfalfa, see the response to comment APHIS-2007-0044-9882-1for issue 5.0.

Comment Excerpt Text:
ISSUE SIX Economics of Alfalfa Farming with Deregulation: Appendix K. Changes in the Economics of Alfalfa Farming with Deregulation of Glyphosate-tolerant Alfalfa are presented in appendix K."

Table K-8 "Comparative Variety Trial Yields Results" for RR alfalfa varieties show that six of the seven locations show RR varieties to be lower yielding. The seventh location shows the RR varieties to be considerably above the trial mean. A quick check of the internet source shows that unlike the prior 6, it does not come from the University research site, but rather is from an University extension site that does not compare RR alfalfa varieties with the trial average, but rather a comparison of RR varieties treated with Roundup compared with the same varieties treated with a conventional herbicide. This site also presents data from another location showing smaller differences that the presenter of this data apparently chose to ignore. This is an inadequate and inaccurate analysis.

There are other problems with these data as well. The comparison should have been RR varieties with recent commercial varieties. Alfalfa yield trials always have older check varieties, one of

which is usually Vernal, now 60 years old and almost always at the bottom of the test. Some trials often contain varieties that were not selected for yield, such as pasture types and HQ varieties bred for quality. Lastly, the comparison should not contain the same RR varieties to which the RR varieties are being compared. That is: the lower yielding RR varieties included in the total bring this average down .A proper comparison would increase the difference between RR varieties and non-RR varieties and in 7 of 7 comparisons the RR varieties would be lower yielding. This is pretty good evidence that the RR varieties are lower yielding.

In summary the report states:" As revealed in table K-8 above, variety trial results do not indicate any systematic hay yield advantage or disadvantage for GT alfalfa hay cultivars." This is quoted on page K-13. It is not true; the GT varieties have a yield drag over 2.4 percent and possibly as high as 10 percent. (Comment Number: APHIS-2007-0044-9537-6)

Response: APHIS acknowledges the comment. Table K-8 was revised in the FEIS to provide a more accurate analysis of trial results. The general conclusion remain unchanged, however, and is supported by additional analyses cited in the DEIS (see Putnam (2008) cited on p. 126 of the DEIS).

Comment Excerpt Text:
WORC feels that APHIS and USDA have fallen far short of providing a true picture of economic or environmental impacts of the commercial release of GE Alfalfa. These comments focus on issues of most importance to WORC and its members. These issues should have been thoroughly covered in the draft EIS but were not adequately analyzed, despite the Court's direction.

The central flaw of the draft EIS is its failure to analyze the "real life" impact of the deregulation of genetically modified (GM) alfalfa. It failed to address the contamination of non-GM alfalfa which will inevitably follow unfettered deregulation. It failed to recognize the impact non-GM alfalfa hay and seed growers, organic meat and livestock producers; producers of 'natural' beef, lamb, and other meat and livestock marketed with source-verification claims related to feed; dairy producers; and conventional and organic honey producers.

In the draft EIS, APHIS refused to recognize the potential economic impacts of deregulation on farmers and the impacts to the environment. WORC believes these two issues go hand in hand and one cannot be evaluated without the other. (Comment Number: APHIS-2007-0044-9882-1)

Response: APHIS analyzed the impact of the presence of any unintended genetically engineered material in alfalfa hay and seed fields on non-GT and organic markets in appendix S of the DEIS. The scenarios under which non-GT and organic farmers would be harmed by GT alfalfa deregulation were analyzed and the impacts described. APHIS found no evidence that non-GT and organic markets as a whole would be negatively affected by the unintended presence of genetically engineered material in non-GT and organic alfalfa, although specific GT sensitive segments might be. This analysis has been expanded in the FEIS, with particular attention to non-GT seed growers.

APHIS analyzed the impact of GT alfalfa deregulation on downstream markets, including meat and dairy, in appendix T of the DEIS. The analysis concluded that adoption of GT alfalfa could benefit dairy and meat farmers to the extent that it affected overall prices of high quality alfalfa hay. APHIS found no evidence that organic dairy and meat farmers would be harmed by the unintended presence of genetically engineered material in non-GT and organic feed, although specific GT sensitive segments might be. Section 2.1 of appendix S explains that honey producers are better analyzed as providers of pollination services to the alfalfa seed industry rather than as a downstream market to alfalfa production. Section 3.2.2 of the same appendix S explains that pollination service providers could be affected if increased market concentration in seed technology leads to increased concentration in the production of alfalfa seeds, although it is not clear the extent to which this will occur.

Regarding the failure to analyze the potential "real life" impact of GT deregulation, the analysis in the DEIS incorporated to the extent possible the existing information on current conditions of affected resources. APHIS updated the FEIS based on information provided in comments on the DEIS and based on information provided by Cal West and Dairyland from their own experiences. Cases of deregulation of other genetically engineered crops typically provide little useful information because of the many differences in circumstances with the current potential deregulation of GT alfalfa. On specific cases of deregulation of genetically engineered crops, see response to comment APHIS-2007-0044-9936-10 for issue 11.15.

5.1 Issue 5.1 – Conventional Alfalfa Hay Farming

Comment Excerpt Text:
Roundup Ready Alfalfa is an extremely important tool in hay production that has been a long time in the making. It will have a huge effect on my trade territory in southwest Nebraska, not only environmentally but economically as well. The Alfalfa fields have been a breeding ground for hard to kill weeds that are spreading to other crop land areas and drainage areas. Roundup Ready Alfalfa can make controlling these weeds in hayfields not only possible for the first time ever, but it will make it affordable. Roundup Ready Alfalfa needs to be nonregulated very soon to help offset the economically trying times that are being encountered in the United States today (Comment Number: APHIS-2007-0044-0298-1)

Response: APHIS acknowledges the comment. In regard to control of weeds in GT alfalfa, see the response to comment APHIS-2007-0044-0298-1 for issue 7.2.

Comment Excerpt Text:
I am a small acreage farmer that competes with larger operations in the forage market. I was fortunate to have been able to purchase and plant roundup ready alfalfa during the short duration of when it was available in the marketplace. I have been able to compete because of the high quality of the alfalfa I have produced. Roundup ready alfalfas helped me to establish the reputation I need to be allowed to sell hay in the elite equestrain barns throughout the state. Even with the weed problems associated with surface irrigation from diverted waters through earthen ditches, I have been able to have this alfalfa certied as "weed free" allowing horsemen to take it with them into back country federal lands where certified hay is required. The product is a useful

tool in the quest for sustainable agriculture. While realizing it does not allow farmers a single solution to responsible weed control, it is one more tool for the farmer's toolbox in a quest to produce the highest quality forage possible. And while my neighbors have planted traditional varieties, as equestrians ride the irrigation ditches and view the fields as they travel, they often come to the house to ask if the hay in one of my fields has yet been sold. Last, not a single neighbor has made a negative comment on the product I have planted. In fact, just the opposite. They often admire the product for its higher value (Comment Number: APHIS-2007-0044-0438-1)

Response: APHIS acknowledges the comment. In regard to control of weeds in GT alfalfa, see the response to comment APHIS-2007-0044-0438-1 for issue 7.2.

Comment Excerpt Text:
I am a farmer who has raised alfalfa for forty years. I am not against using chemicals for weed conrol. I am against roundup ready alfalfa. there are numerous chemicals for control now in alfalfa. this would hasten weed resistance. we need a variety of chemicals in use to forestall resistance. With monsanto going after people who were victims of cross pollination they have demonstrated that they are lacking in good business ethics, no small matter in todays world. In my area hay fields are small and in one mile there can be four different land owners with hay. Can you guarentee that my non roundup hay will be unaffected? And if it is, that there will be no repercussions from monsanto? this is a big concern to me and not without merit. A signed legal document from monsanto might be one way to lesson my objections or restitution if cross pollination does occur. After watching how government officials can be influenced daily on cspan your findings are overshadowed by the actions of others. A matter of trust so to speak. thank you for the opportunity to express my opinion. some reassurrance would be helpfull on these concerns (Comment Number: APHIS-2007-0044-0593-1)

Response: APHIS acknowledges the comment. In regard to the evolution of glyphosate-resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for issue 3.6. In regard to gene flow due to pollen, and gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. Regarding the legal liability for unintentional presence of GE content in non-GE crops, see the response to comment APHIS-2007-0044-6376-1 for issue 5.1.

Comment Excerpt Text:
If GM alfalfa is allowed to be grown without any protections, there is no doubt alfalfa will follow the dangerous road that other GM crops have experienced. Commercialization of GM corn, soybeans, canola and other crops has diminished farmers' choices in what seeds they have access to. For those crops GM introduction has resulted in historic increases in seed prices and the loss of independent seed companies. These developments have significant implications for alfalfa and farmers have been forced to utilize seed varieties "stacked" with multiple traits farmers don't even need. Lower cost seed is no longer in the marketplace.
Finally, as a farmer raising alfalfa for hay and feed, I do not want my crop contaminated with GM genes. I want the freedom and ability to purchase the alfalfa seed I want and need for my

operation that is affordable and readily available. USDA has fallen short doing its job to protect all farmers in this country. USDA should redo this EIS an include protections for real life production of alfalfa. (Comment Number: APHIS-2007-0044-1840-4)

Response: In regard to market seed concentration and competition, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0. In regard to gene flow due to pollen, and gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
I feel that RR will be bad for the hay producers, because
I feel that the technology will help the producer to much hay causing over production. which in turn may drive the price down. It will make average producers better producers, which may cause more people to get into the hay market. (Comment Number: APHIS-2007-0044-2208-1)

Response: Although APHIS acknowledges the possibility of a reduction in the price of alfalfa hay of high quality, the actual impact on prices depends on the market segment being analyzed and on the movements of both supply and demand. Chapter IV and appendix S of the Draft EIS provided additional analysis on this subject.

Comment Excerpt Text:
USDA acknowledges in their EIS that GT alfalfa farming practices using RoundUp weed control would shift alfalfa production away from small farms. The plan to deregulate GT alfalfa is in disagreement with existing USDA views expressed in the National Commission on Small Farms, which states that USDA should "emphasize public policies that recognize the value of small farms and actively encourage their growth and continuation" (USDA – A Time to Act, 1998). The primary concern here is that larger farms growing GT alfalfa would employ fewer workers than smaller farms, resulting in job losses in the agricultural sector. (Comment Number: APHIS-2007-0044-3576-5)

Response: See the response to comment APHIS-2007-0044-4913-7 for issue 5.1.

Comment Excerpt Text:
I take issue with some of the statements in this section. I find the statement 'alfalfa production may shift to larger farms' as a result of GT alfalfa to be highly speculative. The opposite is just as likely to be true. It is clear that both larger farms and smaller farms can utilize GT technology, with equal ability. In fact, GT technology might (slightly) favor smaller farms since conventional larger farms have greater access to professional weed control advise, and licensed professionals that can use restricted (more toxic) materials, whereas glyphosate is more broadly available to smaller farmers, and simpler to implement for part-time farmers. There is less need for expertise. The size of alfalfa farming operations is largely dependent upon other factors such as equipment needs, economics, competitive crops, and relation to animal enterprises, and nearly completely independent of weed control method. Very small farmers don't choose to plant much alfalfa if it needs harvesting, since haying equipment is expensive, but of course could graze it. The needs

for isolation distances cited here as causing increased farm size pertain primarily to seed production situations, and not relevant to hay production purposes, which is 99% of the acreage. It doesn't make senses for APHIS to suggest recommend increasing field buffers for GT-sensitive hay growers because from the outset, there is a near zero risk of gene flow into hay fields from neighboring gene sources. (Hay is harvested prior to ripe seed formation AND secondary seeds are unlikely to survive in hay fields; therefore, an increase in isolation (farm size) would be pointless and impractical.) But even in seed, control of isolation distances is important for all seed growers (regardless of size) for seed purity whether they adapt GT alfalfa or not, and isolation distances are determined by certification requirements and company requirements. Gene flow is a problem for all seed producers. There is no evidence I'm aware of that the introduction of this technology will have an impact on farm size. (Comment Number: APHIS-2007-0044-4913-7)

Response: APHIS acknowledges the comment. The analysis contained in section 2.1.2 in appendix K of the DEIS supports the conclusion that some aspects of GT alfalfa can benefit small farms. As noted in section 2.1.2 in appendix K of the DEIS, "alfalfa varieties that allow for less expense in land preparation, may be more accessible to smaller farms than other varieties." Although APHIS' analysis in the DEIS noted that any increase in the cost of land to non-GT alfalfa farmers caused by GT alfalfa deregulation, whether due to increased buffer zones in the production of non-GT alfalfa or due to relocation of non-GT alfalfa farmers to other areas, would have a more severe impact on small farms, APHIS has revised the discussion contained in section 4.3 of appendix S of the FEIS to reflect the extent to which increases in the cost of land to non-GT alfalfa farms would be expected to occur with deregulation and under the isolation/geographic restrictions alternative added in the FEIS.

In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
The only problem I see with any GMO is the simple fact that it is a patented genetic item. Since it is patented, any cross pollinating that occurs over non GMO farmland makes those farmers legally bound to pay the companies that have created said GMO.
One only has to look at Monsanto's control of GMO soybean and how it threatens farmers whose crops were cross pollinated by that product. There are several cases of litigation occurring now by Monsanto to shut down these farms or at the very least the litigation is so expensive that is forces farmers to either to settle or close the farm. Either way, they are denied to justice and their voice. Genetic purity, or rather the ability to prevent cross pollinating is a fallacy. You can't control or stop nature, it does what it does.
It used to be that universities created much of the agricultural research thus making any genetic improvements available to all. In a sense it was open source. Since this is no longer the case, and since the Supreme Court has upheld the idea that plant DNA can be patented, there are very dubious consequences.
It seems to me that until these new GMO products are either banned, or that their patents are fixed and non-renewable, or if a farmers crop is cross pollinated and no longer liable for incidents of nature, do I see away in which non GMO and GMO will be able to coexist.

(Comment Number: APHIS-2007-0044-6376-1)

Response: USDA-APHIS does not have a position on the potential legal liability for the unintentional presence of GE traits in a grower's fields. Liability is determined through fact-specific inquiry, which is often highly difficult to predict in a hypothetical context. The U.S. Patent Act, 35 U.S.C. §§ 1 *et seq.*, grants the United States Patent and Trademark Office regulatory authority to grant patents to inventors. A patent is an exclusive intellectual property right granted to an inventor that forbids others from making, using, offering for sale, or selling the invention for a standard period of time. United States Patent and Trademark Office, available at http://www.uspto.gov/patents/index.jsp (last visited June 22, 2010). Further, an individual could be found liable if they commit or induce an act which "infringes" upon the rights of a patent holder during their exclusivity period.

Patent infringement is proven once a plaintiff is able to demonstrate that: 1) they hold a valid patent for a product or technology; 2) that patented product/ technology has been made, used, or sold by another entity/person; and 3) that person/entity does not have permission or a license to make, use, or sell that patented technology. "Lack of intent" is not a defense to patent infringement. Monsanto v. Roman, 2004 WL 1107671, *9 (N.D. Tex., May 17, 2004). Patent infringement is a strict liability tort, which means it might be committed intentionally or unintentionally. "[M]istaken planting" of patented seeds is not a defense to patent infringement Monsanto v. Dawson, 2000 WL 33953542, *2 (E.D. Mo., Nov. 24, 2000).

Most case law involving crops which contain patented genetic material has been for intentional patent infringement. Particularly, growers illegally obtained patented GE traits through an illegal purchase or illegal planting (e.g., Monsanto v. Bowman, 686 F. Supp. 2d 2009; Monsanto v. David, 516 F. 3d 1009). In these cases Monsanto executed licensure agreements with farmers and seed producers to utilize a patented GE trait for a single year's harvest, with the intent that the license would be renewed for each successive year's harvests. The doctrine of patent exhaustion does not apply to a farmer who has purchased Roundup Ready seed for planting from an authorized distributor and saved seed for successive plantings. Monsanto Co. v. Scruggs, 459 F.3d 1328 (Fed.Cir. 1992).

There is no unrestricted "first sale" where seed is purchased through a license. Further, "the right to save seed of plants registered under the Plant Variety Protection Act does not impart the right to save seed of plants patented under the Patent Act." Monsanto Co. v. McFarling, 302 F.3d 1291 (Fed. Cir. 2002). In David, a farmer entered a license agreement with Monsanto to plant Roundup Ready soybean and saved seed from that first harvest to replant for the next year. In Bowman, a farmer purchased seed, which contained a patented GE trait, from a grain elevator; planted and harvested that seed; and then saved seed from the first harvest to replant without entering a license agreement with Monsanto. 686 F. Supp at 385-387. In both Bowman and

David, the farmers' actions were found to be in violation of Monsanto's exclusivity rights and license terms.

Liability for the unintended adventitious, or "low-level" presence of a patented GE trait is more unclear. Though one can, as a matter of law, be held strictly liable for adventitious presence of patented GE traits in their fields, there is no precedent in the United States. Canadian courts, however, have held that the unintended "presence" of patented GE traits in a farmer's field is a "use" of a patented intention and, thus, is patent infringement. Monsanto Canada Inc. v. Schmeiser 1 S.C.R. 902 (2004). This is no suggestion, however, that that the Schmeiser holding is persuasive in the United States judicial system and is not indicative that United States Courts would rule in the same manner.

U.S. Courts have held companies liable for the unintentional adventitious presence of GE traits in fields. Farmers in In Re Genetically Modified Rice joined to file an action against BayerCropScience LP for trace adventitious presence of U.S. rice by strains of genetically modified rice not approved for human consumption. 666 F. Supp. 2d 1004 (2009). Farmers sought to find Bayer liable under many theories of liability, including negligence and private nuisance, which survived summary judgment and will proceed to trial. The farmers suffered monetary and actual damage to their fields, equipment, and land; therefore, the economic loss doctrine did not apply.

Though APHIS cannot predict what the outcomes will be of pending, or future litigation, case law does provide a basis on which one would be able to guide their actions and raise their awareness as to the potential liabilities regarding biotechnology. This discussion is not wholly comprehensive of the current status of biotechnology case law in the United States, but this response provides a broad overview and attempts to address the concerns raised in comments to the Alfalfa DEIS/FEIS development and finalization process.

In regard to gene flow, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
As a farmer raising alfalfa for hay and feed, I do not want my crop contaminated with GM genes. I want the freedom and ability to purchase the alfalfa seed I want and need for my operation that is affordable and readily available. USDA has fallen short doing its job to protect all farmers in this country. USDA should redo this EIS an include protections for real life production of alfalfa. (Comment Number: APHIS-2007-0044-7122-1)

Response: In regard to impacts on market seed concentration and competition, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0. In regard to gene flow, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
ISSUE EIGHT Expense to Conventional Alfalfa Breeding Programs

The wide spread distribution of the RR alfalfa gene in alfalfa populations will make convention alfalfa breeding much more difficult and expensive. Also it will be more difficult and expensive to produce conventional breeder and foundation alfalfa seed. Is it the intent of the USDA to drive these breeding programs out of the United States to protect their breeding stock from contamination? (Comment Number: APHIS-2007-0044-9537-8)

Response: In regard to the comment on the impact of deregulation on the costs of producing conventional breeder and foundation alfalfa seed, the discussion of impacts on conventional seed markets was expanded in section 3.2.2 of appendix S to consider the potential impact of increased production costs..
In regard to "the wide spread distribution of the RR alfalfa gene in alfalfa populations," see the response to comment APHIS-2007-0044-12026-7 for issue 3.0 discussing gene flow, and the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response) discussing adventitious presence of GT-alfalfa in non-GE or organic alfalfa.

5.2 Issue 5.2 – Impacts on Domestic Organic Alfalfa Markets

Comment Excerpt Text:
When alfalfa "volunteers" in a yard, pasture, or roadside ditch, it's amazing how quickly it spreads, even where it was never planted.
As a feed for organic, forage-only production models where no grain is fed to ruminant livestock in the winter, non-GMO contaminated alfalfa is critically important due to its nutritional profile for meeting protein requirements in the winter. Such sustainable production models (grass when it is available, hay when it is not, and no grain) would be close to impossible without non-GMO alfalfa in many parts of the country. Because of this, not only organic alfalfa producers are threatened by the spread of Roundup Ready alfalfa, but organic livestock producers are in danger as well.
For farmers who look at 'organic' or 'naturally raised' simply as market differentiators, they may say, "So what?" and will not see a problem. But, they should see the active contamination of their neighbors' fields due to their choices as a problem.
Nothing organic farmers do threatens to put conventional farming neighbors out of business. The same cannot be said for the intentional choice to use GMOs like Roundup Ready alfalfa. If the result of those choices reduces the diversity of our farm operations and causes more people to leave farming, who benefits? (Comment Number: APHIS-2007-0044-0369-1)

Response: The impacts of deregulation of GT alfalfa on organic farmers are analyzed in appendix S of the DEIS. Section 4.3 of this appendix notes that "movement of GT alfalfa into non-GT alfalfa fields would be considered an externality in economics: a cost to third parties of

producing GT alfalfa that is not being internalized in the cost of production of GT alfalfa," and explicitly recognizes this cost as a potential distributional and social impact of GT alfalfa deregulation. In regard to alfalfa volunteer weeds, see the response to comment APHIS-2007-0044-10263-8 for issue 3.4. Regarding the impact on downstream food crops (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
RR Alfalfa seed will eventually contaminate conventionally produced alfalfa seed so ALL alfalfa seed sold will contain GMO's.
RR Corn, Soybeans, Canola, Cotton, Rice etc. continue to spread GMO's around the world with unforeseen consequences. These seed technologies appear benign now, but over time can have unintended consequences. I believe RR Alfalfa should not be approved.
I own and operate an 80 year old Regional Farm Seed company in the Midwest. We produce, process, and market GMO Corn and Soybean Seed from Monsanto, Agrisure and Dow. We are ALSO the largest producer of USDA Organic Farm Seed in the United States.
We have watched small sustainable farms disappear for 40 years as government programs and large agri-business took over the land. Monsanto is a large agri-business that now owns 90% of the Seedcorn and Soybean seed business worldwide. I believe RR Alfalfa seed is another area they will eventually control if they are allowed to market RR Alfalfa. RR Alfalfa would be bad for our conventional alfalfa seed business, for conventional alfalfa seed producers and conventional processors because Monsanto will take control of US alfalfa seed production.
RR Alfalfa is not necessary to produce quality forage for livestock.
In the end RR Alfalfa is not sustainable any more than 3000 and 10,000 acre crop production farms are sustainable. RR Alfalfa will not decrease the amount of herbicide or insecticide or pesticide being used. RR Alfalfa will not increase forage yields.
Though Monsanto and large agri-businesses market themselves as "sustainable" and as companies who offer more "choice", in the end they are offering nothing sustainable and with RR Alfalfa ultimately and effectively REDUCING the amount of choice farmers have for seed
(Comment Number: APHIS-2007-0044-0383-1)

Response: In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).
Regarding the comment that Monsanto will take control of alfalfa seed production, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0. Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to increased use of pesticides, see the response to comment APHIS-2007-0044-0402-1 for issue 6.3. In regard to GT alfalfa yield, see the response to comment APHIS-2007-0044-0933-14 for issue 3.7.

Comment Excerpt Text:
I am writing in opposition to the planting of genetically-engineered (GE) Roundup Ready alfalfa, given the increasing evidence that GE alfalfa will threaten the rights of farmers and consumers, as well as damage the environment.

Allowing Roundup Ready alfalfa to be grown without regulation would be the end of farms that choose not to use Monsantos products. Since bees spread pollen over long distances, its inevitable that the GE pollen will invade conventional and organic alfalfa, making it virtually impossible to grow non-GE alfalfa in just a few years.
What's more, GE alfalfa threatens the organic industry, where products must not be polluted by genetic modification. In order for milk and other dairy products to be marketed as organic according to the USDA's own standards, no less! certified organic alfalfa must be used as forage. When contamination of GE alfalfa becomes widespread, organic dairy farmers will no longer be able to give that assurance.
I urge you to support family farms as well as consumers right to know whats in their food by preventing the planting of GE alfalfa.
Sincerely,
Dr. Andrew C. Millard
(Comment Number: APHIS-2007-0044-0476-1)

Response: Regarding impacts on organic farmers and downstream sources (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for issue 3.1.

Comment Excerpt Text:
Re: GE Alfalfa APHIS-2007-0044-0253
I oppose the planting of genetically engineered alfalfa.
I support organic agriculture and am very upset with the wording such as: researchers can not quanify real world preferences as consumers do not accurately discern between GE and non GE products.
And the imposed idea that organic standards are processed-based not product-based.
This is not what the organic community agreed to.
Organic farmers are always being put in the position to keep out GE/gene flow. It should be the other way around.
No significant impact? For organic farmers and consumers it has serious implications. And shows a total lack of concern for our shared genetic heritage.
This is not the change Americans voted for...just more of the same. (Comment Number: APHIS-2007-0044-0517-1)

Response: Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding organic certification, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
I'm writing to protest the move to make genetically modified alfalfa to non regulated status. This move is specifically aimed at benefiting Monsanto. Pollen from genetically engineered crops has been shown to affect other crops farther away. This natural occurrence of wind spread pollen POLLUTES unsuspecting farmers who are then SUED by Monsanto. Organic farmers and

especially livestock and dairy farmers will suffer if GE alfalfa is unregulated and allowed to spread to other alfalfa fields. Genetically engineered crops should be a regulated biohazard as it can spread unchecked and pollute the genetics of other nearby fields.
The entire farming industry suffers from the current business practices in the genetically engineered crop industry.
I want to feed my baby organic dairy and organic foods and meat. Please do not make it more difficult to find these products (Comment Number: APHIS-2007-0044-0595-1)

Response: Regarding impacts on organic farmers and downstream sources (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. Regarding the legal liability for unintentional presence of GE content in non-GE crops, see the response to comment APHIS-2007-0044-6376-1 for issue 5.1.

Comment Excerpt Text:
I live in the San Luis Valley, Colorado where alfalfa is a major agricultural crop. Much of the alfalfa grown here is exported out of the Valley as hay for dairy feed. I am concerned that the introduction of genetically modified (GM) seed would contaminate the crops of those who choose to grow organic alfalfa and could place a burden upon organic growers to test their hay before selling to dairies who produce organic dairy products.
How can growers who choose to grow GM crops ensure they will not adversely impact those who choose not to grow GM crops? I don't think that's possible. Even though many commercial growers harvest before alfalfa goes to seed, some plants always escape cutting.
Additionally, the San Luis Valley has a number of honey producers who depend upon alfalfa. I believe GM alfalfa could also adversely affect this industry.
The San Luis Valley has some of the poorest counties in Colorado. There is a growing trend among growers to switch to organic production methods as a way to create a value-added agricultural industry to help our economy. I believe that GM crops would destroy this option and this indirectly affect larger communities.
I am not convinced that we fully understand the impacts GE alfalfa seed could have upon wild relatives of alfalfa and do not believe it is appropriate to potentially affect the gene pool of these plants.
Finally, I am concerned that the use of GM seed would increase use of pesticides and add to the growing problem of weeds resistant to glyphosate. We have seen similar problems in other areas of the country with other crops. Why would we not expect that to occur with GM alfalfa also? (Comment Number: APHIS-2007-0044-0693-1)

Response: Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding impacts on honey producers, see the response to comment APHIS-2007-0044-5287-1 for issue 5.9. In regard to the adventitious presence of non-GE or organic alfalfa with GT-alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. In regard to increased use of pesticides, see the response to comment APHIS-2007-0044-0402-1 for issue 6.3.

Comment Excerpt Text:
About alfalfa, any intelligent human being knows that it will contaminate the organic alfalfa severely impacting the organic milk industry. As for example a local organic milk farmer told me he can't feed his cows corn because it's contaminated.
I have clients in social services who only drink organic milk. Many of these are military veterans. I have close communication with my Congressman, to whom all US military generals report and especially President Obama and his Attorney General.
So please, think twice about what you are doing . You will be held accountable. (Comment Number: APHIS-2007-0044-0702-3)

Response: Regarding impacts on downstream sources (e.g., dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
As the owner and operator of certified organic farm I am strongly opposed to the introduction of round-up ready alfalfa into the market place. The contamination of the non-ge alfalfa will be the end result, substantially harming my income and that of other organic farmers. Until such time as the National Organic Program accepts genetically engineered seed as allowed in the program, ALL GE seed should be carefully regulated.
Moreover, the introduction of GE alfalfa will result in increased glyphosate use which will inevitably result in more contamination of our soils and waterways. It is well known that in parts of the country, weeds are resistant to glyphosate resulting in major weed infestations that are difficult to control.
USDA needs to immediately release to the public the "Plant Pest Determination" document for GE alfalfa and extend the comment period for at least 30 days beyond the release of the document (Comment Number: APHIS-2007-0044-0779-1)

Response: Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to increased pesticide use, see the response to comment APHIS-2007-0044-0402-1 for issue 6.3. In regard to the impacts of GE crops on the environment, see the response to comment APHIS-2007-0044-5302-1 for issue 4.0. In regard to the evolution of glyphosate-resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for issue 3.6.

Comment Excerpt Text:
For years, I have supported organic farming, recognizing the importance of replenishing the land we use, acknowledging the interconnected nature of the world we're part of, etc. Now that I have children, I avoid non-organic products especially. Ingesting GMO ingredients has been shown for years to cause health problems; why would I consciously put that stuff in my kid's growing

bodies if I want them to thrive? I understand that the USDA's role is to promote and protect American agriculture; but I think the USDA must now make the decision to support and encourage organic agriculture, which benefits the health of the populace, the economy and the world we all live in. Although the status quo agriculture has served us for a while, it's evident that it's no longer viable, and denying that truth is getting us all in trouble!
Please be the responsible organization the citizens of this country need: instead of serving the powerful agricultural and pharmaceutical companies, whose only concern is their profit margin, consider the greater wealth we'll ALL reap when the USDA protects organic and non-GMO crops from the infringement of GMO crops. Make sure that GMO technology goes through rigorous, peer-reviewed, third party scientific analysis (ie: not paid for by the GMO companies!), and that if it is approved, organic crops do not risk contamination.
When I buy organic produce, I need to rest assured that what I'm giving my children will support their health, support healthy farming practices and give the economy a boost that's based in sound business practice AND common sense. Please wake up and smell the alfalfa flowers- but I'd only do that if they're organically grown (Comment Number: APHIS-2007-0044-0798-1)

Response: In regard to the impacts on human health, see the response to comment APHIS-2007-0044-11034-2 for issue 6.1. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
In 1997 the first proposed rule for organic production via the National Organic Program was scrapped under an unprecedented deluge of consumer comments opposing irradiation, sewage sludge application, and most importantly, the use of genetically modified crops. Polls show that more than 75% of consumers believe that they are purchasing products without GE ingredients when they buy organic. Polls also show that 80% of US consumers favor labeling of food containing GM products.
The USDA claims that consumers will not reject GE contamination of organic alfalfa if the contamination is unintentional or if the transgenic material is not transmitted to the end milk or meat product. But on what basis do they make this claim. Ignorance? Inevitability? The federal court ruling that required this EIS stated that to "farmers and consumers organic means not genetically engineered, even if the farmer did not intend for his crop to be so engineered." In a 2002 survey of organic farmers conducted by the Organic Farming Research Foundation, 32% of organic farmers had a GMO test requested or required by either their certifier or buyer. This seems to strongly contradict the claim that consumers dont care about GMO contamination.
USDA also claims that Monsanto's contracts require measures sufficient to prevent GE contamination. But in the lawsuit requiring this document, the Court found that contamination had already occurred in the fields of several Western states. Unintentional GMO contamination is the norm, not an aberration, and can be disastrous for organic farmers. The USDA and APHIS should recognize this, and act accordingly by prohibiting GM alfalfa (Comment Number: APHIS-2007-0044-0857-1)

Response: Regarding the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Regarding impacts on organic farmers and downstream sources (e.g., dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to adventitious presence of GT-alfalfa in non-GE or organic alfalfa,, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to gene flow due to unintentional mixing and distribution of seed, see the response to comment APHIS-2007-0044-10263-5 for issue 3.2.

Comment Excerpt Text:
I buy organic produce, often from small farms. I am very concerned that genes inserted into alfalfa plants will migrate into organic feedstocks and produce. I want the freedom and information to chose non-genetically modified produce, and meats and dairy produced without genetically modified feed.
I do not believe the current study adequately protects organic farmers from the loss of market value should their crops become contaminated and no longer organic. The "USDA Organic" label should mean no genetic modification anywhere in the production cycle, not even from accidental contamination.
Furthermore, I am very concerned that migration of genes from alfalfa to other plants, bacteria, animals, and fungi may occur, and the manufacturer will be utterly incapable of removing these genes from circulation should a future problem arise (Comment Number: APHIS-2007-0044-0863-1)

Response: Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response
In regard to hortizontial gene transfer see response to comment number APHIS-2007-0044-11018-2 for issue 11.16.

Comment Excerpt Text:
U.S. Department of Agriculture
1400 Independence Ave., S.W.
Washington, DC 20250
Dear United States Department of Agriculture,
I do not believe that these two lines of genetically engineered (Monsanto made) Roundup Ready alfalfa (should b deregulated (or for that matter used at all). The reasons is simply because deregulating their usage will exponentially increase the chances of GE alfalfa infecting organic alfalfa (the grasses pollinate by spores). To vote not to deregulate these brands of GE alfalfa will prevent this, preserving in integrity and independence (as Monsanto will own any crops infected with their alfalfa) ofour organic farms. This will in turn protect and create more American jobs in the much needed area of agriculture. Less reliance on genetic engineering will also promote not only more ethical (environmentally friendly) business practices but also more innovative ones (as farmer's will need to find a way to make profit without the GE crops or pesticides).
Not deregulating these GE crops will keep our nations agriculture healthier overall (as it will prevent an invasive species from entering it), which will in turn increase public health.
To deregulate these alfalfa strands will mean the opposite of all of the above, and giving Monsanto Corporation more of a monopoly over agriculture in the United States and world. It is

for this reason and moreover for all of the above benefits that I strongly feel that Docket No. APHIS-2007-0044. (the GE alfalfa) should not be deregulated.
Sincerely,
Matthew R. Abely
203 Shipstad, University of Portland
5000 North Willamette Blvd
(Comment Number: APHIS-2007-0044-0864-1)

Response: Regarding the monopoly comment, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0. In regard to gene flow, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). Because alfalfa is mostly used as feed for dairy and meat cattle, the use of labor in alfalfa farming depends largely on trends in the dairy and meat industries. As explained in appendices S and T of the DEIS, the impact of deregulation of GT alfalfa on alfalfa downstream markets would likely be minor or none. No consequences for the overall demand for alfalfa and the use of labor would be expected. Labor intensity in the production of alfalfa might increase or decrease depending on production practices (such as for the control of weeds) prior to adoption of GT alfalfa and on the rate and regional distribution of adoption of GT alfalfa. In regard to alfalfa volunteer weeds, see the response to comment APHIS-2007-0044-10263-8 for issue 3.4.

Comment Excerpt Text:
published on the web site of the Organic Consumers Association, "The EIS says that there is no evidence that organic consumers care about GE contamination."
I, therefore, would like to submit that this organic consumer (yours truly) is OUTRAGED that the USDA would allow for the possibility that the organic foods that I consume might be CONTAMINATED by GE crops! That's one of the main reasons why I buy organic!
There you have it. At least ONE organic consumer cares!
I'm quite certain that I'm not alone in my concern (Comment Number: APHIS-2007-0044-0867-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
as an organic farmer who must buy alfalfa hay during the end of the winter, i do not want the contamination of ge strains to ruin the health of my animals. i read the international journal of biological sciences review of genetically modified corn and witnessed it myself when i offered my cattle a choice of ge corn versus organic... they chose to eat the organic.. then i took all the corn away because i recognized that cattle eat grass, clovers, and other medicinal herbs according to what their rumen wants... not according to monsanto or cargill's profits.
http://www.biolsci.org/v05p0706.htm
i also read how obama is waiting to see if organic farmers or agribusinesses will feed the world... well, agribusinesses through cross-pollination are ruining the crops of organic farmers and their products are not 'substantially equivalent'. they are dangerous and should be isolated till they are

eliminated from our food supply. all ge corn should be turned into ethanol as it is not safe for mammal digestion.
i demand all subsidies of ge products cease and the isolation of ge contamination begin immediately... now that's a civil project that will create some jobs and heal our nation. (Comment Number: APHIS-2007-0044-0898-1)

Response: In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for issue 5.2. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to impacts on human health, see the response to comment APHIS-2007-0044-11034-2 for issue 6.1.

Comment Excerpt Text:
On page132 of the EIS (Impacts on Domestic Organic Alfalfa Markets), APHIS reported that no economic data was reported on the possible effects of GE alfalfa introduction on organic producers.
The draft EIS does a very good job characterizing the U.S alfalfa market (Chapter III and Appendices S and V) and the organic alfalfa market (Chapter III pages 48 and 53). Given this complete characterization and a direct survey of the organic trade industry groups, such an analysis could have been completed and the draft EIS is inadequate without it. (Comment Number: APHIS-2007-0044-10172-5)

Response: See the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Alfalfa grown for forage is the third-ranked crop in the U.S. by value and fourth ranked by total acreage. Table 3-12 (page 48) of the draft EIS shows that the organic alfalfa grown for forage has grown from 0.51% of total acreage in 2000 to 0.92% in 2005. This is almost a doubling of the organic acres in a five year period. The organic alfalfa is grown mainly in 6 states – Idaho, Wisconsin, Minnesota, North Dakota, South Dakota, and California. Most of the organic alfalfa is fed to livestock for organic food production with a small amount sold as seed sprouts and food supplements. The price premium for organic alfalfa hay is 18-20 percent higher compared to conventional alfalfa.

Section III (page 60) details and characterizes the organic food industry. The EIS details the rapid growth of the organic food industry in the U.S. U.S. organic food sales were 16.67 billion dollars in 2007. The estimated growth in the organic food sales is projected to be 20 percent per year in the 2007-2010 time period. In addition, 52 percent of organic food firms reported a lack of a dependable supply of organic raw materials.

Impacts Caused by Gene Drift, Loss of Organic Alfalfa, and IP Segregation

In Chapter IV (page 133), the draft EIS states that the supply of organic alfalfa hay and seeds would not be directly affected by the adoption of GE alfalfa by non-organic producers of GE

alfalfa. The draft EIS (page 60) states that there is no policy regarding the unintended presence of GE material in organic products or food. However, genetic engineering is prohibited by the USDA Organic Standard (National Organic Program or NOP) as an "excluded method." Seed that has been fertilized by genetically engineered pollen, such that the resulting plant will be genetically engineered, is therefore by definition "excluded" from organic certification. The Organic Standard also requires that livestock feed for animals used for meat, milk, eggs, and other animal products is 100 percent organic. As a practical matter, consumers purchase organic seed, feed, and produce because they expect that it is free of genetically engineered material, and would reject the notion that a genetically engineered plant is "organic" regardless of how it was grown. Organic consumers reject GE contaminated foods. Polls indicate that more than 75% of consumers believe that they are purchasing products without GE ingredients when they buy organic.

The argument is put forth that 92 percent of organic farmers had not incurred any direct costs due to GE crops being grown near their crops. However, no mention is given about the location of these farms. Alfalfa is the 4th most widely grown crop in the nation at over 22 million acres in forty states. In addition, there are no commercially available GE wheat and rice varieties. These two food crops are major items sold through the organic food system. The draft EIS states that organic premia compensates for the organic producers for the unidentified costs for meeting the contractual obligations and NOP standards. Lastly, APHIS assumes buffer zones can be used to minimize the contamination from GE alfalfa.

One can look at what happened to organic canola production in Canada when GE canola was introduced. Organic canola production was always a niche market. Today, organic canola production in Canada is almost nonexistent. The main reason is that GE events have permeated all canola varieties, even pedigreed seed lines. A number of studies show that the pedigreed oilseed rapeseed supply is deeply contaminated with GE events. Researchers at the University of Manitoba conducted a survey of 27 pedigree seed lots of oilseed rape in 2002 (Friesen et al., 2003). Of the 27 seed lots, 14 had contamination levels above 0.25% and three seed lots had glyphosate resistance contamination levels in excess of 2.0%. Oilseed rape breeder Keith Downey suspected that, "There are varieties of certified seed out there, in which part of the level of contamination was coming right from the breeders' seed." (Organic Agriculture Protection Fund, 2002) Walter Fehr, an agronomist and director of the Office of Biotechnology at Iowa State University, said that the same was true of other crops, such as soybeans and maize (Charman, 2003). If the breeder seed supply is contaminated, then the whole system is contaminated, and it will be hard to find any fields that can be considered GE free. Another report suggested that even Canadian wheat (the GE version of which has not yet been approved) may be contaminated, since researchers were testing Roundup Ready® wheat at a national experimental station alongside plots of wheat destined for commercial seed growers (Zakreski, 2002). The extent of the penetration of contaminated seed into the canola seed supply is now so deep that segregating GE from non-GE seed will not help at this point (http://www.grain.org/front/). (Comment Number: APHIS-2007-0044-10172-6)

Response: In Regard to the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to impacts on organic farmers and downstream sources (e.g., meat and dairy), see the

response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to cases of deregulation of other genetically engineered crops and their relevance for the analysis of the potential consequences of GT alfalfa deregulation, see response to comment APHIS-2007-0044-9936-10 for issue 11.15. In regard to comparisons with canola, see the response to APHIS-2007-0044-10263-9 for issue 3. The references provided are to other deregulated crops, which are not relevant to alfalfa.

Comment Excerpt Text:
The Draft Environmental Impact Statement (DEIS) states:
"Distribution of Costs of Loss of Production and Avoidance: Organic producers could have either a loss of production or need to add additional measures to reduce the likelihood of unintended presence if:
1) there is an amount of GT alfalfa in organic alfalfa that the organic market will reject, or
2) current alfalfa production practices are not already in place to protect against unintended presence of GT alfalfa in GT-sensitive alfalfa fields.
There is no evidence that supports either of these assumptions." (page xvii)
We disagree with the above conclusion as stated in the DEIS. On the contrary, in this submission we offer evidence from the experience of Canadian farmers that:
1) both export and domestic markets will reject product with GE contamination,
2) measures currently in place are unable to prevent such contamination and, furthermore,
3) no measures could be established that would prevent or minimize unintended presence.
Real world experience with GE canola and GE flax validates our warning regarding the inevitability
of gene flow through various predictable and unexpected means as well as the resultant significant impacts of unintended presence on agriculture production systems including impacts on
markets and the immediate and long-term costs to affected farmers. (Comment Number: APHIS-2007-0044-10263-1)

Response: Regarding the impact on the international market, see the response to comment APHIS-2007-0044-3404-1 for issue 5.4. Regarding the impact on the domestic market, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the physical impacts of adventitious presence, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to past adventitious presence cases, see the response to comment APHIS-2007-0044-9936-10 for issue 11.15. In regard to gene flow due to unintentional mixing and distribution of seed, see the response to comment APHIS-2007-0044-10263-5 for issue 3.2.

Comment Excerpt Text:
The consequences of GE canola contamination for organic grain farmers in Canada is a strong cautionary tale that is highly relevant to the question of the negative economic impacts that will be felt by organic alfalfa producers. This lesson in canola cautions that the U.S. survey by Brookes
and Barfoot (2004) which is referred to in the DEIS in relation to the impacts of unintended

presence on organic farmers is outdated and not relevant to examining the case of alfalfa (page 135). The DEIS states that the Brookes and Barfoot survey showed "the vast majority of U.S. organic farmers had not incurred any direct additional costs or incurred losses due to GE crops having been grown near their organically produced crops". Surveys of such impacts need to be understood and undertaken in relation to particular crops and crop-specific contamination issues. It is clear that many more farmers have been affected by the costs of contamination incidents in the U.S. since 2003/2004.

In Canada, GE canola from neighboring farms increasingly appeared as weeds or volunteers in certified organic fields where other crops such as wheat, oat or peas were grown. In order to maintain or re-establish certified organic status for the crop, field or farm, such GE contamination required manual removal of the canola plants as well as on-going measures to avoid contamination of current or future crops. The costs of removing unwanted volunteer GE canola from fields were born by the affected farmers. As mentioned earlier, the manual removal of GE alfalfa volunteers would not even be possible because of the nature of the plant's root system. The unintended presence of GE canola in an organic canola field was not detectable before harvest, nor could it be prevented due to the prevalence of GE canola on prairie farms. Buyers in the organic market tested for the presence of GE canola and did not accept contaminated lots. Organic grain farmers abandoned growing this crop altogether because of the depth of the problem of unintended presence, because the organic market did not accept this unintended GE presence, and because the risks and costs of contamination became too burdensome to bear.

The unintended presence of GE canola in Canada forced organic farmers to abandon growing and marketing that crop: "Every organic grain farmer has lost the right to grow organic canola free of GMO contamination risk. Every organic grain farmer has lost the ability to sell organic canola into Europe." [Footnote xxi: Saskatchewan Organic Directorate. "The Appellants Factum" May 29, 2006. Online at: http://www.saskorganic.com/oapf/pdf/FactumMay29-06.pdf. Accessed March 1, 2010.] Because of extensive unintended presence of GE canola in the Canadian Prairies, many, if not all, certified organic grain growers abandoned canola in their crop rotations. Organic grain farmers in the Canadian Prairies have abandoned organic canola production except in a few isolated areas where other farmers do not grow canola.

Organic grain farmers suffered severe economic losses as a consequence of unintended presence. Saskatchewan organic grain farmers attempted to certify a class action suit seeking compensation for this loss from the corporations Monsanto and Aventis (now Bayer) which developed and commercialized the GE canola varieties. In the class action, the farmers sought damages for the loss of canola as a crop to be used in regular rotation and the loss of the opportunity to participate in the certified organic canola market. The request to certify this case as a class action was not granted and the case for liability and compensation itself was therefore not heard by the courts. (Comment Number: APHIS-2007-0044-10263-12)

Response: Regarding the impacts on organic farmers and the domestic market, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding impacts on organic certification,

see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on international trade, see the response to comment APHIS-2007-0044-3404-1 for issue 5.4.

Comment Excerpt Text:
If organic farmers were no longer able to grow alfalfa due to GE contamination, they would lose the use of the "Queen of Forages" with its various unique and superior agronomic and economic advantages, as well as its valuable health-oriented market. Alfalfa has economic and management
advantages over other forage crops. Alfalfa is a high protein feed, the fastest drying legume for haying and the highest yielding forage. Farmers would lose this option in crop rotations and be forced to turn to less valuable alternatives such as sweet clover or Birdsfoot trefoil. In turning to other forage crops, farmers would also find that there are fewer varieties of these crops available as there has been less breeding investment in them. There is a great deal of infrastructure in place that supports the use of alfalfa for forage and similar infrastructure does not exist for alternative crops. (Comment Number: APHIS-2007-0044-10263-14)

Response: APHIS acknowledges the comment. The analysis done in the DEIS found no evidence to support that organic farmers would no longer be able to grow alfalfa due to the unintended presence of genetically engineered content.
See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Organic Markets will not bear the Unintended Presence of GE Alfalfa
There is no basis for the assumption of the DEIS that consumers of organic products will tolerate "unintended" GE presence. The DEIS incorrectly segments the organic consumer market into "GT-sensitive" and "non-GT sensitive". Organic regulations clearly prohibit the use of genetically engineered organisms and require organic farmers to clean up any unintended presence. (Comment Number: APHIS-2007-0044-10263-15)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Organic Consumers will Reject Unintended GE Presence
Organic farming prohibits the use of genetically engineered organisms and in the absence of mandatory labelling of GE foods, organics is the non-GE choice for consumers. Consumers are buying organic foods for a number of reasons, including the fact that organic is currently the only
certified and labelled non-GE choice on grocery store shelves. In Canada, over 9 surveys since 1999 found that over 80% of Canadian consumers want mandatory labelling of GE foods. A 2000
consumer survey showed that more Canadians were buying organic food and buying their food

from health food stores because of concerns over GE ingredients. [Footnote xxvi: Neville, Judd. "Lack of GMO Labeling Turns Canadians Towards Organic Foods." August 16, 2000. Online at: http://www.organicconsumers.org/Organic/canadalabels.cfm.] The survey found that upon
learning that certified organic foods do not contain GE, 38 percent of Canadians said they are more likely to buy organic foods. Many organic consumers have ongoing concerns about the health impacts of consuming GE foods, this includes health concerns about consuming end products such as meat and milk.
It is wrong for the USDA to assume that consumers would accept unintended GE presence if the contamination is unintended or not detectable in the end product. It is well established, for example, through our experience with recombinant Bovine Growth Hormone (rBGH) for dairy cows, that Canadian consumers do not tolerate the use of GE products even where there is no detectible transgene in the final product. Canadian consumer and farmer opposition to the use of rBGH was so strong that regulatory agencies in Canada responded by denying approval for commercialization of this product. [Footnote xxvii: Sharratt, Lucy "No to Bovine Growth Hormone: A Story of Resistance from Canada" from:
Redesigning Life? The Worldwide Challenge to Genetic Engineering, edited by Brian Tokar. London: Zed Books, 2001.] Consumer resistance to rBGH is also strong in the U.S. and opposition has persisted for over 15 years to the current day.
Further, as mentioned in our introduction, 101 consumer and farmer groups in Canada have signed a statement opposing the trade, sale, and production of GE alfalfa in Canada. (Appendix 2)
This list is an indication of the degree to which organic consumers, and organic and conventional farmers agree about the serious negative impacts of planting GE alfalfa. (Comment Number: APHIS-2007-0044-10263-17)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
APHIS refused to recognize the potential economic impacts of deregulation on farmers, the impacts to the environment and the connection between the economic and environmental impacts of releasing Roundup Ready alfalfa. Nearly 80 million tons of alfalfa is grown each year on 22 million acres in the U.S., according to USDA statistics. Nearly 90 million tons more is grown and harvested in mixed hay production on 40 million more acres. Feral and volunteer alfalfa is ubiquitous in the West. The potential cost of any unintended adverse agronomic, environmental or economic impacts of release of Roundup Ready alfalfa are large, and are largely unexamined in APHIS EIS. (Comment Number: APHIS-2007-0044-10318-2)

Response: Chapter IV of the DEIS examines the potential impacts of GT alfalfa deregulation to environmental and socioeconomic resources. This analysis was expanded in the FEIS to incorporate comments received on the DEIS.

Comment Excerpt Text:
Health Concerns with GE products

Recognizing that organic and conventional consumers purchase organic products or prefer to eat GM food for health reasons is considerable, and demonstrates the wariness that consumers have about the potential human health effects of GM food. Recent and increasing evidence is suggesting that GM foods are indeed not safe for human consumption and that GM crops have the potential to transfer GM DNA into their byproducts, including milk and meat, as would be most probable with GE alfalfa.

New evidence has found that GM DNA can transfer into milk. Agodi et al. (2006) found that the presence of GM maize was evident in 25% of their samples and GM soy was present in 11.7% of their samples. Furthermore, it was demonstrated that the pasteurization process was not able to degrade the GM DNA. Similar results have been found in pigs, which were fed GM corn. DNA from the corn persisted in the gastrointestinal tracks of pigs and results indicated that the ingested corn DNA and proteins were not totally degraded in the gastrointestinal tract (Chowdhury et al. 2003).

Economic Impacts on Organic Farmers Organic consumers clearly stand to be deeply affected by the approval of GE alfalfa, particularly given their preferences for wanting to avoid GM foods. Organic farmers also stand to be heavily impacted by the approval of GE alfalfa. APHIS notes that, “the supply of organic alfalfa hay and organic alfalfa seeds would not be directly affected by adoption of GT alfalfa by non-organic producers of alfalfa” (APHIS pg. 133). As well, APHIS concludes that calculating the economic impacts of GT alfalfa deregulation on organic alfalfa is not possible given limited data. NCGA strongly disagrees with the assumption that organic alfalfa growers in the United States will not be affected by the deregulation of GE alfalfa.

A 2008 study published by Munro, examined the spatial impacts of GM crops from an economic perspective in unregulated situations, such as the one that APHIS is proposing. It was concluded that the spatial externalities associated with unregulated GM crop plantings may have a notable effect on organic farmers, “because the presence of transgenic crops may eliminate or severely reduce the planting of organic varieties and other crops where some consumers have a preference for non-GM crops.” Further, Munro concluded that “co-existence may be impossible without strong regulation on planting patterns” (Munro, 2008).

Munro further discussed how such spatial issues would economically affect organic farmers, noting that in a competitive market, organic and non-GM farms adjacent to or nearby farms growing GM varieties may be compelled to sell their product for a lower price or “face elimination from the market or be forced to switch to the GM variety”. In essence, what Munro demonstrated was the spatial dominating power of GM crops in an agricultural setting, noting that even if transgenic crops occupied only 10% of the space in a given area, 60% of the total area could be denied to non-transgenic crops because of spatial externalities like barriers associated with GM crops (Figure 4) (Munro 2008).

[See original submission letter for Figure 4. Illustrative Patterns of GM Spatial Externalities. Black square represent spaces grown with GM crops and gray squares represent areas that would

be unable to be planted in organic or non-GM varieties. Munro, A. 2008. The spatial impact of genetically modified crops.]

Munro concluded that in order to create "consumption efficiency" or market equilibrium, there would need to be an incentive for farmers to sow non GM crops when they lie in the shadow of GM crops. Without such incentives or regulation within the market, efficiency is unlikely to be obtained and that co-existence between GM and non GM varieties is unsustainable in an unregulated market. Importantly, Munro noted, "As long as there is no cost to the GM planting farmer from introducing a transgenic crop into a previously GM free geographical area, then equilibrium between GM and non GM cultivars is inherently unstable" (Munro 2008). (Comment Number: APHIS-2007-0044-11018-6)

Response: In regard to the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to economic impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to spatial impacts, see the response to comment APHIS-2007-0044-11741-4 for issue 1.0. In regard to the Munro, 2008 reference, APHIS evaluated it and determined it did not need to be included in the FEIS.

For more on FDA responsibilities, see the response to comment APHIS-2007-0044-11865-1 for Issue 6.1. The FDA letter to Monsanto and FGI, and analysis by FDA, in response to their submission regarding GT alfalfa lines J101 and J163 can be found at http://www.fda.gov/Food/Biotechnology/Submissions/ucm155589.htm and in the DEIS appendix P. Section IV.E.4 and appendix P of the DEIS discuss that the CP4 EPSPS protein in GT-alfalfa has a long history of safe consumption by humans and animals. Animal feeding study results are discussed in appendix U (section 7.0) of the DEIS.

Comment Excerpt Text:
Although USDA says it supports "coexistence" of all types of agriculture, USDA does not account for or adequately assess the direct and indirect impacts of GE contamination on either domestic [Footnote 4 Domestic sales of organic food sales are estimated at $23 million annually (2008), according to the Organic Trade Association (OTA), http://www.ota.com/pics/documents/01a_OTAExecutiveSummary.pdf (accessed 28 January 2010).] or export [Footnote 5 Organic exports are estimated at $125 million to $250 million annually, according to USDA's Economic Research Service (September 2009), http://www.ers.usda.gov/briefing/organic/trade.htm, (accessed 28 January 2010).] food markets. The Agency's draft EIS fails to even consider any future scenarios that would include regulatory and/or statutory protections from GE contamination for organic and conventional farmers and exporters, leaving the organic industry and consumers of organic foods with no protections from GE contamination whatsoever (Comment Number: APHIS-2007-0044-11689-3)

Response:

An additional alternative has been added to the FEIS that was not considered in detail in the DEIS. This alternative was added in response to public comment on the DEIS. This alternative was added to address concerns with the effect of gene flow on GE sensitive alfalfa markets. It intended to more fully examine the potential impacts on non-GE farmers. Full descriptions of these added alternatives are included in chapter II of the FEIS.

Comment Excerpt Text:
Harm To Small And/Or Organic Farmers And Businesses Is Significant

USDA concludes that GE alfalfa will cause production to shift to larger farms (that can afford built-in isolation distances) and to conventional growers who are not threatened by GE contamination, but it erroneously concludes that these economic shifts are not significant. This is simply not the case. For example, CROPP Cooperative is comprised of 1,404 organic farmers located in 36 states, 1,084 of which are organic dairies and 220 of which are organic meat or pork producers. They market nationally and internationally under the brand names Organic Valley and Organic Prairie. With annual sales of $523 million, they are the number one selling organic brand in the Natural Food Retail Channel. In a court declaration on the economic impacts of GE alfalfa, Organic Valley's CEO, George Siemon states: "If Roundup Ready alfalfa is permitted to be sold commercially, and this causes contamination of certified organic alfalfa stands, or seed stock, this will devastate the organic farmers who market their milk through CROPP Cooperative.7" [Footnote 7 Siemon, George. (April 6, 2007) Declaration of Albert Straus in Support of Plantiffs Permanent Injunction, The United States District Court for the Northern District of California, San Francisco Division, Case No. C06-175 CRB.P. 3.] The same situation holds true for all other organic dairies and meat producers across the country.

Small and family farms are the backbone and future of American agriculture and they must be protected from being pushed out of business by GE agriculture. In many communities, they provide the freshest food available to local residents. Such farms also serve as the gateway for new generations of farmers to grow our nation's food and they offer opportunities for young people to remain in rural communities, actively contributing to local economies and the cultural fabric of rural America. Moreover, small and family organic farms provide multiple benefits to the communities in which they are located including: healthy food, healthy work environment, economic opportunities for existing and emerging local businesses, and a farming system that improves the quality of the environment for present and future generations. (Comment Number: APHIS-2007-0044-11689-5)

Response: See the response to comment APHIS-2007-0044-4913-7 for issue 5.1.

Comment Excerpt Text:
Organic Seed Alliance (OSA) is a nonprofit organization that supports the ethical development and stewardship of the genetic resources of agricultural seed. We accomplish our goals through collaborative education, advisory services, and research programs with organic farmers and other seed professionals. Over the last ten years we have become leaders in organic seed education and research, delivering educational services nationally to over 600 farmers, working with more than

thirty seed companies, partnering in research-education with seven Land Grant Universities and dozens of nonprofits, and convening national discussions on the values, principles, practices, and benefits of organic seed systems.

We have a staff and board of professionals who have worked in both conventional and organic systems with experience in seed biology, genetics, plant breeding, seed production, seed markets, and farmers as end users of seed. These are the qualifications and experience we bring to an assessment of the draft EIS on the deregulation of Roundup Ready (RR) alfalfa.

Organic Seed Alliance strongly believes this EIS failed to address the economic and environmental consequences of GE alfalfa. It sets dangerous precedent for future deregulation, and threatens the integrity and credibility of organic seed and food systems, as well as the natural resource of seed distinct from any market-based application. We encourage you to consider our comments, and the tens of thousands of others you will undoubtedly receive, deny commercial approval of RR alfalfa, and address the inadequacies of the draft EIS. Specifically, we feel there are five key areas of assumptions and conclusions that are erroneous. You may recognize some of these points from other commentators, as OSA provided organic producers with information on our concerns regarding the EIS. However, we encourage you to read our specific comments given our area of expertise in these issues.

1. USDA-APHIS relied on information from biotech seed companies (Forage Genetics and Monsanto) with an interest in deregulating RR alfalfa in regards to the production of organic alfalfa seed in the US. (Appendix V; section 3.5 Common and Organic Seed Production; page V-33: "In 2006-07, FGI found no publicly available evidence to support that there are any certified organic alfalfa seed producers in the United States……Organic alfalfa seed sold in the U.S. by U.S. seed companies is therefore most likely to have been wholly or largely imported from organic producers in Canada or elsewhere.")

Response: Clearly this is a conflict, and does not represent an adequate analysis of the organic alfalfa seed market. Organic alfalfa seed producers from Wyoming and Idaho have attended our workshops and educational events, and are supplying commercial seed to the US market. Additionally, the organic seed companies we work with have indicated that they are interested in increasing contracts with US growers for alfalfa seed as their conventional seed growers transition ground to organic. The constraints that are pointed to by FGI and Monsanto (disease and pest pressure) are environmental issues in all organic seed production, and the organic seed industry has addressed such challenges as it matures and develops. FGI and Monsanto's remarks are clearly meant to undermine the existence and importance of the organic seed trade for their own benefit. APHIS needs to get information from the organic seed sector, and to have accurate information in order to assess risk to organic and non-GE seed industry. Given our contacts and partnerships we would be happy to point them in this direction in the next draft of the EIS and provide a different market perspective on organic seed than that of the biotech industry.

2. APHIS admits that genetically engineered (GE) crops accidentally end up in organic products but suggests there's no evidence that this is impeding the development of the organic sector (p. 135 – 136). That is, APHIS asserts there's no evidence that organic consumers demand products free from the unintended presence of GE traits (p. 135). APHIS says consumer preferences for

organic over GE foods are influenced in part by philosophical factors that are likely unrelated to unintended cross-fertilization of feed crops with GE material (p. 135).

Response: Consumers are increasingly educated regarding the production, ownership, and regulation of farming and food systems. As I'm sure the USDA has tracked over the last decade, comments from consumers regarding agricultural and food policy is on the rise. Specifically, when USDA first released a draft of the organic rule in 1997 there was a historical surge of comments regarding the allowance of GE methods, with over 275,000 citizens speaking out against GE methods in organic. They understand drift, and unlike with pesticide or herbicide drift that is not passed down generation-to-generation, consumers understand that contamination of organic seed systems leads to the long-term contamination of organic food systems. I'm sure countless consumers and consumers groups will comment on this issue, and so we will not reference the studies and surveys along this line, but suffice it to say – the consumer has spoken and they do wish to know what they are eating, even trace amounts of GE contamination are of concern to them.

3. The EIS states that stewardship practices laid out in organic system plans and Monsanto's "best practices" are sufficient to minimize cross-fertilization between organic and GE crops (p. 103).

Response: The EIS response to cross-fertilization of GE and organic crops places an imbalanced and unfair burden on organic producers to protect the integrity of organic seeds, agricultural products, and markets. There needs to be mandatory regulation and enforcement of "best practices" for growers and patent holders of GE crops, including but not limited to placing all GE traits in the female (male sterile) parent in hybrid seed production to limit contamination during the production of hybrid seed. The extent to which conventional and organic seed is contaminated by GE material is unknown because it has not been comprehensively examined. Still, studies indicate that conventional seed with GE counterparts – at times used by organic producers – (i.e., corn, soybeans, canola) are pervasively contaminated with GE material. Once seed is contaminated, contamination expands along the entire chain of production, from seed to crop to final product. It is unreasonable to place the economic burden of protection along this entire chain of production on the potential and actual victims of contamination.

4. In the case of Roundup Ready alfalfa, APHIS said the supply of organic alfalfa hay and organic alfalfa seeds would not be directly affected by adoption of GE alfalfa (p. 133). The agency said it did not have economic data or other related information to demonstrate economic ramifications to organic producers regarding loss of markets and increased production costs for protecting the integrity of products from GE crop gene flow (p. 132).

Response: Organic seed farmers and farmers who save their own alfalfa seed have no recourse in the event GE material enters their crops because the question of who is liable has not been determined. They are left with the economic and agronomic costs of detecting and eradicating GE material; losing the genetic integrity of seed on which they rely; taking measures to avoid future contamination; and selling contaminated products into the conventional market, receiving a lower price that does not match their higher costs of organic production. Tests to determine genetic integrity are expensive, especially for smaller producers and companies. A fund should

be established by the biotech industry – managed by USDA-APHIS - to pay for testing at the commercial seed level to more properly balance the economic burden of testing, with an indemnity fund to pay for loss of value of the seed crop that show the presence of transgenic DNA above detectable level of 0.01% (using PCR tests).

5. APHIS says USDA organic certification would not be affected given that organic certification does not require testing for GE content and focuses on the process used to grow the product rather than on the content of the product (p. 133).

Response: When farmers purchase organic seed they expect it to be free of all GE material as GE traits are specifically excluded from the USDA National Organic Program (USDA NOP 7CFR 205.105(e) and 205.204). Knowingly planting seed with GE traits would threaten certification, as well as further contaminate organic crops. The conclusions of the EIS do not provide adequate protection from seed contamination, and sets a dangerous precedent that would undermine the integrity of the organic seed supply of all types of all crops for which there are GE crop counterparts. The current regulatory framework for GE crops fails to contain and segregate GE and non-GE crops, unfairly placing the entire burden of protecting the integrity of organic products on the shoulders of organic farmers.

The EIS completely ignores organic farmers desire – and right – to grow GE-free seed and raise GE-free agricultural products. It poses a conflict with the National Organic Program's federal regulations excluding GE by creating conditions in which organic seed, free of any and all GE contaminants, will increasingly become difficult if not impossible to source. In the event organic seed producers and organic seed companies detect GE material in organic seed, they must choose between maintaining the integrity of the organic market by sending it to the conventional market or knowingly sending the GE product to the organic market. Both options place them in a vulnerable and awkward position. In the first scenario, they lose a premium price for my product. In the second, they further risk the credibility of organic seed systems. The organic industry risks losing credibility altogether should its consumer base become aware that GE material is making its way into organic products. Additionally, the NOP federal regulations are at risk, as there is no "acceptable" use of an excluded method, such as the use of genetically engineered inputs. Excluded means excluded – organic seed cannot have GE traits and be used by an organic farmer. APHIS needs to respect the federal rule, and recognize that the companies releasing GE crops must have a clear and sound method for preventing contamination of organic seed systems. Until that is the case the use of GE alfalfa should be prohibited. (Comment Number: APHIS-2007-0044-11774-1)

Response: APHIS used the best available data in the DEIS. Unfortunately, statistics on the production of organic alfalfa seeds in the United States are not readily available. Still, the discussion of the seed market and the availability of conventional and organic alfalfa seed under a scenario of GT alfalfa deregulation is expanded in the FEIS to incorporate comments received. Regarding consumer preference for organic products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding the legal liability for unintended presence of genetically engineered material in non-GE fields, see response to comment APHIS-2007-0044-6376-1 for issue 5.1. To the extent that gene flow does occur and to the extent that specific sensitive markets do reject the presence of genetically engineered

content, section 4.3 of appendix S of the DEIS explicitly recognizes this cost as a potential distributional and social impact of GT alfalfa deregulation. The FEIS also expands on the analysis of testing and its costs in section 3.2.3 of appendix S. The FEIS also expands the discussion of stewardship programs and incorporates an additional alternative that uses isolation and geographic restrictions to segregate GT alfalfa seed production and conventional seed production.
The point regarding limiting all GE traits to the female (male sterile) parent for hybrid seed production does not apply to alfalfa seed production or breeding.

Comment Excerpt Text:
APHIS said the supply of organic alfalfa hay and organic alfalfa seeds would not be directly affected by adoption of GE alfalfa (p133), and that they did not have economic data or information to demonstrate economic ramifications to organic producers. Perhaps I can provide some of that information. The supply of organic alfalfa seed is already very limited. It is ludicrous to think that the loss of organic seed production to GE contamination, in any amount, will not affect the supply and price of organic alfalfa seed. Also, the burden of testing my production for GE contamination falls squarely on me. Not only do I have to bear the direct costs of the testing, but I have to solely bear the loss of value of the product if my test is positive. In such an event, I can maintain my organic integrity only by selling into a conventional market at a drastically reduced price. (Comment Number: APHIS-2007-0044-12428-3)

Response: Regarding impacts on organic farmers/products, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Deregulation of glyphosate-tolerant alfalfa will result in irreparable harm caused by genetic contamination of organic and non-GMO fields, food, and feed. The USDAs Draft Environmental Impact Statement (DEIS) grossly underestimates the significance of the impacts of contamination on organic markets for hay, dairy, sprouts, and honey as well as natural and other GMO-free markets. The DEIS also understates the interest of producers, handlers, and consumers in maintaining the integrity of organic, natural, and GMO-free crops that are free from contamination. Producers have a right to grow crops and feed livestock without a threat of genetic contamination, and consumers have a right to choose food that is not genetically engineered or produced with genetically engineered feed. (Comment Number: APHIS-2007-0044-1632-1)

Response: Regarding impacts on organic markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Second, page 103 of the EIS states that stewardship practices laid out in organic system plans and Monsanto's "best practices" are sufficient to minimize cross-fertilization between organic and GE crops. The widespread contamination of seeds of conventional, non-GMO varieties of corn, soybean, and canola with GMO germplasm, documented extensively by crop scientists in the US, Mexico and elsewhere, has shown this to be untrue. More than once, I have talked with organic growers who are concerned about growing sweet corn or edamame soybean (either for fresh market or for producing organic seed) because of the proximity of farmers who grow GMO field corn or grain soybean. Because alfalfa sprouts are a high value food product, organic sprouts producers would be directly impacted by the introduction and deregulation of GMO alfalfa. (Comment Number: APHIS-2007-0044-1687-2)

Response: In regard to the potential presence of genetically engineered content in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to past episodes of deregulation of genetically engineered crops, see the response to comment APHIS-2007-0044-9936-10 for issue 11.15.

Comment Excerpt Text:
Fourth, on page 133 of the EIS, APHIS says USDA organic certification would not be affected given that organic certification does not require testing for GE content and focuses on the process used to grow the product rather than on the content of the product. This conclusion is also incorrect, as organic producers can lose their USDA Organic certification if they knowingly plant GMO or GMO-contaminated crop seeds. Organic farmers grow alfalfa to produce organic forage (to feed their own livestock, or to sell to other organic producers), seed, or sprouts for human consumption. In addition, many organic farmers use alfalfa as a perennial cover crop, alone or with perennial grasses, to restore soil quality, organic matter, and fertility, and to break hardpan and improve drainage and root penetration. Alfalfa is one of the most valuable of all cover crops for restoring soil worn out by intensive cultivation. Once GMO alfalfa is in widespread production, so will the contamination of purportedly non-GMO alfalfa seed with GMO germplasm become widespread. When this occurs, informed and conscientious organic producers who play by the USDA Organic Rule will no longer be able to plant alfalfa, either for production or for cover cropping purposes. Their ability to market organic meat, dairy and eggs from animal and birds fed alfalfa (one of the most nutritious of forages) will also be curtailed. Thus, deregulating GMO alfalfa on the basis of the current EIS would abridge organic and non-GMO producers' right to grow GMO-free alfalfa, and will seriously curtail their cropping options.
On behalf of organic producers across the US, I urge APHIS to reconsider the deregulation of Roundup Ready Alfalfa, because it places an undue burden on organic growers who will face potential contamination of the organic seed supply by a technology that is explicitly and legally prohibited by the USDA National Organic Program. Deregulation of GMO alfalfa would threaten the integrity of the organic food and forage markets, and would rob organic growers of a valuable, multi-purpose crop through circumstances beyond their control. Please do not let this happen. (Comment Number: APHIS-2007-0044-1687-4)

Response: Regarding the comment on organic certification, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on organic farmers and downstream sources (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
The USDA's EIS maintains that avoiding GE contamination would be your responsibility as an organic producer. They say that all you have to do is change your planting and harvest schedules to "avoid simultaneous flowering" with RR alfalfa in your neighbor's field, and "disallow or remove commercial beekeepers' hives anywhere near your alfalfa field." Is this feasible? NO! USDA needs to protect all farmers and the livelihoods of those who choose not to grow RR alfalfa. (Comment Number: APHIS-2007-0044-1976-3)

Response: In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
The vitality of the $25 billion organic industry is at risk. Consumers support organics because they want healthy foods, sustainability and economic opportunity for family farmers. How will we react to contamination of the organic dairy and beef sector by genetically modified crops? Genetic engineering is prohibited in organics and organic consumers, as well as organic farmers, don't want it. (Comment Number: APHIS-2007-0044-1976-5)

Response: Regarding consumer preference for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
It is clear from the EIS that the inevitable consequences of this decision would negatively impact organic farmers in the interest of Monsanto's Profits. This would create undue hardship on small farmers trying to avoid GMO's. The impact on our export market would surely be impacted. In the interest of protecting the future of sustainable varied american agriculture, please disallow this proposal. Allowing this to continue will just compound the negative consequences we've already seen from similar such actions in the past. We are digging ourselves a hole without a ladder to climb out. (Comment Number: APHIS-2007-0044-2205-1)

Response: Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding impacts on the international market, see the response to comment APHIS-2007-044-3404-1 for issue 5.4.

Comment Excerpt Text:
This comment refers to Docket No. APHIS-2007-0044.
The new Genetically modified Round-Up-Ready Alfalfa by Monsanto should not be allowed to be produced. It will have an environmental impact on Organic producers which could contaminate Organic farming areas. There is no reason that Organic farmers should be the ones burdened with the responsibility to assure that their farms have not been contaminated by the Genetically modified Round-Up_Ready Alfalfa. This would greatly increase the price of orgainc farming and therefore increase the price for organic products purchased by the consumer. They are already quite expensive. There are more and more people becoming aware of the health benefits provided by eating organic. To jeopardize their ability to purchase these products by increased costs and possible contamination that may be extremely difficult to avoid is not wise. (Comment Number: APHIS-2007-0044-2231-1)

Response: Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I am writing to express my concerns about genetically engineered food. This is a bing issue or concern for my family. We choose organic when offered an option but are beginning to find that we have little or no option when it comes to produce because the food is being mixed in the fields.
Please enforce restriction to the distribution of genetically engineered foods.
Thanks, Marv Kvamme (Comment Number: APHIS-2007-0044-2239-2)

Response: APHIS acknowledges the comment. The market availability of organic produce in local markets is outside the scope of this EIS.

Comment Excerpt Text:
Dear USDA,
I am an 'organic' consumer and care about the organic industry and the small farmer. I disapprove of growing GE alfalfa and any other GE crop as there are provable links to human cell damage and more specifically non-hodgkins lymphoma, as the Journal of the American Cancer Society has studied and found. Spraying GE crops threatens the organic farmer with drift from the chemicals, thus damaging sustainable agriculture.
Please know that this organic consumer DOES care about how GE affects the small/organic farmer.
Gretchen McLlarky (Comment Number: APHIS-2007-0044-2243-1)

Response: In regard to impacts on human health, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0. In regard to comment on non-Hodgkin's lymphoma, see the response to comment APHIS-2007-0044-10525-1 and APHIS-2007-0044-

2243-1 for issue 6.0. In regard to chemical drift, EPA uses a registration process to regulate the sale, distribution, and use of pesticides in order to protect health and the environment under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). Thus EPA can mandate label restrictions and is reviewing glyphosate for reregistration. APHIS has no regulatory authority over the use of glyphosate for any crop (see DEIS section III.B).

Comment Excerpt Text:
Dear USDA,
I purchase organic produce and consumables whenever I can and I care about the organic industry and the small farmer. I disapprove of growing GE alfalfa and any other GE crops that will effect Organic crops.The Journal of the American Cancer Society has studied and found there are provable links to human cell damage and more specifically non-hodgkins lymphoma from the cultivation of GE crops. Spraying GE crops threatens the organic farmer with drift from the chemicals, thus damaging sustainable agriculture.
Please know that this organic consumer DOES care about how GE affects the small/organic farmer. (Comment Number: APHIS-2007-0044-2245-1)

Response: In regard to the impacts on human health, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3. In regard to comment on non-Hodgkin's lymphoma, see the response to comment APHIS-2007-0044-10525-1 and APHIS-2007-0044-2243-1 for issue 6.0. In regard to drift, see response to comment APHIS-2007-0044-2243-1 for section 5.2.

Comment Excerpt Text:
I am opposed to the USDA approving the use of GM alfalfa. It threatens small farmers in favor of agribusiness. It impacts bee production and behavior. It is not well regulated and lets the burden of keeping organic farms organic fall with the organic farmers, not with the business that is using it.
It is a step in the wrong direction for our food sources, and our country, which was founded on the principal of government by the PEOPLE, for the PEOPLE, of the People:
Not government by the corporation, for the corporation, of the corporation. We are moving toward a "Corporist" society. Some might call it Fascism... (Comment Number: APHIS-2007-0044-2255-1)

Response: Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to potential impacts on bee production and behavior, see response to comment APHIS-2007-0044-2255-1 for issue 4.4.

Comment Excerpt Text:
I will not buy GE Alfalfa and GE Alfalfa-Derived Meat Dairy Products. This regulation/non-regulation does not Protect All Farmers, Organic Included, Who Wish to Choose to Grow Non-GE Crops; this documentation must be or re-written to do so. GE Alfalfa Would Significantly Increase Pesticide Use and Increase Harm to Human Health and the Environment and that is incredibly undesirable for me and for the sake of my children. Protecting Organic Farmers is part

of the mandate of the USDA. Any threat to the sustainability of small farmers is a threat to small communities and local economies; if this legislation passes as written, then broken local economies, bankrupt small farms, and the torn fabric of small town America would lay at the feet of the USDA. The EIR is completely inadequate and the conclusions made in this document are not sufficently supported to merit approval. (Comment Number: APHIS-2007-0044-2256-1)

Response: Regarding impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to increased pesticide use, see the response to comment APHIS-2007-0044-0402-1 for issue 6.3. In regard to impacts on human health, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3. In regard to the impacts of GE crops on the environment, see comment APHIS-2007-0044-5302-1 under issue 4.0.

Comment Excerpt Text:
I am an organic consumer and I do care about GE contamination. I do not want any genetic engineering involved with my foods.
Thank you. (Comment Number: APHIS-2007-0044-2259-1)

Response: Regarding consumer preference for food free of genetically engineered content, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Section 3, part 1 Uses of Alfalfa states that GT alfalfa is permitted for human consumption but that Monsanto does not allow GT alfalfa to be planted for sprouts. This is a voluntary restriction and could be reversed at their discretion; therefore, humans could consume GT alfalfa at any time. Section 4, Part D, Subsection 2 Impacts on Domestic Organic Alfalfa Markets acknowledges that it would be difficult for organic growers to control the introduction of GT genes to their crops, and to avoid this they should employ avoidance measures like buffer zones. Bees can certainly cross any buffer zone an organic alfalfa farmer could implement, and due to the hundreds of thousands of acres of GT alfalfa that will likely be planted their organic alfalfa will be contaminated thereby imposing a significant impact on their livelihood and the possibility of human consumption. The statement that organic alfalfa production systems have coexisted with the 200,000 acres of GT alfalfa planted since 2005 doesn't correlate to organic producers being able to prevent cross-contamination if GT alfalfa is deregulated nationwide. This is a much larger impact and necessitates additional analysis beyond the cursory determination of safety presented in the first sentence of page 138 of the EIS. (Comment Number: APHIS-2007-0044-2325-4)

Response: APHIS acknowledges comment. It is unlikely that alfalfa sprout growers would adopt GT alfalfa, even is Monsanto removed this restriction from the TUG. Alfalfa sprouts are not reared in a manner that is compatible with herbicide use for weed control. Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.1. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for issue 3.1.

Comment Excerpt Text:
The contamination of non-genetically engineered alfalfa crops will result in the eventual contamination of alfalfa seed stock, through cross pollination and/or admixture. Since the use of genetically engineered seed is prohibited in certified organic agriculture, it will become increasingly difficult to impossible for farmers to find seed which does not contain genetically engineered DNA. Further, the farmers will risk cross-pollination of their crops from neighbouring contaminated stands and roadside plants. Organic certification rules require that farmers take measures to eliminate any contamination from genetically engineered plants that may occur on their farms. In practice, this will mean that in order to maintain organic certification, alflafa will not be able to be grown on organic farms. (Comment Number: APHIS-2007-0044-2380-2)

Response: Analysis of the impact of deregulation of GT alfalfa on organic markets was analyzed in appendix S of the DEIS. This analysis was expanded in the FEIS to incorporate comments received, with particular attention to seed markets. The analysis addressed the availability of seed for organic alfalfa production. Regarding impacts on organic certification, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to gene flow and comingling, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
4. Alfalfa is a primary ingredient in animal forage and feed for dairy farmers, and for beef, chicken, and pork ranchers. The planting and growing of genetically engineered, Roundup Ready ("GE", "RR") Alfalfa therefore poses an enormous threat to the market for organic and non-GE alfalfa sprouts, milk, cheese, yogurt, ice cream, beef, chicken, and pork. If this deregulation stands without any protection mechanisms that prevent contamination, the Skagit Valley, which is home to many dairy farmers and ranchers, will inevitably lose the ability to choose to purchase organic and non-GE forage for organic and non-GE meat and dairy products due to biological contamination. The very existence of the family farm is at risk and a shift in production from small farms to larger farms in the nation's fourth-largest crop substantially increases that risk. As large scale GE, RR alfalfa production grows, small and mid scale farmers who purchase non-RR alfalfa varieties for crop and feed will lose their financial viability - as non-GE alfalfa becomes harder to source and to afford - and the Skagit Valley Co-op will lose a large chunk of its brand integrity, which threatens the viability of our business.
Organic agriculture provides many benefits to society: healthy foods for consumers, economic opportunities for family farmers and urban and rural communities, and a farming system that improves the quality of the environment. However, the continued vitality of this sector is imperiled by the complete absence of measures to protect organic production systems from GE contamination and subsequent environmental, consumer, and economic losses. (Comment Number: APHIS-2007-0044-2421-2)

Response: Regarding the impact on organic farmers and downstream markets (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding impact

to small farms, see response to comment APHIS-2007-0044-4913-7 for issue 5.1. Analysis of the impact of deregulation of GT alfalfa on organic markets was analyzed in appendix S of the DEIS. This analysis was expanded in the FEIS to incorporate comments received, with particular attention to seed markets. The analysis addressed the availability of seed for organic alfalfa production.

Comment Excerpt Text:
History has shown us that cross contamination of GE and non-GE crops are high. If you deregulate GE alfalfa you can not protect our food supply & you risk causing significant harm to small and organic farmers & their customers. People who do not wish to consume GE foods will have no reliable alternatives. (Comment Number: APHIS-2007-0044-3024-3)

Response: In regard to the risk of gene flow, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to impacts on organic markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the impact to small farms, see response to comment APHIS-2007-0044-4913-7 for issue 5.1.

Comment Excerpt Text:
The deregulation of GM alfalfa, a wind pollinated perennial crop carrying high risk of seed and forage contamination, would further add to our economic and testing burden. Contamination could eventually make it impossible for the farmers producing our inputs to produce non-GMO organic products. This is not just an issue for animal farming, but as alfalfa is also a popular and necessary legume rotation crop for organic crop farmers (ensuring fertility of organic fields), it could contaminate any organic cropland with GM. (Comment Number: APHIS-2007-0044-3528-2)

Response: In regard to impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Sourcing non GE products and ingredients becomes markedly more difficult with each new GE crop approval, and with each increase of the GE production of a given crop. What were once extremely small levels of adventitious contamination of organic crops have become appreciably larger, and these greater levels of contamination place the value and integrity of the USDA Organic label – and consequently, the United States organic industry – at risk. Organic consumers do not expect to find significant levels of GE
material in organic products, and will reject such products.
Exclusion of genetic modification (GM) is a fundamental tenet of the Organic Standard, and polls show that more than 75% of consumers believe that they are purchasing products without GM ingredients when they buy organic. As cultivation of GM corn, soy, canola, sugar beets and cotton has become increasingly widespread, , our Company has had to adopt new quality control measures and implement testing programs to identify GM to provide products that meet that expectation and retain our customers' trust---, work which carries significant burden and

expense. We are now enrolled in the Non- GMO Project. While this program helps us mitigate contamination, it is not a substitute for government regulation and protection. The deregulation of GM alfalfa, a perennial crop carrying high risk of seed and forage contamination, would further add to our economic and testing burden and, contamination could eventually make it impossible to produce non-GMO organic animal products. (Comment Number: APHIS-2007-0044-3540-2)

Response: Regarding the comment that consumers will reject organic products, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on downstream markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). Analysis of the impact of deregulation of GT alfalfa on organic markets was analyzed in appendix S of the DEIS. This analysis was expanded in the FEIS to incorporate comments received, including recognition of the growth of private marketing initiatives such as the "Non-GMO Project" and increased analysis of testing as a requirement in accessing sensitive markets.

Comment Excerpt Text:
Finally, perhaps the greatest threat that GM alfalfa poses is that it cannot be contained or isolated. While this doesn't really affect non-organic growers, it severally impacts organic growers (or anyone else) not wanting GM alfalfa in their fields. Again, we take lessons from other crop growers like canola farmers in Canada or soybean growers in the United States who have experienced tremendous losses because seed from the GM crop eventually blew into their GM-free fields. It is not right to tell organic growers or non-participating GM growers that they just have to accept this and learn to put up with some GM contamination in their fields. Organic growers can lose their certified status immediately if GM crops are found on their fields and therefore they lose out economically. Bottom line, GM alfalfa or any GM crop for that matter is a living pollution because unlike chemical spills that dilute over time, GM crops replicate themselves and spread. Once released on a wide-scale basis, GM alfalfa cannot be recalled when it is found to be causing long-term problems. (Comment Number: APHIS-2007-0044-3548-4)

Response: Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding impacts on organic certification, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to alfalfa volunteer weeds, see the response to comment APHIS-2007-0044-10263-8 for issue 3.4.

Comment Excerpt Text:
The USDA Organic label is a process-based certification system, and the process to create transgenic alfalfa would mean that products containing GT alfalfa could not retain the USDA Organic label.
Unintentional hybridization of GT alfalfa with non-GT Medicago spp. would mean that products that would otherwise meet USDA organic standards that end up unknowingly using the hybridized alfalfa could no longer label their products organic (or would mistakenly label their

products as organic). Without USDA monitoring of the genetic purity of seeds, and with limited product monitoring under the USDA Organic certification program, such an unintentional inclusion of transgenic products would compromise the meaning of the USDA Organic label. (Comment Number: APHIS-2007-0044-3576-3)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
As we have seen in the corn market, even if a farmer has planted an independent, non-GE seed and the resulting plant becomes cross-pollinated by a GE plant, that new seed now carries the GE gene. The company that originally produced the GE seed can then command a royalty payment for the altered seed. Worst yet, for an organic farmer, the crop cannot command the organic price premium.
A core element to the definition of the USDA Organic label is the use of no genetically engineered ingredients. Yet, we know based on experience of cross-contamination of GE corn seed, that genetically engineered alfalfa is certain to contaminate non-GE and organic alfalfa. This situation has resulted in reducing the organic domestic corn supply, forcing organic livestock producers to source organic corn from outside of the country, and thereby increasing the cost of the organic meat that will be available in the marketplace. This situation results in a disadvantage not for the organic livestock producer, but for the consumer as well. Applegate believes that the USDA must take steps to preserve non-genetically modified alfalfa from being contaminated, and thus losing its credibility as an organic source.
Because of the potential cross-pollination of non-GE fields by GE components, farmers raising organic feed for livestock will incur additional burden in proving that neighboring seeds are not contaminating their organic alfalfa. This will not only cause an economic disadvantage to organic farmers who are near others using GE alfalfa, it will also increase their potential for losing organic certification, thus threatening their livelihood. (Comment Number: APHIS-2007-0044-3597-1)

Response: Regarding impacts on organic farming and downstream markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the comment on organic certification, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Your stated mandate is to protect American agriculture and to support the co-existence of all types of agriculture. I, Gisele, of "The People" further mandate you to take all necessary actions to include a future that is irrefutably supportive of a healthy food supply and thriving communities.
In this case, this will take the form of setting regulations that are heavily biased toward protecting organic and alfalfa farmers and conventional exporters from contamination by RR Alfalfa. We are not here to support Monsanto! Monsanto is here to support us, and, in the long run, can only thrive by doing so. (Comment Number: APHIS-2007-0044-4201-2)

Response: APHIS acknowledges the comment. The USDA supports coexistence which is not biased toward one production system over the other.

Comment Excerpt Text:
I oppose approval of the deregulation of GE Alfalfa. I am highly concerned about possible contamination of organic farms and largely about the potential increase in the use of Roundup on the GE crops. I don't believe food should be artificially engineered to withstand higher doses of chemical application. In addition this appears to unfairly benefit a large multinational corporation which profits from chemical pesticide sales while harming the smaller organic producers at the heart of our country. I do not believe it is the role of the government to condone a commercial application which has the potential to directly harm other producers, especially when such a product has side effects that are detrimental to our environment and food supply. Even as govt rhetoric is pushing "green" environmental choices and "healthy eating" for our obese children, it would be hypocritically acting otherwise. (Comment Number: APHIS-2007-0044-4206-1)

Response: Regarding the comment that deregulation would unfairly benefit Monsanto, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to the impacts of GE crops on the environment, see comment APHIS-2007-0044-5302-1 for issue 4.0. In regard to the potential impacts on food safety, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
VERY concerned about yet ANOTHER genetically altered product being introduced into the US. Europe has already refused to allow this "round up" crop into their countries. If such a product continues to be produced and supported in the US, we will lose any chance of sustainable organic farms many of which are located here in your state. PLEASE protest against BIG company infiltration and take over of US produce! Thank you for your concern.
Check out what Monsanto has done with their corn. Any airborn cross pollination protects Monsanto's interests, not the local small farm/family farm/organic farms. WOW. (Comment Number: APHIS-2007-0044-4210-1)

Response: Regarding impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the legal liability for unintentional presence of GE content in non-GE crops, see the response to comment APHIS-2007-0044-6376-1 for Issue 5.1.

Comment Excerpt Text:
As a consumer of entirely organic food I care about GE Alfalfa and the effect it will have on the food I eat and the milk I drink. I will absolutely not purchase or consume any product that is contaminated or derived from GE Alfalfa! Alfalfa is widely used in organic farming and feed. Please do not let this contamination occur. It is the USDA responsibility to protect the organic

farmer which in turn protects the consumers. I will not be Monsanto's science project. Let's keep food real! Is that too much to ask? (Comment Number: APHIS-2007-0044-4225-1)

Response: Regarding consumer preferences for products free of genetically engineered content see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Not only has Monsanto shown that they have no concern for small farmers or the integrity of our food supply but they have consistently worked to undermine any farmer that does not pay homage to their company. This new seed is certain to infect the organic alfalfa crop. When that happens not only will Monsanto not be required to pay damage to the orgainic farms that they contaminate but, if history repeats itself, Monsanto will sue theses farmers for using their patented seed. This is a travesty and one that you have the potential to stop. (Comment Number: APHIS-2007-0044-4234-1)

Response: In regard to the adventitious presence of non-GE or organic alfalfa with GT-alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response.

Comment Excerpt Text:
There are currently no protections in place to prevent contamination of non GMO crops by GE crops. However there are prohibitions on the import of GMO products into other countries so allowing the unbridled use of Monsanto roundup tolerant Alfalfa will significantly harm the organic farming community. Further the continued expansion of Roundup use in agriculture will further polute our water ways, contaminate our feed, and poison our soil. (Comment Number: APHIS-2007-0044-4417-1)

Response: Regarding the comment on international trade, see the response to comment APHIS-2007-0044-3404-1 for issue 5.4. In regards to the impacts of GE crops on the environment, see the response to comment APHIS-2007-0044-5302-1 for issue 4.0. In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for issue 5.2.

Comment Excerpt Text:
First, I am tired of hearing about farmers unfairly being sued for “stealing” proprietary crops, such as this genetically engineered alfalfa, because of unintentional cross-pollination. The laws allowing such a lawsuit are ridiculously skewed in favor of big companies like Monsanto. It would make more sense to me for organic farmers to be able to sue Monsanto for allowing their genetically engineered pollen to escape their fields, contaminating organic crops. (Comment Number: APHIS-2007-0044-4426-1)

Response: APHIS acknowledges the comment. Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Thus it seems the burden is being placed largely on the backs of us organic growers, which is just plain unfair. We are the ones who would be the victims of GE-contamination in terms of loss of value of our crops. It is immoral to expect the victims of a potential crime to bear the responsibility of preventing the transgression. Finally, on pp. 135-136, the claim is made that while contamination does occur, there is no evidence that this negatively impacts the organic sector and that consumers don't care. Well, my customers have made it clear that they HIGHLY value the GE-free aspect of organic products. I strongly urge you to reconside (Comment Number: APHIS-2007-0044-4855-2)

Response: Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the comment that customers value products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Thus, if the USDA recommends full approval for Monsantos GE alfalfa, it will not be providing any protection to conventional or organic alfalfa farmers. Such a recommendation is likely to cause these farmers to lose their certification as non-GE, to subsequently lose sales, markets, and price advantages, and to incur unusual, unanticipated expenses. This would produce economic disaster for a segment of the market that is meeting the growing demand for organic food. The USDA must protect such farmers rights, and not treat them cavalierly as though their rights are not worth protecting. (Comment Number: APHIS-2007-0044-4896-1)

Response: Regarding the comment that organic farmers will lose their certification, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on organic farming and downstream markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
However, many organic farmers claim a burden of economic harm from the presence of Roundup Ready alfalfa and this may not be borne out in reality. Milk companies are not likely to reject milk from organic dairy farms feeding lightly GMO contaminated organic alfalfa, and it is difficult to imagine GMO tests being routinely part of an organic hay auction. This isn't the norm in our industry now and it not likely that Roundup Ready alfalfa would change that, especially since the USDA National Organic Program will not back us up with regulations. GM (genetically modified) corn and soybeans have been grown in the US for the past 15 years, during which time organic corn and soybean acreage has increased geometrically. Very rarely are feedgrade organic corn or soybeans tested for recombinant DNA presence, mainly because

the USDA National Organic Program is crafted as "Process Based" system, defining organic by certain agronomic practices, rather by a chemical purity test of the product. Contrary to what some consumers may think, lightly GM-contaminated organic soybeans, if strictly grown according to the NOP standards, are still considered organic.

Organic food manufacturers and seed producers may choose to reject products that test above a certain threshold level of GM presence, but that is strictly a market-based decision, not required by either USDA or organic certifiers. A threshold for rejection is neither uniform or regulated consistently across the organic/non-GM industry. Since the National Organic Program only defines organic as an agronomic system, the sole reason a buyer would have to reject such a product would be if they couldn't resell it to their customers. In the organic feed grain industry, few buyers make that demand so rarely are GM tests done on organic feedgrains unless there is reason to suspect the grain might not be legitimately organic. A GMO test of soybeans is actually quite a good 'organic' test, since over 90% of the conventional soybeans grown in this country are Roundup Ready To be honest, interpreting and using a GMO test on feed grain is not easy and fraught with ethical problems in the absence of an industry-wide and governmentally-supported definition of what constitutes "non-GMO". Nearly everyone would agree that grain testing 75-90% is truly contaminated and should not be considered organic, but what if the sample tests 10% or 5%?
Not really clean, but likely the result of pollen drift, seed contamination, or incompletely cleaned-out equipment, but not fraud. As a grain buyer, I certainly believe that organic crops should NOT contain GM contamination, and that those companies claiming ownership of these genes should be responsible for keeping them under control, far away from where they are not wanted and do not belong. However, I also do not believe it is ethical to punish the hapless organic farmer who did everything right according to the organic standards, but still acquired low-grade GM contamination. On the other hand, I have no such ambiguity with mycotoxin grain that could cause serious harm to my customers and their animals. (Comment Number: APHIS-2007-0044-4924-4)

Response: APHIS acknowledges the comment. Regarding impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Please do not allow GE Alfalfa to gain nonregulated status. Listen, I DO care about GE alfalfa, as does EVERY informed eater that I know. As an organic farmer, I see it as the USDA's duty to support and protect the genetic material on which our race relies. As the past has shown, Monsanto's practices with GE crops can significantly harm vegetable and feed producers such as myself, particularly those that are organic, or are not interested in Monsanto's products. Please extend the comment period. I think all wisdom, that which goes beyond immediate profit and shortsighted mongering, will lead you to ban this product from the market. (Comment Number: APHIS-2007-0044-6214-1)

Response: Regarding the comment on consumer preference for products free of genetically engineered material APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to

extending the DEIS comment period, see the response to comment APHIS-2007-0044-0948-8 for issue 2.4.

Comment Excerpt Text:
4) The increased cost of GE seeds may affect alfalfa (as cited above in the Organic Center study, resulting not only in increased costs of hay, but in dairy and livestock production as well. (Comment Number: APHIS-2007-0044-6353-11)

Response: Regarding impacts on organic farming and downstream markets (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Additionally, certified organic producers and handlers may potentially be de-certified, sued, or otherwise financially damaged if their crops or processed products become contaminated by GMOs. In fact, such losses have already occurred in our state when a Nevada-based organic processor recently lost over $100,000 as a result of GMO-contaminated "certified organic" soybeans, purchased from the Midwest. We also cite the landmark case where Monsanto prevailed legally against a Canadian farmer, when they (Monsanto) discovered GMO plants on his land that he neither planted nor wanted. (Comment Number: APHIS-2007-0044-6353-14)

Response: Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. See the response to comment APHIS-2007-0044-11689-2 for issue 5.6 regarding organic certification.

Comment Excerpt Text:
2) Additionally, we want regulations which will protect the many small alfalfa farmers, including the 15 certified organic alfalfa farmers, and organic farmers, whose main crops are not alfalfa, but who grow their own alfalfa for row cover. APHIS asserts that gene flow from GE alfalfa to conventional or organic alfalfa can be managed by isolation (especially in seed production). and that hay is usually harvest before significant bloom (limiting cross contamination.) But these assertions seem relatively unenforceable, due to such obvious factors as unpredictable weather, and human and machine failure. Even feral alfalfa, impossible to control, poses a risk of cross contamination (Comment Number: APHIS-2007-0044-6353-9)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
The DEIS rationalizes the deregulation of glyphosate tolerant alfalfa by assuming that organic alfalfa growers will not be significantly affected by low levels of glyphosate

tolerant DNA contamination in their crops. The authors of the DEIS incorrectly posit that organic certifiers, will allow the sale of alfalfa seed and hay crops known to be contaminated with glyphosate tolerant DNA because, "USDA organic certification is a process-based certification only; organic seeds or products are not certified according to genetic purity (p. 33)," and "… there is no policy regarding the unintended presence of GE material in organic products or food (p. 60)".
But from my experience working for an organic certifier, when the National Organic Program regulation is vague and does not explicitly lay out a policy, it is up to the organic certifier to make decisions based on the intent of the Organic Foods Protection Act, which ultimately guides organic producers to maintain the organic integrity of their products. I know that if an organic alfalfa hay or seed crop were to test positive for genetically modified DNA, it is likely that the organic certifier would work to prohibit the marketing and sale of the contaminated alfalfa hay or seed as organic. The certifier would be within its legal right to block the sale of the contaminated crop and could face adverse action from the National Organic Program if it did not.

Organic Farmers cannot knowingly feed genetically modified forage crops to livestock or knowingly plant seed that is contaminated with genetically modified, glyphosate tolerant DNA because this violates the ethos of what it means to be an organic farmer—we are trying to grow pure food, forage, and fiber crops. Also, knowingly planting seed contaminated with genetically modified DNA violates the National Organic Program rule §205.105(e) that explicitly states that an organic farmer cannot produce organic products
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using excluded methods. Excluded methods has been defined in the National Organic Program regulation as "a variety of methods used to genetically modify organisms or influence their growth and development by means that are not possible under natural conditions or processes and are not considered compatible with organic production."
Additionally, if the organic producer knowingly sold a contaminated crop as organic, he could be in violation of §205.100(c)(1) and be subject to a $10,000 penalty per violation. He also could get his organic certification suspended or revoked.
The DEIS states that, "although the probability is low, GT alfalfa genes may be found in non-GT alfalfa but cannot be considered a significant impact because, among other factors, contractual "best practices" have been found to produce non-GT alfalfa seed with >99.5 percent purity." Its impressive that "best practices" have been found to produce non-glyphosate tolerant alfalfa seed with >99.5 percent purity, but even 0.5% contamination with a prohibited material or excluded method can void the value of a certified organic hay or seed crop. Growing crops that can't be sold as organic is a significant impact for an organic farmer. Cross contaminated alfalfa crops would have zero value to organic buyers—no organic dairyman or organic seed buyer will buy alfalfa products known to be contaminated with genetically modified DNA, because it could put their organic certification at risk.
It is clear that if genetically modified alfalfa is deregulated, there could be serious economic consequences to organic growers unfortunate enough to have their organic alfalfa crops contaminated with nearby glyphosate tolerant pollen. But this was not seriously addressed by the DEIS because of the incorrect assumption that low levels of genetic pollution will have no serious impact to organic growers and would be tolerated

by organic certifiers and organic consumers. There are more than 50 domestic organic certification agencies in the United States with practical experience working with the National Organic Program. If APHIS wants to have an accurate discussion of the potential socioeconomic impacts of deregulation caused by the inevitable crosscontamination of organic alfalfa with genetically modified DNA, then it should survey organic certifiers (www.accreditedcertifiers.org) about the potential consequences organic growers face if they knowingly sell crops contaminated with genetically modified DNA as organic. (Comment Number: APHIS-2007-0044-6769-2)

Response: Regarding organic certification, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on organic farming and downstream markets (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Overall, the Draft EIS on the Request for Nonregulated Status for Round-up Ready Alfalfa (Document ID APHIS-2007-0044-0253) minimizes domestic and international concerns over the safety of GE crops. As an example, on p.80, the EIS states "[d]emand for GE foods or for foods free of GE content is very difficult to estimate." Except it has been estimated; I am aware of a number of market studies from the early part in this decade on the topic, and I suspect this area of academic research has increased along with the interest in GE crops. A larger issue comes in the very next sentence: [i]n the case of European countries this is because most European major food retailers do not carry GE foods in response to consumer concerns. The paragraph then focuses on the inability to estimate, but spends no time at all discussing how in other Western societies where product labeling informs the consumer as to the presence of GE crops, most food retailers do not carry GE crops. I would say that is an extremely strong statement as to the consumer demand for foods free of GE content I am not certain you could pass the arbitrary and capricious review standard with glaring omissions such as that in your EIS.
The EIS also attempts to minimize the size of the current domestic market for organic foods and both minimize and distort the impact that genetic drift and subsequent contamination will have on both the market for organic alfalfa and organic dairy products. This presents a direct harm to farmers, who would be left without an effective recourse to address that harm. The impact that would have on a market would be severe, in the form of risk aversion in response to the chance that an organic crop may end up contaminated, and unacceptable through no fault of the farmer. "Businesses Lost and Gained" on p.143 is an incredibly nave possibly intentionally nave paragraph. I would write more, but I have run out of space. (Comment Number: APHIS-2007-0044-6994-1)

Response: Regarding the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on organic farming and downstream markets (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
National Organic Program

Organic farming is a small but rapidly growing sector of U.S. agriculture, with about 0.5% of all U.S. cropland and 0.5% of all U.S. pasture being certified organic in 2005 (USDA-ERS 2007). Only a small percentage of the top U.S. field crops (0.16% of corn, 0.17% of soybeans, and 0.48% wheat) were grown under certified organic farming systems. Although small, organic production has been one of the fastest growing segments of U.S. agriculture for the past decade, it still represents <3% of the U.S. food market (Hellmich et al. 2007). The U.S. had less than one million acres of certified organic farmland when Congress passed the Organic Foods Production Act (OFPA) of 1990. By the time USDA implemented national organic standards in 2002, certified organic farmland had doubled, and it doubled again between 2002 and 2005 (USDA-ERS 2007). Because there has been a great deal of public confusion as to how biotechnology is treated in organic production systems, and what the term "organic" does and does not mean as a matter of law, a short summary of these issues is set forth here.

Congress passed The Organic Foods Production Act of 1990 to avoid severe confusion and misrepresentation then taking place in the organic marketplace. [Footnote 8: 7 U.S.C. § 6501 et seq.] The OFPA required USDA to establish a National Organic Program (NOP) to develop uniform standards and a certification process for those producing and handling food products offered for sale as organically produced (USDA-ARS 2000). The OFPA requires the NOP to be process-based, specifically describing the NOP as "an organic certification program for producers and handlers of agricultural products that have been produced using organic methods." [Footnote 9: 7 U.S.C. § 6503(a).] No claims or assumptions regarding the quality or content of organic products may be made beyond the fact that the product was produced under these standards.

Following two separate proposals and extensive public debate on the NOP's treatment of biotechnology, USDA finalized the NOP in 2000. Among other production standards and requirements, the NOP generally prohibits the use of biotechnology as a method of production. Biotechnology is specifically defined as an "excluded method" of organic production. [Footnote 10: The NOP defines "excluded methods" at 7 C.F.R. § 205.2.] The NOP prohibits the use of the term organic for products produced using excluded methods: "To be sold or labeled as '100 percent organic,' 'organic,' or 'made with organic (specified ingredients or food group[s]),' the product must be produced and handled without the use of . . . (e) Excluded methods . . ." The term "excluded methods" is defined as follows:

"A variety of methods used to genetically modify organisms or influence their growth and development by means that are not possible under natural conditions or processes and are not considered compatible with organic production. Such methods include cell fusion, microencapsulation and macroencapsulation, and recombinant DNA technology (including gene deletion, gene doubling, introducing a foreign gene, and changing the positions of genes when achieved by recombinant DNA technology). Such methods do not include the use of traditional breeding, conjugation, fermentation, hybridization, in vitro fertilization, or tissue culture" (USDA-ARS 2000).

Importantly, NOP prohibits the use of biotechnology: growers selling crops as organic may not intentionally plant seed produced through biotechnology. USDA repeatedly stated in the

finalized NOP that the mere presence of plant materials produced through biotechnology in a crop will not jeopardize the integrity of products labeled as organic:

"We have not accepted the comments that requested adding the products of excluded methods to the definition [of excluded methods]. The emphasis and basis of these standards is on process, not product. We have specifically structured the provisions relating to excluded methods to refer to the use of methods. Including the products of excluded methods in the definition would not be consistent with this approach to organic standards as a process-based system" (USDA-ARS 2000).

All organic growers' production plans (Organic Systems Plans) must be approved by an organic certifying agent before the farm can be certified as organic. [Footnote 11: 7 C.F.R. Part 205, Subpt. E.] Such plans must include, among other things, steps the organic grower is taking to avoid what the NOP refers to as genetic drift from any neighboring biotechnology-derived crops (USDA-ARS 2000). Certification must include on-site inspections of the farm to verify the procedures set forth in the Organic Systems Plan. [Footnote 12: 7 C.F.R. § 205.403.]

Thus, the NOP recognizes the coexistence of organic growers with neighboring growers who may choose to grow biotechnology-derived crops. Indeed some growers successfully produce organic and biotechnology-derived crops of the same species on the same farm (Cameron 2008, NCC 2007). So long as an organic grower follows an approved Organic Systems Plan that seeks to avoid contact with biotechnology-derived crops, if some residue of biotechnology-derived plant material is later found in the organic crop (or food produced from it), neither the crop (or food) nor the organic acreage is in danger of losing its organic status. This is consistent with other IP production systems.

When announcing the NOP, USDA emphasized that it is the use of biotechnology as a production method that is prohibited, not the mere presence of biotechnology-derived genetic material (described in the preamble as "a detectable residue of a product of excluded methods"):

"When we are considering drift issues, it is particularly important to remember that organic standards are process based. Certifying agents attest to the ability of organic operations to follow a set of production standards and practices that meet the requirements of the Act and the regulations. This regulation prohibits the use of excluded methods in organic operations. The presence of a detectable residue of a product of excluded methods alone does not necessarily constitute a violation of this regulation. As long as an organic operation has not used excluded methods and takes reasonable steps to avoid contact with the products of excluded methods as detailed in their approved organic system plan, the unintentional presence of the products of excluded methods should not affect the status of an organic product or operation" (USDA-ARS 2000).

Unlike some IP systems, the NOP does not require that organic crops be tested for the presence of biotechnology-derived genetic material. In fact, the NOP calls for testing only if there is "reason to believe" that a grower has used excluded methods. [Footnote 13: 7 C.F.R. § 205.670(b).] The preamble states that a reason to believe may be triggered by situations such as a formal, written complaint to the certifying agent regarding the practices of a certified organic

operation; the proximity of a certified organic operation to a potential source of drift; or the product from a certified organic operation being unaffected when neighboring fields or crops are infested with pests (USDA-ARS 2000).

Similar to EU and Japanese labeling laws, NOP does not establish a zero tolerance standard for the presence of biotechnology-derived plant material in organically labeled food. Rather, the NOP's testing provision serves as a warning that excluded methods may have been used: "Any detectable residues of . . . a product produced using excluded methods found in or on samples during analysis will serve as a warning indicator to the certifying agent" (USDA-ARS 2000). The presence of biotechnology-derived genetic material in an organic crop test sample is not, of itself, determinative that either the crop or the farm is not organic.

"[T]hese regulations do not establish a 'zero tolerance' standard. . . [A] positive detection of a product of excluded methods would trigger an investigation by the certifying agent to determine if a violation of organic production or handling standards occurred. The presence of a detectable residue alone does not necessarily indicate use of a product of excluded methods that would constitute a violation of the standards" (USDA-ARS 2000).

If detectible residues of biotechnology-derived genetic material are found, the certifying agent may then conduct an investigation of the certified organic operation (USDA-ARS 2000). The purpose of this investigation is to determine if the biotechnology-derived genetic material is present due to the intentional acts of the organic operator.

Only if the organic producer intentionally used excluded methods of crop production, e.g., sold biotechnology-derived crops as organic, or included biotechnology-derived ingredients in an organic food product will that producer be subject to suspension or revocation of organic certification: "[i]f the investigation reveals that the presence of the " … product produced using excluded methods in or on an agricultural product intended to be sold as organically produced is the result of an intentional … use of excluded methods, the certified organic operation shall be subject to suspension or revocation of its organic certification" (USDA-ARS 2000). [Footnote 14: 7 C.F.R. at § 205.660-681.]

The detection of the products of excluded methods in organically labeled foods will not require the recall or relabeling of such food unless: (1) the producer of such food has lost its certification through suspension or revocation, and (2) the suspension or revocation order specifies such action. OFPA does not authorize USDA to require recall or relabeling of organic products in commerce prior to the issuance of a suspension or revocation order:

"USDA will not, unless the noncompliance involves a food safety issue under FSIS, require the recall or relabeling of product in the channels of commerce prior to the issuance of a suspension or revocation order. First, at the time the product was produced, it may have been produced in compliance with the Act and these regulations. Second, USDA does not have the authority, under the Act, to issue a stop sale order for product sold, labeled, or represented as organic and placed in the channels of commerce prior to suspension or revocation of a certified operation's certification" (USDA-ARS 2000).

Even if an organic production operation has its certification suspended or revoked, the NOP does not necessarily require the recall or relabeling of products in commerce. Rather, the individual suspension or revocation order will set forth terms and conditions on a case-by-case basis:

"Operations that have had their certification suspended or revoked will be subject to the terms and conditions of their suspension or revocation relative to the labeling of product produced prior to the suspension or revocation. No product produced by an operation after suspension or revocation of certification may be sold, labeled, or represented as '100 percent organic,' 'organic,' or 'made with …" (USDA-ARS 2000).

This approach is consistent with the provisions of the NOP regarding labeling. [Footnote 15: 7 C.F.R. Part 205, Subpt. D.] A product may be labeled as organic if its ingredients were produced according to organic standards, even if the product contains some residue of biotechnology-derived plant material. However, if an organic farmer were found to be growing biotechnology-derived crops and attempting to sell them as organic, any organic labeling would be false and misleading, and recall or relabeling may be appropriate. (Comment Number: APHIS-2007-0044-7620-41)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
USDA also acknowledges that RR Alfalfa will hurt small and family sized conventional and organic farmers. There is no evidence that Monsanto will consider the economic impacts and biological contamination issues as regards to growers who choose not to use its product. These issues have been repeated across North and Central America for wheat, soybeans, corn, sugar beets and now alfalfa. (Comment Number: APHIS-2007-0044-7955-4)

Response: Regarding impacts of GT alfalfa deregulation on small farms, see the response to comment APHIS-2007-0044-4913-7 for issue 5.1. Regarding impact on conventional and organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding Monsanto's responsibilities in cases of presence of genetically engineered content in non-GT alfalfa fields, see response to comment APHIS-2007-0044-6376-1 for issue 5.1.

Comment Excerpt Text:
Organic livestock is the fastest growing segment in the organic industry. There is tremendous interest in organic milk and meat and growth of the entire sector is jeopardized with the release of GE alfalfa into growing fields. (Comment Number: APHIS-2007-0044-7955-6)

Response: See the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
According to experts, the entire $25 billion organic industry is at risk from GE alfalfa. If not stopped, the entire alfalfa industry will take a huge hit in and of itself. Because farmers will no longer be able to ensure the integrity of their alfalfa crops, they could potentially lose all export

contracts with countries that oppose genetic modification. In time, all alfalfa besides Monsanto's GE variety could become extinct. (Comment Number: APHIS-2007-0044-8176-4)

Response: Regarding impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding impacts on international trade, see the response to comment APHIS-2007-0044-3404-1 for issue 5.4.

Comment Excerpt Text:
As President of Irish Grove Farms, Inc., I write to oppose the approval of Glyphosate-Tolerant Alfalfa.My farm grows over 90 acres of organic alfalfa--alfalfa which would be contaminated by GM alfalfa. Not only will I lose my organic premium, this ruling will also effectively throw away thousands of dollars worth of organic fertilizers and soil correctives that I have carefully applied to improve the quality and health of my land. (Comment Number: APHIS-2007-0044-8321-1)

Response: Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
GM crops are a long-term economic disaster for farmers
A 2009 report showed that GM seed prices in America have increased dramatically, cutting average farm incomes for U.S. farmers growing GM crops.
GM and non-GM cannot co-exist
GM contamination of conventional and organic food is increasing. An unapproved GM rice that was grown for only one year in field trials was found to have extensively contaminated the U.S. rice supply and seed stocks. In Canada, the organic oilseed rape industry has been destroyed by contamination from GM rape. In Spain, a study found that GM maize has caused a drastic reduction in organic cultivations of this grain and is making their coexistence practically impossible.
You cant trust GM companies
The big biotech firms pushing their GM foods have a terrible history of toxic contamination and public deception. GM is attractive to them because it gives them patents that allow monopoly control over the worlds food supply. They have taken to harassing and intimidating farmers for the of saving patented seed or patented genes -- even if those genes got into the farmers fields through accidental contamination by wind or insects. (Comment Number: APHIS-2007-0044-9298-5)

Response: Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the monopoly comment, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0.
In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
There is no documented certified organic seed produced in the United States, although there is likely a small amount grown organically. There is no doubt that the organic market will grow with demand from organic dairies, but even if it grew 10-fold it will likely remain the minority of total production.
Seed-seed and hay-seed interfaces are likely to make up the minority (<2%) of potential gene flow situations. In terms of importance based on acres and value, it is clear that the hay-to-hay interface
is the most prevalent, yet we provide scientific evidence that this situation is manageable and provides the least opportunity for gene flow (Fig. 1). (Comment Number: APHIS-2007-0044-9304-2)

Response: APHIS acknowledges the comment. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
As a consumer of organic products, I feel that genetically engineered crops or products should NOT be allowed under the label of "organic" - or at any stage in the production of organic foods and products. This type of Glyphosate-Tolerant Alfalfa should be regulated, and should not be associated with organic products and processes. Along with concerns about long term impacts on human health and the environment, I am concerned that GE alfalfa will hurt the organic industry and small farmers, which was concluded in the economic analysis the USDA has acknowledged. I urge you to not allow glyphosate-tolerant alfalfa, or any other GE materials, to be associated with organic products and designations. (Comment Number: APHIS-2007-0044-9398-1)

Response: Regarding impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to impacts on human health, see the response to comment APHIS-2007-0044-11034-2 for issue 6.1. In regard to the impacts of GE crops on the environment, see comment APHIS-2007-0044-5302-1 under issue 4.0.

Comment Excerpt Text:
Furthermore, given the history of certain companies to aggressively defend their GMO technology, I believe that granting this request for nonregulated status would jeopardize many family farmers who do not have the resources to defend their lands and crops from contamination and subsequent legal action by GMO growers. (Comment Number: APHIS-2007-0044-9411-2)

Response: Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
I have two businesses, Robinette Farms and Meadow to Market, that depend on the integrity of organic forages including alfalfa and the guaranteed contamination of organic crops with Roundup Ready alfalfa is a danger to my businesses and many others like it. (Comment Number: APHIS-2007-0044-9417-1)

Response: Regarding impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
This is in reference to proposed deregulation of a genetically engineered alfalfa seed from the Montsanto company. Instead of protecting a company that has an arsenal of funding to promote many types of chemical endeavors, why not protect organic farming which is a growing $25 billion dollar industry.
Since U.S. organic standards prohibit genetic engineering, allowing Montsanto to continue with the production of GMO alphalpha ignores the precedents esatblished by those qualified to determine its safety.
The organic food industry offers choice to Americans and its success is growing. Since America is a capitalist market and a nation that promotes individual choice, it makes sense that protecting a choice about an industry that promotes health and nutrition would be easy to make.
Because of the science behind pollenation, eventually Monsanto will monopolize the production of alfalfa seed grown in the US.
This monopoly will force organic producers to choose between two solutions: switch to other legumes or buy organic seed from foreign sources.
Please consider the growing organic farming industry and as America becomes smarter about the things they eat, empower them with viable choices and not the dregs of a chemical industry whose goal is foreign monies. (Comment Number: APHIS-2007-0044-9443-1)

Response: Regarding the monopoly comment, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0. Regarding impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
The national organic standards in both the U.S. and Canada prohibit the use of genetically engineered organisms. This is a central tenet of organics. For example, animals used for certified organic meat, milk, eggs, and other animal products need 100 percent organic feed. Alfalfa is used widely for livestock feed, including for dairy cows. I am deeply concerned that the U.S. may allow plantings of genetically engineered (GE) alfalfa which I know will result in the contamination of organic alfalfa in the U.S. and Canada. I do not want to eat GE foods which is one reason why I choose to buy organic food.
The USDA claims that consumers will not reject GE contamination in organic alfalfa if the contamination is unintentional or if the transgenic material is not transmitted to the end milk or meat product. THIS IS SIMPLY NOT THE CASE. Canadian consumers of U.S. organic foods and food ingredients care deeply about the integrity of certified organic foods, and GE is fundamentally not organic.

The GE contamination of organic alfalfa would severely impact the entire organic system in the U.S. and Canada, especially because many different types of organic farmers plant alfalfa to improve soil fertility. This important technique makes it possible to farm successfully without using chemical fertilizers. Contamination by GE alfalfa would eliminate this valuable tool, causing severe economic and agronomic costs to organic farmers.
I care about the livelihoods of organic farmers, and the future of organic farming in North America. (Comment Number: APHIS-2007-0044-9446-1)

Response: Regarding the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on organic farming and downstream markets (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
In particular, I believe organic farmers will be adversely affected by this policy. While not an organic farmer, I do buy organic products when available and when my finances allow. And I disagree with the EIS when it states that organic processes theoretically allow for GE seed; that's certainly NOT my expectation when I buy organic products, and I'm pretty sure organic regulatory agencies (Oregon Tilth, etc.) back that up. (Comment Number: APHIS-2007-0044-9486-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
We are one of the over 300 organic dairy farms in New York State. Many of us grow alfalfa as one of our main crops. Given that alfalfa is pollinated by bees, which can and do travel for several miles, there will be no way we will be able to protect our organic alfalfa from contamination if genetically engineered alfalfa is allowed by USDA. Conventional alfalfa is grown all around this state and the country. GE alfalfa and certified organic alfalfa will not be able to coexist.
The DEIS wrongly asserts that organic crops do not have to be tested for GE contamination. While it is true that not all organic crops are required to be tested currently, testing is something that can and will be required if such contamination is likely / unavoidable, as will be the case with GE alfalfa. Not only will we most certainly have to bear the cost of testing, if positive results are found, that contaminated crop will not be able to maintain organic status and that loss will cause significant economic harm. The release of GE alfalfa in the country will undoubtedly lead to the total loss of alfalfa as a crop for organic production, again a huge economic loss. This is a serious issue, both to me as an organic farmer and as an organic consumer. USDA should not deregulate GE alfalfa. It is morally and economically reprehensible to allow a transgenic crop, such as alfalfa, to be grown that will contaminate the crops of others, who do not want the GE crop, and thereby cause widespread economic and ecological harm. (Comment Number: APHIS-2007-0044-9538-1)

Response: Regarding the concern that testing will be required, see the response to comment APHIS-2007-0044-0693-1 for issue 5.9. Regarding the comment about organic certification, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for issue 3.1. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
There is an appearance of tremendous impropriety here: the only certain beneficiary of your approval of round-up ready alfalfa will be Monsanto. The certain losers will be those of us who chose to grow, sell, buy and use organic foods. Organic foods, by the way, are one of the brightest lights in an otherwise dim economy - in spite of the endless and endlessly funded assurances of giants like Monsanto that we have nothing to fear from their cutting-edge agricultural wizardry.
Individuals vastly better educated than I have studied and reported on the real potential harm of genetically engineered crops. If their findings don't influence you, it's difficult to imagine that my plea will find your ears. Yet, you do have a responsibility to impartially consider all relevant information, and to decide on behalf of protecting the integrity of our food supply, and our agricultural system.
I have a simple question for you: if the USDA doesn't protect farmers and consumers from GE contamination, where are farmers consumers to turn for protection? I believe that's a question you need to answer. (Comment Number: APHIS-2007-0044-9558-2)

Response: APHIS acknowledges the comment. Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Because alfalfa is an open-pollinated crop, markets for alfalfa seed and hay that reject genetically engineered (GE) material in seeds and feed risk acquiring the Roundup Ready trait through gene flow. The USDA National Organic Program does not allow the use of agricultural biotechnology in certified organic farming systems, so cross-pollination of Roundup Ready alfalfa with organic crops will increase production costs, reduce profits and eliminate markets for organic alfalfa producers.
APHIS admits that GE crops, such as corn, soybeans, and canola, accidentally end up in organic products but says theres no evidence that this is impeding the development of the organic sector (pp. 135 136). APHIS asserts there is no evidence that organic consumers demand products free from the unintended presence of GE traits (p. 135).
The organic farmers and businesses that MOA represents know their customers well, and they know these customers expect their products to be free of GE traits. Any and all presence of such traits will cause their customers to lose confidence in their products. The EIS dismisses the reality that consumers view organic products as GE-free and demand zero tolerance for GE material they purchase organic products to avoid GE ingredients in food. Indeed, the organic

community fought hard for the complete exclusion of genetically engineered products in certified organic products when the NOP was first created. (Comment Number: APHIS-2007-0044-9561-1)

Response: Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
The EIS says USDA organic certification would not be affected given that organic certification does not require testing for GE content and focuses on the process used to grow the product rather than on the content of the product (p. 133).
This statement completely dismisses organic farmers and consumers demand for non-GE seed and food. When organic farmers purchase organic seed they expect it to be free of all GE material since GE traits are specifically excluded from the National Organic Program (USDA NOP 7CFR 205.105(e) and 205.204). Knowingly planting seed with GE traits could threaten certification, as well as further contaminate organic farmers crops.
USDAs own Inspector General and the U.S. Government Accountability Office have both published reports noting that the current regulatory framework for GE crops fails to contain and segregate GE and non-GE crops. This means the entire burden of protecting the integrity of organic products will continue to be on the shoulders of organic farmers. The conclusions of the EIS do not provide adequate protection from seed contamination, and set a dangerous precedent that would undermine the integrity of the organic seed supply of all types of crops for which there are GE crop counterparts.
The EIS completely ignores our members desire and right to grow GE-free agricultural products. The document poses a conflict with the National Organic Programs federal regulations excluding GE by creating conditions in which organic seed, free of any and all GE contaminants, will increasingly become difficult if not impossible to source.
In the event an organic farmer detects GE material in his organic products, he must choose between maintaining the integrity of the organic market by sending it to the conventional market or knowingly sending the GE product to the organic market. Both options place this farmer in a vulnerable and awkward position. In the first scenario, he loses a premium price for his product. In the second, he further risks the credibility of the organic label.
Consumers have established an implied zero tolerance for GE material in organic products, since polls show confidence in organic products as clear alternatives to GE ingredients. The organic industry risks losing credibility altogether should its consumer base become aware that GE material is making its way into organic products. This puts organic operations and this valuable market at risk. Additionally, the NOP federal regulations are at risk, as there is no use of an excluded method, such as the use of genetically engineered inputs. Excluded means excluded organic seed cannot have GE traits and be used by an organic farmer. APHIS needs to respect the federal rule, and recognize that the companies releasing GE crops must have a clear and sound method for preventing contamination of organic seed systems. Until that is the case GE crops should be prohibited. It is unreasonable to place the economic burden of protection along this

entire chain of production on the potential victims of contamination. (Comment Number: APHIS-2007-0044-9561-3)

Response: Regarding the comment on organic certification and consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
I am an organic dairy farmer in NE Iowa. I want to express my concerns on the possible release of round-up ready alfalfa.
Roundup ready alfalfa will cause more harm then good if released for public sale.It has already cross pollinated other non GMO plants near current seed fields. Bee's will carry the pollen 5 miles or more to cross pollinate all allfalfa if it is released for sale.
It will destroy the organic hay market and export markets. It has been well documented the GE alfalfa can not be contained.
I can not see the reason for its use. Weeds can be controled easily in forage production with timly cutting. The seed industry has produced seed without roundup for decades (Comment Number: APHIS-2007-0044-9636-1)

Response: Regarding impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding impacts on international trade, see the response to comment APHIS-2007-0044-3404-1 for issue 5.4. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for issue 3.1.

Comment Excerpt Text:
In USDA's Environmental Impact Statement (Docket No. APHIS-2007-0044) on genetically engineered alfalfa, USDA claims that there is no evidence that consumers care about contamination to organic alfalfa and alfalfa-derived foods from Monsanto's GE Roundup Ready alfalfa. The Wedge Community Co-op is writing to assure you as the largest, single store consumer co-op open to the public, and a Certified Organic Retailer with over 14,000 members, that consumers do care.
Wedge Co-op customers spend over $30 million in our Co-op and our members purchase 80% of our organic product sales. Our members view organic foods as healthful and of the highest quality. Currently the USDA organic seal is seen as trustworthy in a marketplace where there is a general mistrust over labels, a lack of transparency and some level of outrage over government's perceived failure to enforce food safety regulations.
If alfalfa is contaminated through the release of a genetically engineered version of alfalfa, our customers will no longer trust the organic label, which will seriously impact our business. As our business is impacted, so are the farmers and their communities.
Our customers will not only mistrust the label, but will believe the USDA has undermined it's own program. Prohibition of genetic engineering (GE) is a fundamental tenet of the Organic

Standard. In fact, the organic rule's failure to exclude GE from its first version was one of the main reasons why the Wedge and our members filed public comments in 1997, at the time the largest outpouring of public participation in the history of U.S. administrative procedure. Consumers care deeply about organic integrity, and GE is fundamentally not organic. Polls show that more than 75% of consumers believe that they are purchasing products without GE ingredients when they buy certified organic product.
USDA also claims that consumers will not reject GE contamination of organic alfalfa if the contamination is unintentional or if the transgenic material is not transmitted to the end milk or meat product. The Organic Standard requires that livestock feed for animals used for meat, milk, eggs, and other animal products is 100 percent organic. As the Court found in the lawsuit that required this EIS, to "farmers and consumers organic means not genetically engineered, even if the farmer did not intend for his crop to be so engineered." Whether or not the end product is impacted is not the issue. Farmers' fundamental right to sow the crop of their choice is eliminated when it is contaminated with transgenes, and so is the public ability to support meaningful organic food and feed production. Consumers will reject GE contamination of organic by any means or at any stage of food production.
USDA claims that Monsanto's seed contracts require measures sufficient to prevent GE contamination, and that there is no evidence to the contrary. In the lawsuit requiring this document, the Court found that contamination had already occurred in the fields of several Western states with these same business-as-usual practices in place! In general, where other GE crops were approved without restriction, contamination of organic and conventional seeds and crops is widespread and has been documented around the world. A recent report documented 39 cases in 2007 and more than 200 in the last decade. The EIS itself acknowledges that GE contamination may happen and includes studies that honey bees can cross-pollinate at distances over 6 miles, and Alkali bees at 4-5 miles, much further than any distances under Monsanto's "best practices."
As a consumer-owned cooperative, the Wedge is deeply concerned about the contamination of organic foods and crops. We expect USDA to do everything the agency can to protect organic farmers and consumers. The organic industry provides many benefits to society: healthy foods for consumers, economic opportunities for family farmers and urban and rural communities, and a farming system that improves the quality of the environment. However, the continued vitality of this sector is imperiled by the complete absence of measures to protect organic production systems from contamination and subsequent environmental, consumer, and economic losses. USDA must reject the deregulation of GE alfalfa and protect the integrity of organic. (Comment Number: APHIS-2007-0044-9740-1)

Response: Regarding the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for issue 3.1.

Comment Excerpt Text:

The problems of contamination for organic growers through comingling cannot be ignored. Organic farmers cannot tolerate any GE contamination of their alfalfa. If contamination is found, despite all of the precautions taken, the farmer will lose a certification and market that took years and hard work to establish. Losing this market affects both the farmer and his customers, who may have go farther for their organic hay and pay more for it. The long term result is to make organic food more expensive and to take away the right for consumers to choose what they want to eat because it is financially out of reach.

The EIS assumes that consumers will not reject GM contaminated of organic alfalfa if the contamination is unintentional or not transmitted to the end product. However, prohibition of GM is a fundamental tenet of the Organic Standard. This Standard requires that livestock feed for animals used for organic meat, milk, eggs and other animal products is 100% organic. Protecting organic alfalfa, the main source of feed for organic dairies is crucial to the health of that popular and important sector of U.S. agriculture. (Comment Number: APHIS-2007-0044-9882-10)

Response: Regarding the impact on organic and downstream markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding consumer preference for products free of genetically engineered content, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
The EIS also failed to analyze the economic costs of contamination to producers' conventional and organic alfalfa and the foods derived from them. Roundup Ready alfalfa may also spread by crossing with feral alfalfa, through the spread of volunteer plants, through wind and water erosion, and by the transport, feeding and digestion of feed.

The EIS should have analyzed whether and to what extent segregation of GM from conventional alfalfa is possible. The questions outlined by APHIS for its proposed scope of the EIS appear to get at this under items #16 and #17, but the EIS still did not evaluate whether any of the potential negative environmental and economic impacts resulting from the deregulation of glyphosate-tolerant alfalfa can be mitigated and the likelihood that mitigation measures will be successful – that is, whether "coexistence" (see #17) is practical or possible. The EIS simply ignores the possibility, thus the problems comingling creates. (Comment Number: APHIS-2007-0044-9882-7)

Response: Regarding impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. In regard to alfalfa volunteer weeds, see the response to comment APHIS-2007-0044-10263-8 for issue 3.4. In regard to gene flow due to unintentional mixing and distribution of seed, see the response to comment APHIS-2007-0044-10263-5 for issue 3.2. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
These additional costs include those to "avoid gene flow" from Roundup Ready alfalfa, testing costs to identify GE material, and costs associated with organic products being rejected by buyers due to undesirable GE material. Conventional and organic seed and alfalfa growers will suffer a similar fate. When unwanted genetic material flows into crops planted and grown to be free of GE material, the farmer loses his/her ability to protect their crop and market. This is a form of genetic trespass similar to trespass by pesticides, which do have some protection under current law. It does not appear the USDA adequately consulted with organic or conventional alfalfa seed growers or producers to also include data that would indicate the current and projected costs of testing and loss of markets over time. Members of our trade association are spending thousands of dollars on PCR testing to determine whether or not organic seed has been subject to GE contamination for soy, corn, papaya and other GE crops and the release of GE alfalfa will add to this incredible burden on farmers who have the right to grow crops free of genetically engineered material. (Comment Number: APHIS-2007-0044-9896-3)

Response: Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding genetic testing, see the response to comment APHIS-2007-0044-0693-1 for issue 5.9.

Comment Excerpt Text:
APHIS concludes that the deregulation will not have significant interrelated economic impacts on alfalfa farmers and alfalfa end users. However overwhelming evidence belies this conclusion, demonstrating that biological contamination of non-GE conventional and organic alfalfa seed, hay, and end products that rely on non-GE alfalfa will in fact cause significant economic harm that must be addressed under NEPA. Failure to acknowledge this interrelated economic harm, and failure to find that this economic harm is a significant impact under NEPA is arbitrary, capricious, and an abuse of discretion.

The rule under NEPA is that economic effects are relevant and must be examined "when they are interrelated with natural or physical environmental effects." [Footnote 54 Ashley Creek Phosphate Co. v. Norton, 420 F.3d 934, 944 (9th Cir. 2005) (quoting 40 C.F.R. §1508.14).] The court explained in Geertson: "The economic effects on the organic and conventional farmers of the government's deregulation decision are interrelated with, and, indeed, a direct result of, the effect on the physical environment; namely, the alteration of a plant species' DNA through the transmission of the genetically engineered gene to organic and conventional [sugar beets]." [Footnote 55 2007 WL 518624 *8.] (Comment Number: APHIS-2007-0044-9936-12)

Response: Regarding the impact on organic farming and downstream markets (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

5.3 Issue 5.3 – Impacts on Dairy and Beef Markets

Comment Excerpt Text:
When alfalfa "volunteers" in a yard, pasture, or roadside ditch, it's amazing how quickly it spreads, even where it was never planted.
As a feed for organic, forage-only production models where no grain is fed to ruminant livestock

in the winter, non-GMO contaminated alfalfa is critically important due to its nutritional profile for meeting protein requirements in the winter. Such sustainable production models (grass when it is available, hay when it is not, and no grain) would be close to impossible without non-GMO alfalfa in many parts of the country. Because of this, not only organic alfalfa producers are threatened by the spread of Roundup Ready alfalfa, but organic livestock producers are in danger as well.
For farmers who look at 'organic' or 'naturally raised' simply as market differentiators, they may say, "So what?" and will not see a problem. But, they should see the active contamination of their neighbors' fields due to their choices as a problem.
Nothing organic farmers do threatens to put conventional farming neighbors out of business. The same cannot be said for the intentional choice to use GMOs like Roundup Ready alfalfa. If the result of those choices reduces the diversity of our farm operations and causes more people to leave farming, who benefits? (Comment Number: APHIS-2007-0044-0369-1)

Response: APHIS acknowledges the comment. In regard to the potential for alfalfa to act as a weed, see the response to APHIS-2007-0044-0369-1 for issue 3.5. In regard to the impacts on organic and downstream markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Sirs, I am very much opposed to the approval of roundup ready alfalfa. As a dairyman and alfalfa grower for over 30 years, I have never wanted or needed to spray my alfalfa fields. Like a growing number of dairymen in my area, I now add grasses to my alfalfa seed. This is on the reccomendation of my dairy nutritionist and I am sold on it as are the cows.
There can be no doubt that contamination of non GMO alfalfa fields will occur. There are always areas of alfalfa fields that do not get cut before pollination, weather being the main reason. They have found the GMO corn gene in the native maize in remote areas Mexico. It is hard to believe that the GMO alfalfa gene won't cross a fenceline or road, and once the GMO genie is out of the bottle you can't put it back.
As far as profitability goes, the only ones making money off this will be, as in corn and soybeans, the manufacturers and sales businesses. Farmers need to ask themselves, are they really better off financially since the introduction of GMO corn and soybeans. High priced seed and high priced chemicals and the grain is worth the same price as before or less.
Conventional seed is becoming harder and harder to find as there are fewer seed varieties and seed companies to buy from. If left unchecked, farmers will be forced to buy there seed/chemical package from just 2 or 3 agribusiness giants.
The furure is in the seed. Thank you
Robert Mueller
(Comment Number: APHIS-2007-0044-0482-1)

Response: APHIS acknowledges the comment. In regard to the impact of GT alfalfa deregulation on non-GT markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the likelihood of gene flow, see the response to comment APHIS-2007-0044-0482-1 for issue 3.1.

Comment Excerpt Text:
GE alfalfa would threaten organic livestock production including dairy
If GE alfalfa were introduced, contamination would occur and the crop would no longer be available for organic livestock feed. Organic meat and dairy is a growing market, particularly when
cattle are raised on pasture and/or are grass fed. Alfalfa, known as "The Queen of Forages", is an extremely important forage crop as, in addition to its other advantages, it is high in protein. The loss of alfalfa could significantly reduce the number of organic livestock and dairy operations and/or increase the costs for producers, as the availability of certified organic feed is already a limiting factor in the growth of this market.
Losses of organic livestock due to the loss of alfalfa as an organic crop would have a cascading effect on the fertility of organic farms, as manure from organic livestock is an important source of
phosphorus as well as nitrogen. (Comment Number: APHIS-2007-0044-10263-11)

Response: APHIS acknowledges the comment. In regard to impacts on organic and downstream markets, see response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
A Wide Range of Organic Products would be Affected by Unintended GE
Presence
A wide range of organic foods and food ingredient exports from the U.S. to Canada will be severely impacted by GE contamination.
Canada's growing demand for organic food on the part of consumers and organic ingredients on the part of processors is largely satisfied by imports from the United States. Imports, mostly from the U.S., account for 80 to 90 percent of the organic products sold at retail in Canada. [Footnote xxii: George Myles, "Canada Organic Products Organic Regulations 2007" USDA Foreign Agricultural Service GAIN Report Number: CA7004.
http://www.fas.usda.gov/gainfiles/200702/146280139.pdf February 06, 2007.] The large majority are organic fruits and vegetables, but there are many organic ingredients that are also
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imported. In 2007, the organic food market accounted for approximately 2.0 percent of total Canadian retail food sales and was valued at $2.6 billion at retail. The market for organic food is growing at 15-20 percent per year. [Footnote xxiii: Ibid.]
In addition to the retail sale of alfalfa sprouts as well as alfalfa seeds for home sprouting which will immediately experience consumer rejection due to unintended presence, alfalfa forage is an upstream input to human food production, as noted in the DEIS. Alfalfa feed is an input to dairy farms, beef cattle, as well as other animal feeds. Dairy is an important piece of the organic value chain in Canada, with an approximate 25% increase in organic milk production from 2006-2007. [Footnote xxiv: Holmes, Matthew and Macey, Anne, in "The World of Organic Agriculture: Statistics and
Emerging Trends 2010" International Federation of Organic Agriculture Movements (IFOAM).

2010. P194.]
Honey production would also be negatively affected. According to the U.S National Honey Board
alfalfa is ranked as the most important honey plant in Utah, Nevada, Idaho, Oregon and most of the western states. The Board lists 73 U.S. suppliers of alfalfa honey. [Footnote xxv: National Honey Board, Honey Locator
http://www.honeylocator.com/floral_results.asp?Floral_ID=4 Accessed March 1, 2010.]
(Comment Number: APHIS-2007-0044-10263-16)

Response: See response to comment APHIS-2007-0044-10263-16 for issue 5.4.

Comment Excerpt Text:
Health Concerns with GE products

Recognizing that organic and conventional consumers purchase organic products or prefer to eat GM food for health reasons is considerable, and demonstrates the wariness that consumers have about the potential human health effects of GM food. Recent and increasing evidence is suggesting that GM foods are indeed not safe for human consumption and that GM crops have the potential to transfer GM DNA into their byproducts, including milk and meat, as would be most probable with GE alfalfa.

New evidence has found that GM DNA can transfer into milk. Agodi et al. (2006) found that the presence of GM maize was evident in 25% of their samples and GM soy was present in 11.7% of their samples. Furthermore, it was demonstrated that the pasteurization process was not able to degrade the GM DNA. Similar results have been found in pigs, which were fed GM corn. DNA from the corn persisted in the gastrointestinal tracks of pigs and results indicated that the ingested corn DNA and proteins were not totally degraded in the gastrointestinal tract (Chowdhury et al. 2003).

Economic Impacts on Organic Farmers Organic consumers clearly stand to be deeply affected by the approval of GE alfalfa, particularly given their preferences for wanting to avoid GM foods. Organic farmers also stand to be heavily impacted by the approval of GE alfalfa. APHIS notes that, “the supply of organic alfalfa hay and organic alfalfa seeds would not be directly affected by adoption of GT alfalfa by non-organic producers of alfalfa” (APHIS pg. 133). As well, APHIS concludes that calculating the economic impacts of GT alfalfa deregulation on organic alfalfa is not possible given limited data. NCGA strongly disagrees with the assumption that organic alfalfa growers in the United States will not be affected by the deregulation of GE alfalfa.

A 2008 study published by Munro, examined the spatial impacts of GM crops from an economic perspective in unregulated situations, such as the one that APHIS is proposing. It was concluded that the spatial externalities associated with unregulated GM crop plantings may have a notable effect on organic farmers, “because the presence of transgenic crops may eliminate or severely reduce the planting of organic varieties and other crops where some consumers have a preference for non-GM crops.” Further, Munro concluded that “co-existence may be impossible without

strong regulation on planting patterns" (Munro, 2008).

Munro further discussed how such spatial issues would economically affect organic farmers, noting that in a competitive market, organic and non-GM farms adjacent to or nearby farms growing GM varieties may be compelled to sell their product for a lower price or "face elimination from the market or be forced to switch to the GM variety". In essence, what Munro demonstrated was the spatial dominating power of GM crops in an agricultural setting, noting that even if transgenic crops occupied only 10% of the space in a given area, 60% of the total area could be denied to non-transgenic crops because of spatial externalities like barriers associated with GM crops (Figure 4) (Munro 2008).

[See original submission letter for Figure 4. Illustrative Patterns of GM Spatial Externalities. Black square represent spaces grown with GM crops and gray squares represent areas that would be unable to be planted in organic or non-GM varieties. Munro, A. 2008. The spatial impact of genetically modified crops.]

Munro concluded that in order to create "consumption efficiency" or market equilibrium, there would need to be an incentive for farmers to sow non GM crops when they lie in the shadow of GM crops. Without such incentives or regulation within the market, efficiency is unlikely to be obtained and that co-existence between GM and non GM varieties is unsustainable in an unregulated market. Importantly, Munro noted, "As long as there is no cost to the GM planting farmer from introducing a transgenic crop into a previously GM free geographical area, then equilibrium between GM and non GM cultivars is inherently unstable" (Munro 2008). (Comment Number: APHIS-2007-0044-11018-6)

Response: APHIS acknowledges the comment. In regard to consumer preferences for products free of genetically engineered content and organic certification, see response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to impacts on organic and downstream markets, see response to comment APHIS-2007-0044-9882-1 for issue 5.0. The source provided (Munro 2008) has been incorporated to the analysis in the FEIS. In regard to the health impacts of GE alfalfa, see the response to comment APHIS-2007-0044-11034-2 for issue 6.1.

Comment Excerpt Text:
Consuming milk and meat from animals fed crops that are genetically engineered is also risky. In a survey of milk products sold in stores in Italy, results from the screening of 60 samples of 12 different milk brands demonstrated the presence of GM maize sequences in 15 (25%) and of GM soybean sequences in 7 samples (11.7%). (Comment Number: APHIS-2007-0044-11034-4)

Response: APHIS acknowledges the comment. In regard to the health impacts of GE alfalfa, see the response to comment APHIS-2007-0044-11034-2 for issue 6.1.

Comment Excerpt Text:
In addition, alfalfa is the primary livestock feed in the U.S.; therefore, GT alfalfa would be indirectly consumed by humans. The fact that no adverse effects to livestock from GT hay have

been observed since its deregulation in 2005 (page 33) is not nearly enough evidence or enough of a sample size or timeline to confirm that GT alfalfa would not harm humans because often long-term adverse effects are not observed until many years later. Livestock consuming GT crops for a short period of less than a few years does not correlate to long-term human consumption. A 2009 long-term post-approval study on the ingestion of GT corn published in the International Journal for Biological Sciences found concerning health impacts, including liver and kidney failure. The study concludes that "Patho-physiological profiles are unique for each GM crop/food, underlining the necessity for a case-by-case evaluation of their safety, as is largely admitted and agreed by regulators. It is not possible to make comments concerning any general, similar subchronic toxic effect for all GM foods." (Comment Number: APHIS-2007-0044-2325-5)

Response: APHIS acknowledges the comment. In regard to the link between glyphosate and health effects, see the response to comment APHIS-2007-0044-2243-1 for issue 6.0.

Comment Excerpt Text:
Without alfalfa being grown on organic farms, there will be a severe loss of feed for certified organic livestock and dairy production. Alfalfa is an important, nutritious feed, particularly in northern areas where feed must be stockpiled as hay for the winter months. The alfalfa plant is able to fix atmospheric nitrogen and convert it into a form of nitrogen useable by plants through a symbiotic relationship it has with certain soil bacteria that colonize its roots. Alfalfa is thus able to increase soil fertility, which improves productivity of farmland. The nitrogen that alfalfa makes biologically available is also converted to plant protein within the plant itself. This is why alfalfa is such an important feed crop for meat and dairy animals which have high protein requirements.
Canadian consumers are increasingly turning to certified organic foods. The growth in the organic sector is approximately 20% per year. Organic meat and dairy is an area poised for even greater growth as processing capacity is developed. In addition there is a high proportion of imported organic food from the USA. The introduction of genetically engineered alfalfa will reduce volume and the range of products that can be sold organically, as the loss of organic alfalfa will have a severe impact on the viability of organic dairy, beef, and pork production. (Comment Number: APHIS-2007-0044-2380-3)

Response: APHIS acknowledges the comment. In regard to the impacts on organic and downstream markets such as dairy and beef, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
6. The Organic Food Production Act does not allow genetically engineered products to be used and sold as "organic." Additionally, the market demands that foods labeled as "organic" do not contain any genetically engineered material. Thus, contamination of non-GE dairy and meat threatens organic ranchers and dairy farmers' organic certification and their markets, which in turn threatens our market. (Comment Number: APHIS-2007-0044-2421-4)

Response: APHIS acknowledges the comment. In regard to organic certification in the presence of unintended genetically engineered material, see response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
7. The Skagit Valley Co-op purchases organic dairy and meat products from 10-15 Skagit Valley and Whatcom County farmers as well as farmers in California and Oregon. In 2009 we sold approximately $592,219 worth of Meat products, $817,012 worth of Ice Cream, Butter, Milk, Eggs, and Cheese products, and $480,560 worth of Deli Entrees, Cold Salads, Sandwiches, Soup, and ready-made To-Go products containing the above ingredients. Our combined sales in these departments: $1,889,791. If our supplying farmers lose access to animal feed free of GE contamination, we will lose all of these sales. Thus, wide spread GE contamination of alfalfa has the potential to cause serious negative effect on our business in the near future. (Comment Number: APHIS-2007-0044-2421-5)

Response: APHIS acknowledges the comment. In regard to the impacts on dairy and beef markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Without alfalfa being grown on organic farms, there will be a severe loss of feed for certified organic livestock and dairy production. Alfalfa is an important, nutritious feed, particularly in northern areas where feed must be stockpiled as hay for the winter months. The alfalfa plant is able to fix atmospheric nitrogen and convert it into a form of nitrogen useable by plants through a symbiotic relationship it has with certain soil bacteria that colonize its roots. Alfalfa is thus able to increase soil fertility, which improves productivity of farmland. The nitrogen that alfalfa makes biologically available is also converted to plant protein within the plant itself. This is why alfalfa is such an important feed crop for meat and dairy animals which have high protein requirements.
Canadian consumers are increasingly turning to certified organic foods. The growth in the organic sector is approximately 20% per year. Organic meat and dairy is an area poised for even greater growth as processing capacity is developed. In addition there is a high proportion of imported organic food from the USA. The introduction of genetically engineered alfalfa will reduce volume and the range of products that can be sold organically, as the loss of organic alfalfa will have a severe impact on the viability of organic dairy, beef, and pork production. (Comment Number: APHIS-2007-0044-2741-5)

Response: APHIS acknowledges the comment. In regard to the impacts on organic and downstream markets such as dairy and beef, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
And because alfalfa is fed to dairy cows and other livestock, contamination puts organic dairy and meat at risk too. (Comment Number: APHIS-2007-0044-2844-3)

Response: See the response to comment APHIS-2007-0044-3240-1 for issue 5.3.

Comment Excerpt Text:
I ask in earnest to stop and evaluate the long term effects of yet another GM crop. Studies are proving that GM products are unstable and DO NOT deliver the same nutrient value of organically grown crops.
The government's intended role in this area is to safeguard, or at least identify those practices which are harmful. GM alfalfa WILL contaminate the organic grown product, this adversely destroying the organic beef industry. Stop the destruction of our people and promote HEALTHY and UNITY. (Comment Number: APHIS-2007-0044-3239-3)

Response: APHIS acknowledges the comment. In regard to the impacts on beef markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for issue 5.2. In regard to the link between glyphosate and health effects, see the responses to comment APHIS-2007-0044-2243-1 for issue 6.0.

Comment Excerpt Text:
You may not think about alfalfa much when you're drinking organic milk, but organic alfalfa is important to organic farming, as a nourishing animal feed that's also a nitrogen-fixing soil enhancer. Once GE alfalfa is introduced, its contamination of non-GE plants - including organic - is all but inevitable. And because alfalfa is fed to dairy cows and other livestock, contamination puts organic dairy and meat at risk, too. I care deeply about GE contamination and it needs to be stopped. (Comment Number: APHIS-2007-0044-3240-1)

Response: In regard to consumer preference for products free of genetically engineered content, see response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to the impacts on dairy and beef markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for issue 5.2.

Comment Excerpt Text:
And because alfalfa is fed to dairy cows and other livestock, contamination puts organic dairy and meat at risk, too!" (Organic Valley Staff and Farmers) (Comment Number: APHIS-2007-0044-3255-3)

Response: APHIS acknowledges the comment. In regard to the impacts on dairy and beef markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Dispite what you might think, consumers DO care about GE Alfalfa. It you allow GE alfalfa to be grown it will contaminate non-GE alfalfa. This means that all the dairy and meat we consume will also be contaminated. I strongly oppose the use of GE alfalfa and urge you to reconsider your stance on the matter. (Comment Number: APHIS-2007-0044-4216-1)

Response: In regard to consumer preference for products free of genetically engineered content, see response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for issue 5.2.

Comment Excerpt Text:
I was horrified to hear that genetically modified alfalfa might soon be approved for use. Genetically modified crops inevitably contaminate regular crops, creating a domino effect that is almost impossible to stop. Not only does this monopoly on crops hurt farmers, it also angers consumers. I DO NOT want to drink milk that came from cows that ate genetically modified alfalfa. When I buy organic milk, I should be assured that it is indeed organic with minimal pesticide residue and genetically modified components, even down to the cow's feed. Please do not allow genetically modified alfalfa to be fed to cows. In my eyes and in the eyes of many, it would mean the end of organic milk. And it would mean a lot of angry consumers. (Comment Number: APHIS-2007-0044-4218-1)

Response: APHIS acknowledges the comment. In regard to the impacts on dairy markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to consumer preferences, see response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to gene flow, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
I am an American who eats organic and am convinced that once GE alfalfa is introduced, its contamination of non-GE plants - including organic - is inevitable. And because alfalfa is fed to dairy cows and other livestock, contamination puts organic dairy and meat at risk, too! (Comment Number: APHIS-2007-0044-4223-1)

Response: APHIS acknowledges the comment. In regard to the impacts on dairy and beef markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presense of non-GE or organic alfalfa with GT-alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to gene flow, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
Aside from the negative dependency on seed producers and the potential health effects of GM foods themselves, this would render the raising of organic meat almost impossible. (Comment Number: APHIS-2007-0044-4233-2)

Response: APHIS acknowledges the comment. In regard to the impacts on beef markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the link between glyphosate and health effects, see the response to comment APHIS-2007-0044-2243-1 for issue 6.0.

Comment Excerpt Text:
In addition to nonsense lawsuits, I am opposed to genetically engineered (GE) and genetically modified (GM) crops because I don't think people should be duped into eating traces of RoundUp. GE crops that are resistant to herbicides allow more contamination of food with chemicals. In the case of alfalfa, these toxins, which are stored in fat, will contaminate dairy products as well as beef. (Comment Number: APHIS-2007-0044-4426-2)

Response: APHIS acknowledges the comment. In regard to the link between glyphosate and health effects, see the response to comment APHIS-2007-0044-2243-1 for issue 6.0.

Comment Excerpt Text:
The USDA draft EIS document on GE 'Roundup Ready' Alfalfa indicates the USDA intends to approve it's use. This is a serious threat to organic dairy farming and organic beef production as Alfalfa is a major food source for these cattle. Contamination of Organic Alalfa crops from nearby GE Alflafa crops will be inevitable thereby compromising Organic status for these farmers.
The approval of GE Alfalfa for widespread unregulated use is irresponsible and must be stopped. The US will end up importing more and more organic beef and dairy products...which is a huge growth market by the way....yet another blow to the smaller American farmers...and more American jobs lost...in addition industrial agriculture has to be kept in check to protect the environment from genetically modified mono crops that have unknown long term consequences. Given that GE Alfalfa will be patented to the manufacturer (Monsanto) perhaps conventional farmers should be concerned also. (Comment Number: APHIS-2007-0044-6405-2)

Response: APHIS acknowledges the comment. In regard to the impact on organic farms, see response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the possibility of an increase in imports of organic dairy and beef products. Section 2.3 of appendix T of the FEIS recognizes this possibility. In regard to the impacts of GE crops on the environment, see the response to comment APHIS-2007-0044-5302-1 for issue 4.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
In addition, I strongly believe that not preventing this is
Anti-competitive. Organic feed contaminated by GE traits cannot, by USDAs own regulations, be used by organic dairies.
Result 1: organic dairies have to find alternative sources and pay more for the now-scarcer feed. Practical outcome: non-organic dairies are given a competitive advantage by the USDA.
Result 2: Organic alfalfa farms are effectively taxed for being organic. If their product is contaminated they suffer large losses that do not befall their competitors. (Not enough words permitted to discuss the inability of liability actions to even this playing field.) Practical outcome: failure of some organic farms, reduction of their farmlands value and its probable sale at a bargain price to the neighboring GE using farms that caused the reduction in value. Double advantage to GE users. (Comment Number: APHIS-2007-0044-6771-1)

Response: APHIS acknowledges the comment. In regard to the impacts on dairy markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
3) Import of meat from animals fed GM alfalfa may be banned by Europe and Japan etc. This is counter to the intention of US farmers who should be exporting so as to redress the trade imbalance.
4) Meat from GM alfalfa fed animals will be boycotted in the USA. I for one, only buy New Zealand lamb, cheese, and butter for this simple reason. (Comment Number: APHIS-2007-0044-7149-2)

Response: See the response to comment APHIS-2007-0044-7149-2 for issue 5.4.

Comment Excerpt Text:
Genetically engineered alfalfa would be the first perennial GM crop, and would result in a huge increase of toxic RoundUp in the environment. It would expose livestock widely to both genetically engineered genes and pesticide residues. It would especially affect cows and horses--their health, their reproduction, and their byproducts, particularly milk.
Alfalfa pollen is carried far and wide by the wind and bees, so the presence of GM alfalfa in the environment would contaminate organic alfalfa, rendering organic dairy impossible. Consumers who eat alfalfa sprouts would be exposed directly, as well as those who eat meat.
Despite positive trends, this is the most serious GMO threat yet, as it creates the legal precedent at the Supreme Court level, for GMO contamination to be acceptable for any crop, with the support of the USDA (Comment Number: APHIS-2007-0044-7242-1)

Response: APHIS acknowledges the comment. In regard to the impact on organic farms, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the impacts of GE crops on the environment, see the response to comment APHIS-2007-0044-5302-1 under issue 4.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Alfalfa pollen is carried far and wide by the wind and bees, so the presence of GM alfalfa in the environment would contaminate organic alfalfa, rendering organic dairy impossible. Consumers who eat alfalfa sprouts would be exposed directly, as well as those who eat meat.
Please maintain the ban on Monsanto's genetically modified (GM) "Roundup Ready" alfalfa for our individual health and the health of the environment. (Comment Number: APHIS-2007-0044-7281-2)

Response: APHIS acknowledges the comment. In regard to the impact on organic farms, see response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the link between glyphosate and health effects, see the response to comment APHIS-2007-0044-2243-1 for issue 6.0. In regard to the impacts of GE crops on the environment, see the response to comment APHIS-2007-0044-5302-1 for issue 4.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Meat, eggs and dairy products from animals raised on the millions of tons of GM feed imported into Europe do not have to be labeled. Some studies show that if GM crops are fed to animals, GM material can appear in the resulting products, and that the animals health can be affected. (Comment Number: APHIS-2007-0044-9298-4)

Response: APHIS acknowledges the comment. In regard to the impact on animal health, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
The problems of contamination for organic growers through comingling cannot be ignored. Organic farmers cannot tolerate any GE contamination of their alfalfa. If contamination is found, despite all of the precautions taken, the farmer will lose a certification and market that took years and hard work to establish. Losing this market affects both the farmer and his customers, who may have go farther for their organic hay and pay more for it. The long term result is to make organic food more expensive and to take away the right for consumers to choose what they want to eat because it is financially out of reach.

The EIS assumes that consumers will not reject GM contaminated of organic alfalfa if the contamination is unintentional or not transmitted to the end product. However, prohibition of GM is a fundamental tenet of the Organic Standard. This Standard requires that livestock feed for animals used for organic meat, milk, eggs and other animal products is 100% organic. Protecting organic alfalfa, the main source of feed for organic dairies is crucial to the health of that popular and important sector of U.S. agriculture. (Comment Number: APHIS-2007-0044-9882-10)

Response: In regard to the impact of GT alfalfa deregulation on organic and downstream markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to consumer preference for products free of genetically engineered content, see response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
The impact of widespread contamination of organic alfalfa hay by GM alfalfa also must take into effect the availability of organic feed for dairy cattle, the costs to organic dairy farmers and the organic dairy industry, and on the price of organic milk to consumers. (Comment Number: APHIS-2007-0044-9882-15)

Response: In regard to the impact of GT alfalfa deregulation on organic and downstream markets, see response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Like in Geertson, "APHIS reasoning that farmers will 'not necessarily' be prohibited from labeling their products as organic is wholly inadequate." [Footnote 60 Id. at *7.] And here, contrary to APHIS's brazen conclusion that "most U.S. consumers are unaware of the prevalence of GE material in the U.S. food supply," (DEIS at 58), as the evidence in the record will demonstrate, consumers are in fact extremely concerned about avoiding GE content in organic food. For example, during the Geertson Seed Farm litigation, organic dairy companies including CROPP Cooperative (aka Organic Valley), Straus Family Creamery, and dairies across Wisconsin that rely on organic alfalfa forage for their organic dairy production, indicated that contamination of organic alfalfa from GE alfalfa could cost millions. Straus Family Creamery indicated that loss of organic alfalfa in 2007 could jeopardize their entire $15 million dairy operation. Organic Valley's $287 of 2006 sales, projected to be $450 million in 2007 and significantly more by 2010, could lose significant portions of its business. At a minimum, contamination of organic alfalfa would eliminate the loss of organic premiums, which can be over 40% more than conventional premiums. For a $450 million dairy industry, biological contamination could account for hundreds of millions of dollars in losses, never mind the potential loss of markets and market credibility in the specific organic sector.

Beyond organic dairy losses that could result from deregulation of GE alfalfa, there will be significant losses in the seed markets themselves. In 2007, alfalfa seed was grown on over 120,000 acres to produce over 60 million tons of seed, including over 2 million pounds of organic seed. Contamination of this seed will result in losses exceeding well over $3 million. Similarly, non-GE conventional seed export markets are in jeopardy because critical foreign markets, including Japan, Saudi Arabia, and the EU are GE-sensitive markets or reject GE seed stocks outright. Conservatively, U.S. seed exports exceed $3.5 million, and are in grave risk due to broad contamination once GE alfalfa is deregulated. (Comment Number: APHIS-2007-0044-9936-14)

Response: APHIS acknowledges the comment. In regard to consumer preferences for products free of genetically engineered content and organic certification, see response to comment

APHIS-2007-0044-11689-2 for issue 5.6. In regard to impacts on organic and downstream markets, see response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the impact on export markets, see response to comment APHIS-2007-0044-3404-1 in issue 5.4.

5.4 Issue 5.4 – Impacts on Trade

Comment Excerpt Text:
I believe that the introduction of RR alfalfa will cause undo hardships upon alfalfa producers who are trying to grow non-gmo or organic alfalfa for what ever their reason. My company exports considerable animal food to foreign countrys that require the feed ingredients to be non-gmo, and if the vast majority of alfalfa that is common within the market place is gmo alfalfa, then it will become very difficult, to maybe impossible, to be in this market. We also have organic pellets that must have organic/non-gmo ingredients in them, and if there is the possibility of not being able to obtain an organic/non-gmo alfalfa, then this market is also ruined for us. In addition to all of this, it IS NOT very difficult to raise relatively weed free or weed controlled alfalfa, even if there is no RR alfalfa. (Comment Number: APHIS-2007-0044-0260-1)

Response: In regard to impacts on international trade, see the response to comment APHIS-2007-0044-3404-1 in issue 5.4. In regard to weed control, see the response to comment APHIS-2007-0044-0260-1 for issue 7.2.

Comment Excerpt Text:
Allowing the production in the Imperial County of Califonia would ruin the marketing of non-GMO alfalfa seed. The largest market for alflafa seed produced in Imperial County is Saudi Arabia which does not allow GMO seeds into their Country. Similiar prohibitions are found in smaller but important markets in the middle east. We feel that Monsanto will find it impossible to sway those governments' policies to allow importation of GMO seed products to that region. Monsanto is concerned about non-GMO seed contaminating their Round Up Ready Alfalfa Seed but the larger issue is their seed contaminating the non-GMO seed varieties (Comment Number: APHIS-2007-0044-0446-2)

Response: See the response to comment APHIS-2007-0044-3404-1 in issue 5.4.

Comment Excerpt Text:
As an alfalfa farmer for domestic dairy hay and export hay to Pacific Rim countries, and former licensed crop consultant for agricultural chemicals and pesticides, I am AGAINST allowance of glyphosate-tolerant alfalfa seed to be grown for forage. Although the Japanese government has allowed the import of this forage, the latest survey by hay exporters shows that 90% of their dairy clients in Japan do NOT want forage from glyphosate-tolerant alfalfa. The Japanese public consuming the milk from these dairies will concur and quickly vote by withholding their economic support at the retail stores.
If the end consumer does not want this and their is NO benefit to the end consumer, then why damage our export markets for the financial gain of Montsanto. They have lost the patent for glyphosate (Roundup) and the generics have beaten the price downward to where there is little

economic gain for Monsanto. They are running an end-around by grabbing the economic gain of developing a monopoly of our nation's seed supplies through partnerships with major seed companies; both corn and soybean. We need Monsanto, but as farmers, this technology will exhibit diminishing returns in future years for the following reason.
As a farmer with a horticultural background, I already see agri-chemical consultants needing to add additional chemicals to glyphosate on field corn to control the weeds. We have seen resistance to glyphosate developing in weeds for years. Canada thistle control in asparagus is a good example where straight glyphosate became as effective as spraying water on the Canada thistle. We are seeing the same resistance developing in redroot pigweed, lambsquarter, and kochia Roundup Ready field corn. All of the latter developed atrazine resistance years ago. This represents a massive economic investment that will be rendered impotent as more crops develop glyphosate resistant weeds. RR corn and soybean rotations in the Midwest will hasten this eventuality (Comment Number: APHIS-2007-0044-0821-1)

Response: Regarding impacts on international trade, see the response to comment APHIS-2007-0044-3404-1 in issue 5.4. Regarding impacts on market seed concentration and competition, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0.
In regard to the evolution of glyphosate-resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for issue 3.6.

Comment Excerpt Text:
Trade Impacts on Exported Alfalfa

The draft EIS (Appendix R) details the foreign markets for alfalfa. It does a good report in detailing who imports most of the U.S. alfalfa. Five countries; Japan, Republic of Korea, Taiwan, Canada, and Mexico) account for 98% of the total metric tons exported. 1.6 percent of the US hay crop is exported. Most of this grown in Washington State and California. This amounts to approximately 204,000 acres. The average export price is $160/ ton. The export hay market is valued at $192 million dollars.

Japan has 74% of the U.S. alfalfa export share and is consistently the largest annual importer of U.S. alfalfa hay (Table V-1, EIS). Of the total U.S. alfalfa exports, 91.6 percent of alfalfa forage is sold to GE sensitive countries - Japan and Korea, and Taiwan (page V-8, EIS).

Saudi Arabia is the largest customer for U.S. alfalfa seed followed by Mexico, Argentina, and Canada (Table R-1, EIS). Of this list of countries, Saudi Arabia is the most GE sensitive country. The draft EIS reports that Saudi Arabia would not purchase GE alfalfa seed. However, the draft EIS reports that Saudi Arabia would continue to import non-GE alfalfa as long as exporters are able to guarantee seed purity standards.

Although the draft EIS notes that there is much uncertainty in the trade of GE products, it fails to mention that previous unintended releases of GE crops in the US resulted in lost exports to GE sensitive countries. Table 1 details the history of unauthorized releases of GE crops in the U.S.

[See original comment for Table 1. Summary of the Six Known Unauthorized Releases of

Regulated GE Crops into the Food and Feed Supply of the U.S., 2000-2008 (GAO, 2008).]

The two most prominent unintended releases, Starlink corn and Liberty Link rice, resulted in economic losses to farmers. The release of Starlink was done under a dual use label. Starlink corn was only approved for use as livestock feed, however, it got into the U.S. food system. Schmitz, et al. (2004) estimated that StarLink caused U.S. corn producers to lose between $26 and $290 million in revenue. Blue (2007) estimated that world-wide economic losses caused by the accidental release of Liberty Link GE rice ranged from $741 million to $1.285 billion.

U.S. alfalfa exports to Asian countries, particularly Japan, would be at risk if GE alfalfa is approved. Even though the Japanese government has approved GE alfalfa, many major Japanese importers as well foreign consumers are opposed to GE products (see Evans, Gauntt, and Oishis declarations). In 2007 the alfalfa exports to Japan, Korea, and Taiwan were $159,229,000 (Table R-3, EIS). The total alfalfa hay export market is valued at 171 million. The introduction of GE alfalfa would impact 93% of the export alfalfa market.

The U.S. alfalfa export share to Japan has been declining over time. Concurrently, the Australian export share has been increasing. If the U.S. pursues the deregulation of GE alfalfa, export revenue could be lost. In addition, Australia would assume a more important role in Japanese alfalfa exports.

In 2007, the total value of export alfalfa seed was 66 million dollars. Saudi Arabia is the largest U.S. export market for alfalfa seed ($38,075,000) followed by Canada, Argentina, and Mexico (Table R-1, EIS). Of these markets Saudi Arabia is GE sensitive. The introduction of GE alfalfa would impact 57 percent of the alfalfa seed export market.

If the U.S. deregulates GE alfalfa, the alfalfa (seed and forage) exports at risk would be $197,304,000. These export impacts would be felt throughout the western states that have large export shares such as Washington State, California, and Idaho. (Comment Number: APHIS-2007-0044-10172-7)

Response: Regarding impacts on international trade, see the response to comment APHIS-2007-0044-3404-1 in issue 5.4. In regard to past deregulation of genetically engineered crops and their relevance for the analysis of the potential impacts of GT alfalfa deregulation, see the response to comment APHIS-2007-0044-9936-10 for issue 11.1.

Comment Excerpt Text:
The Draft Environmental Impact Statement (DEIS) states:
"Distribution of Costs of Loss of Production and Avoidance: Organic producers could have either a loss of production or need to add additional measures to reduce the likelihood of unintended presence if:
1) there is an amount of GT alfalfa in organic alfalfa that the organic market will reject, or
2) current alfalfa production practices are not already in place to protect against unintended presence of GT alfalfa in GT-sensitive alfalfa fields.
There is no evidence that supports either of these assumptions." (page xvii)

We disagree with the above conclusion as stated in the DEIS. On the contrary, in this submission we offer evidence from the experience of Canadian farmers that:
1) both export and domestic markets will reject product with GE contamination,
2) measures currently in place are unable to prevent such contamination and, furthermore,
3) no measures could be established that would prevent or minimize unintended presence.
Real world experience with GE canola and GE flax validates our warning regarding the inevitability
of gene flow through various predictable and unexpected means as well as the resultant significant impacts of unintended presence on agriculture production systems including impacts on
markets and the immediate and long-term costs to affected farmers. (Comment Number: APHIS-2007-0044-10263-1)

Response: APHIS acknowledges the comment. The extent to which domestic and export markets will reject alfalfa with the presence of unintended genetically engineered material is analyzed in the appendices S and R of the Draft EIS.
In regard to gene flow, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0
In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to past deregulation of genetically engineered crops and their relevance for the analysis of the potential impacts of GT alfalfa deregulation, see the response to comment APHIS-2007-0044-9936-10 for issue 11.1.

Comment Excerpt Text:
The consequences of GE canola contamination for organic grain farmers in Canada is a strong cautionary tale that is highly relevant to the question of the negative economic impacts that will be felt by organic alfalfa producers. This lesson in canola cautions that the U.S. survey by Brookes
and Barfoot (2004) which is referred to in the DEIS in relation to the impacts of unintended presence on organic farmers is outdated and not relevant to examining the case of alfalfa (page 135). The DEIS states that the Brookes and Barfoot survey showed “the vast majority of U.S. organic farmers had not incurred any direct additional costs or incurred losses due to GE crops having been grown near their organically produced crops”. Surveys of such impacts need to be understood and undertaken in relation to particular crops and crop-specific contamination issues. It is clear that many more farmers have been affected by the costs of contamination incidents in the U.S. since 2003/2004.
In Canada, GE canola from neighboring farms increasingly appeared as weeds or volunteers in certified organic fields where other crops such as wheat, oat or peas were grown. In order to maintain or re-establish certified organic status for the crop, field or farm, such GE contamination
required manual removal of the canola plants as well as on-going measures to avoid contamination of current or future crops. The costs of removing unwanted volunteer GE canola from fields were born by the affected farmers. As mentioned earlier, the manual removal of GE alfalfa volunteers would not even be possible because of the nature of the plant’s root system. The unintended presence of GE canola in an organic canola field was not detectable before harvest, nor could it be prevented due to the prevalence of GE canola on prairie farms. Buyers in

the organic market tested for the presence of GE canola and did not accept contaminated lots. Organic grain farmers abandoned growing this crop altogether because of the depth of the problem of unintended presence, because the organic market did not accept this unintended GE presence, and because the risks and costs of contamination became too burdensome to bear.
The unintended presence of GE canola in Canada forced organic farmers to abandon growing and
marketing that crop: "Every organic grain farmer has lost the right to grow organic canola free of GMO contamination risk. Every organic grain farmer has lost the ability to sell organic canola into
Europe." [Footnote xxi: Saskatchewan Organic Directorate. "The Appellants Factum" May 29, 2006. Online at:
http://www.saskorganic.com/oapf/pdf/FactumMay29-06.pdf. Accessed March 1, 2010.] Because of extensive unintended presence of GE canola in the Canadian Prairies,
many, if not all, certified organic grain growers abandoned canola in their crop rotations. Organic
grain farmers in the Canadian Prairies have abandoned organic canola production except in a few isolated areas where other farmers do not grow canola.
Organic grain farmers suffered severe economic losses as a consequence of unintended presence. Saskatchewan organic grain farmers attempted to certify a class action suit seeking compensation for this loss from the corporations Monsanto and Aventis (now Bayer) which developed and commercialized the GE canola varieties. In the class action, the farmers sought damages for the loss of canola as a crop to be used in regular rotation and the loss of the opportunity to participate
in the certified organic canola market. The request to certify this case as a class action was not granted and the case for liability and compensation itself was therefore not heard by the courts. (Comment Number: APHIS-2007-0044-10263-12)

Response: In regard to past episodes of deregulation of genetically engineered crops and their relevance for the analysis of the potential impacts of GT alfalfa deregulation, see the response to comment APHIS-2007-0044-9936-10 for issue 11.1.

Comment Excerpt Text:
The market impacts of unintended GE presence can now be seen in flax with the 2009 discovery of GE flax in Canadian flax exports. Canada is the world's leader in the production and export of
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flax - flax is one of Canada's five major cash crops, along with wheat, barley, oats and canola. In September 2009 Canada's European market - 60% of its flax exports – was closed. Contamination
was found, or declared to have been distributed to, 35 countries that had not approved GE flax for
human consumption or environmental release.
Before the contamination scandal, cash bids for flax in Manitoba were $9.90CND to $9.92CND per
bushel. But just based on rumour, before contamination was confirmed, flax bids in Manitoba were down to $6.78CND a bushel - a fall in price of 32%. The price of flax is still depressed and the markets remain uncertain.

Farmers are now seeing a new, additional cost associated with unintended presence from GE crops. Under the auspices of cleaning up the contamination, grain companies are now requiring flax farmers to buy and plant only certified seed for the 2010 crop that is destined for sale to the EU market. This requirement will force many farmers to abandon their farm-saved seed, even if tests prove it is uncontaminated. Farmers will therefore experience this cost not just as the price of buying new, high-priced certified seed from the market but also as the loss of their farm-saved,
older varieties that may no longer be easily available and which are adapted to specific local conditions and/or particular market demands.
The widespread unintended GE presence in flax is a problem for both conventional and organic flax farmers as they must all bear the costs of market closure, testing and clean up. The grain industry's expensive and onerous measures to eliminate GE flax from our seed and handling system may force some farmers to ultimately to abandon flax altogether. (Comment Number: APHIS-2007-0044-10263-13)

Response: In regard to past episodes of deregulation of genetically engineered crops and their relevance for the analysis of the potential impacts of GT alfalfa deregulation, see the response to comment APHIS-2007-0044-9936-10 for issue 11.1.

Comment Excerpt Text:
A Wide Range of Organic Products would be Affected by Unintended GE
Presence
A wide range of organic foods and food ingredient exports from the U.S. to Canada will be severely impacted by GE contamination.
Canada's growing demand for organic food on the part of consumers and organic ingredients on the part of processors is largely satisfied by imports from the United States. Imports, mostly from the U.S., account for 80 to 90 percent of the organic products sold at retail in Canada. [Footnote xxii: George Myles, "Canada Organic Products Organic Regulations 2007" USDA Foreign Agricultural Service GAIN Report Number: CA7004.
http://www.fas.usda.gov/gainfiles/200702/146280139.pdf February 06, 2007.] The large majority are organic fruits and vegetables, but there are many organic ingredients that are also
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imported. In 2007, the organic food market accounted for approximately 2.0 percent of total Canadian retail food sales and was valued at $2.6 billion at retail. The market for organic food is growing at 15-20 percent per year. [Footnote xxiii: Ibid.]
In addition to the retail sale of alfalfa sprouts as well as alfalfa seeds for home sprouting which will immediately experience consumer rejection due to unintended presence, alfalfa forage is an upstream input to human food production, as noted in the DEIS. Alfalfa feed is an input to dairy farms, beef cattle, as well as other animal feeds. Dairy is an important piece of the organic value chain in Canada, with an approximate 25% increase in organic milk production from 2006-2007. [Footnote xxiv: Holmes, Matthew and Macey, Anne, in "The World of Organic Agriculture: Statistics and
Emerging Trends 2010" International Federation of Organic Agriculture Movements (IFOAM). 2010. P194.]
Honey production would also be negatively affected. According to the U.S National Honey

Board
alfalfa is ranked as the most important honey plant in Utah, Nevada, Idaho, Oregon and most of the western states. The Board lists 73 U.S. suppliers of alfalfa honey. [Footnote xxv: National Honey Board, Honey Locator
http://www.honeylocator.com/floral_results.asp?Floral_ID=4 Accessed March 1, 2010.]
(Comment Number: APHIS-2007-0044-10263-16)

Response: APHIS acknowledges the comment. Regarding impacts of deregulation of GT alfalfa on organic and downstream (including honey) U.S. markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Although trade data in organic products are not readily available, APHIS expanded the analysis of impacts on U.S. exports in appendix R of the FEIS to include a brief discussion of potential impacts on organic export markets with particular attention to Canada.

Comment Excerpt Text:
U.S.-Canada Organic Trade Will be Disrupted
Organic food from the U.S. will be compromised by the unintended presence of GE alfalfa. Many
U.S. organic farmers will lose their certification, resulting in a decline in certified organic foodstuffs
produced in the U.S. for export into Canada. This diminished supply, combined with a predicted consumer mistrust of U.S. organic products, may lead many Canadian processors and retailers to seek alternative sources of certified organic foods and food ingredients. (Comment
Number: APHIS-2007-0044-10263-18)

Response: In regard to impacts of GT alfalfa deregulation on organic certification in the United States, see response to comment APHIS-2007-0044-11689-2 for issue 5.6. Although trade data in organic products are not readily available, APHIS expanded the analysis of impacts on U.S. exports in appendix R of the FEIS to include a brief discussion of potential impacts on organic export markets with particular attention to Canada.

Comment Excerpt Text:
The DEIS states that, "In the case of Canada…GT alfalfa has also been approved." (page 143) This
statement is technically correct but not fully descriptive of the current regulatory status for GT alfalfa in Canada. While GT alfalfa has been approved for environmental release and human consumption by Canadian regulatory authorities, GT alfalfa seed cannot be legally sold in Canada
until the seed variety is registered according process set out in the Seeds Act regulations. The variety registration process for GT alfalfa in Canada has, to our knowledge, not officially started, and would take at least two years to complete under current rules.
Furthermore, there is no guarantee that GT alfalfa will receive variety registration in Canada. The
likelihood that GT alfalfa will receive variety registration is reduced in light of the recent GM

flax
contamination crisis in Canada along with the well-established opposition to GT alfalfa in Canada
among conventional and organic farming communities, and consumer groups. (We again refer you
to Appendix 2). (Comment Number: APHIS-2007-0044-10263-2)

Response: APHIS acknowledges the comment. Section 2.2.1 of appendix R of the FEIS includes a revised analysis of the current status of GT alfalfa approval in U.S. export markets.

Comment Excerpt Text:
Although USDA says it supports "coexistence" of all types of agriculture, USDA does not account for or adequately assess the direct and indirect impacts of GE contamination on either domestic [Footnote 4 Domestic sales of organic food sales are estimated at $23 million annually (2008), according to the Organic Trade Association (OTA), http://www.ota.com/pics/documents/01a_OTAExecutiveSummary.pdf (accessed 28 January 2010).] or export [Footnote 5 Organic exports are estimated at $125 million to $250 million annually, according to USDA's Economic Research Service (September 2009), http://www.ers.usda.gov/briefing/organic/trade.htm, (accessed 28 January 2010).] food markets. The Agency's draft EIS fails to even consider any future scenarios that would include regulatory and/or statutory protections from GE contamination for organic and conventional farmers and exporters, leaving the organic industry and consumers of organic foods with no protections from GE contamination whatsoever. (Comment Number: APHIS-2007-0044-11689-3)

Response: Regarding the impact of GT alfalfa deregulation on domestic sales of organic food, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the impact of GT alfalfa deregulation on U.S exports, APHIS expanded the analysis of the impact on export markets in appendix R of the FEIS, further detailing levels of tolerance for unintended presence of genetically engineered material in feed and seed in importing countries. Regarding regulatory or statutory protections for organic and conventional farmers the FEIS contains added analysis of an additional alternative that includes isolation distances and geographical restrictions for GT alfalfa.

Comment Excerpt Text:
First, the buyers and customers that USDA certified organic farmers serve demand food that is free of contamination with genetically engineered (GMO) ingredients. In addition, the USDA National Organic Program requires that food marketed as organic be free from GMO ingredients. Thus, accidental cross-fertilization of organic crops with genetic material from GMO varieties of the same crop, which leads to the presence of transgenic material in the organically managed crop, can make that crop unacceptable to organic consumers. Organic producers have had their crops rejected by both domestic and export markets because the crops contained detectable traces of transgenic (GMO) material, from contamination that was beyond the farmers' control. Thus, APHIS errs when it states on page 135 of its EIS regarding GMO alfalfa, that "there is no evidence that organic consumers demand products free from the unintended presence of GE

traits." This erroneous belief leads to the incorrect conclusion that such accidental cross-pollination does not have a significant economic impact on organic producers. The impacts are potentially serious, and can spell economic ruin for the producer. (Comment Number: APHIS-2007-0044-1687-1)

Response: Regarding the preference of organic producers and consumers for products free of genetically modified material and the impact on organic certification, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Although trade data in organic products are not readily available, the analysis of impacts on U.S. exports in appendix R of the FEIS was expanded to include a brief discussion of potential impacts on organic export markets with particular attention to Canada.\

Comment Excerpt Text:
It is clear from the EIS that the inevitable consequences of this decision would negatively impact organic farmers in the interest of Monsanto's Profits. This would create undue hardship on small farmers trying to avoid GMO's. The impact on our export market would surely be impacted. In the interest of protecting the future of sustainable varied american agriculture, please disallow this proposal. Allowing this to continue will just compound the negative consequences we've already seen from similar such actions in the past. We are digging ourselves a hole without a ladder to climb out. (Comment Number: APHIS-2007-0044-2205-1)

Response: Regarding impacts on small producers, see the response to comment APHIS-2007-0044-4913-7 for issue 5.1. Regarding impacts on domestic organic alfalfa markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the impact on export markets, see the response to comment APHIS-2007-0044-3404-1 for issue 5.4.

Comment Excerpt Text:
Roundup Ready alfalfa will ruin the hay export market for Pacific Northwest growers (Comment Number: APHIS-2007-0044-2301-5)

Response: See the response to comment APHIS-2007-0044-3404-1 for issue 5.4.

Comment Excerpt Text:
Canadians are concerned about the impacts of deregulation of glyphosate tolerant alfalfa in the United States for two main reasons: contamination of alfalfa through imports to US hay and seed, and simultaneous deregulation of genetically engineered alfalfa in the Canadian jurisdiction.
Canada's process for approving (deregulating) genetically engineered crops has several stages. Health Canada must approve crops for food and feed safety, and the Canadian Food Inspection Agency (CFIA) must approve crops for environmental release. Canada requires crop seed varieties to be registered through the CFIA before they can be sold or used to grow a commerical crop. No variety of glyphosate tolerant alfalfa seed has yet been registered in Canada, so it is still illegal to grow or sell glyphosate tolerant alfalfa in Canada.

Canada's regulatory system has been strongly criticized by farmers for not taking into account the impact of genetically engineered varieties upon markets. There is a strong movement of farm organizations seeking a reversal of Canada's environmental release of glyphosate tolerant alfalfa. Monsanto and Forage Genetics International have stated their intention to commercialize glyphosate tolerant alfalfa in Canada and the United States simlutaneously. Therefore, it is important to us to ensure that deregulation does not occur in the USA, as it would promote the fast-tracking of variety registration, leading to deregulation of the crop in Canada as well. Because glyphosate tolerant alfalfa has been approved for health safety and environmental release it would be possible for hay produced from glyphosate tolerant alfalfa from the USA to be imported into Canada if the crop is deregulated in your country. It is very important to protect the integrity of Canada's alfalfa, and thus our certified organic farms, by preventing contamination by imported hay, which may contain viable seed. If American hay contains genetically engineered alfalfa Canadian farmers may need to implement a de facto boycott of risky imports. (Comment Number: APHIS-2007-0044-2380-5)

Response: APHIS acknowledges the comment. The impact of deregulation of GT alfalfa in the United States on the registration of the variety in Canada is beyond the scope of this EIS.

Comment Excerpt Text:
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States for two main reasons:
contamination of alfalfa through imports to US hay and seed, and simultaneous deregulation of genetically engineered alfalfa in the Canadian jurisdiction.

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Canada's regulatory system has been strongly criticized by farmers for not taking into account the impact of genetically engineered varieties upon markets. There is a strong movement of farm organizations seeking a reversal of Canada's environmental release of glyphosate tolerant alfalfa. Monsanto and Forage Genetics International have stated their intention to commercialize glyphosate tolerant alfalfa in Canada and the United States simlutaneously. Therefore, it is important to us to ensure that deregulation does not occur in the USA, as it would promote the fast-tracking of variety registration, leading to deregulation of the crop in Canada as well. Because glyphosate tolerant alfalfa has been approved for health safety and environmental release it would be possible for hay produced from glyphosate tolerant alfalfa from the USA to be imported into Canada if the crop is deregulated in your country. It is very important to protect the integrity of Canada's alfalfa, and thus our certified organic farms, by preventing contamination by imported hay, which may contain viable seed. If American hay contains

genetically engineered alfalfa Canadian farmers may need to implement a de facto boycott of risky imports (Comment Number: APHIS-2007-0044-2741-7)

Response: APHIS acknowledges the comment. The impact of deregulation of GT alfalfa in the United States on the registration of the variety in Canada is beyond the scope of this EIS.

Comment Excerpt Text:
Furthermore, during a time of great financial turmoil for our country, you will risk a decline in export revenue to countries who do not want GE crops and food in their food supply, thus refusing to import American GE crops and food. (Comment Number: APHIS-2007-0044-3024-2)

Response: Regarding impacts on international trade, see the response to comment APHIS-2007-0044-3404-1 in issue 5.4.

Comment Excerpt Text:
Please don't allow GE/GM alfalfa to jeopardise US non-GE/GM alfalfa exports to Japan and other countries. (Comment Number: APHIS-2007-0044-3404-1)

Response: APHIS acknowledges the comment. The DEIS analyzed the impact on export markets in appendix R. The analysis supports the conclusion of potential harm of GT alfalfa deregulation on U.S. alfalfa exports, if there is presence of unintended genetically engineered material in alfalfa export products. In response to comments, this analysis has been expanded in appendix R of the FEIS to further consider the differing impacts for feed and seed exports and the differing levels of tolerance for unintended presence of genetically engineered material in feed and seed in various importing countries. In regard to the likelihood of presence of genetically engineered material in alfalfa forage and seed, and therefore the likelihood of damage, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
There are currently no protections in place to prevent contamination of non GMO crops by GE crops. However there are prohibitions on the import of GMO products into other countries so allowing the unbridled use of Monsanto roundup tolerant Alfalfa will significantly harm the organic farming community. Further the continued expansion of Roundup use in agriculture will further polute our water ways, contaminate our feed, and poison our soil. (Comment Number: APHIS-2007-0044-4417-1)
Response: Regarding impacts on international trade, see the response to comment APHIS-2007-0044-3404-1 for issue 5.4. Regarding protections to seed purity, see the response to comment APHIS-2007-0044-4417-1 for issue 3.3.

In regard to the link between glyphosate, feed, and health effects, see FEIS sections III.D and IV.E and associated appendices for a detailed analysis of the effects. In regard to the impacts of

GE crops on waterways and soil, see FEIS sections III.B, III.G, IV.B, IV.C, and IV.G and associated appendices for a detailed analysis of the effects.

Comment Excerpt Text:
5) Conventional or organic alfalfa farmers, exporting or wishing to export to Japan, may sustain economic harm, if cross contamination by GE alfalfa renders their crops unacceptable to the export market. (Comment Number: APHIS-2007-0044-6353-12)

Response: Regarding impacts on international trade, see the response to comment APHIS-2007-0044-3404-1 for issue 5.4.

Comment Excerpt Text:
The USDA draft EIS document on GE 'Roundup Ready' Alfalfa indicates the USDA intends to approve it's use. This is a serious threat to organic dairy farming and organic beef production as Alfalfa is a major food source for these cattle. Contamination of Organic Alalfa crops from nearby GE Alflafa crops will be inevitable thereby compromising Organic status for these farmers.
The approval of GE Alfalfa for widespread unregulated use is irresponsible and must be stopped. The US will end up importing more and more organic beef and dairy products...which is a huge growth market by the way....yet another blow to the smaller American farmers...and more American jobs lost...in addition industrial agriculture has to be kept in check to protect the environment from genetically modified mono crops that have unknown long term consequences. Given that GE Alfalfa will be patented to the manufacturer (Monsanto) perhaps conventional farmers should be concerned also. (Comment Number: APHIS-2007-0044-6405-2)

Response: Regarding the economic impacts on dairy and beef production, see response to APHIS-2007-0044-9882-1 for issue 5.0.. Regarding the impact on small producers, see the response to comment APHIS-2007-0044-4913-7 for issue 5.1.In regard to the impacts on the environment from monoculture, see the response to comment APHIS-2007-0044-11753-1 for issue 2.0.

Comment Excerpt Text:
3) Import of meat from animals fed GM alfalfa may be banned by Europe and Japan etc. This is counter to the intention of US farmers who should be exporting so as to redress the trade imbalance.
4) Meat from GM alfalfa fed animals will be boycotted in the USA. I for one, only buy New Zealand lamb, cheese, and butter for this simple reason. (Comment Number: APHIS-2007-0044-7149-2)

Response: In regard to impacts on dairy and beef markets in the United States, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.. In regard to impacts on export markets, see the response to comment APHIS-2007-0044-3404-1 for issue 5.4.

Comment Excerpt Text:
As a dietitian, my profession is to understand the food choices made by consumers and be an advocate for their rights. I am very concerned about one aspect of this EIS. APHIS proclaims that consumer preferences for organic over GE foods are influenced in part by philosophical factors that are likely unrelated to unintended cross fertilization of feed crops with GE material (pg.135). This makes assumptions on the needs and wants of consumers. Yes, the organic buyers are a minority. Yes, they have a variety of reasons for choosing organic. HOWEVER, they are growing rapidly and still deserve the right to choose. If contamination could be controlled this would be another story, but the inevitable unintended cross fertilization takes away the consumer's right to choose, period. (Comment Number: APHIS-2007-0044-7178-1)

Response: Regarding the preference of organic producers and consumers for products free of genetically modified material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Please do not approve the use of this product without strong protections for organic alfalfa producers and significant labeling of products produced with it (including meat, dairy, and other products that may be produced by animals eating the alfalfa). I am an organic consumer, and I care about GE contamination. It is critically important to avoid with alfalfa what has happened with corn -- As a consumer, I have to suspect any product with non-organic corn has genetically engineered ingredients, and organic farmers have no protections from neighbors engineered materials getting into their fields. As a consumer, I avoid dairy products with growth hormone, and if this goes through with no labeling, I'll have an even more difficult time selecting wholesome food for my family. (Comment Number: APHIS-2007-0044-7179-1)

Response: In regard to the preference of organic producers and consumers for products free of genetically modified material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Organic or Export Seed Production

There is and will likely continue to be markets for U.S. produced alfalfa seed that will require non-detectable presence of biotech traits, including GT alfalfa. As discussed above, effective GT trait testing is available for seeds (and hay) to verify to a stated statistical confidence level that the seed lot is non-GT and highly pure. See DEIS, App. V at V-69, V-78. In cooperation with several U.S. alfalfa seed companies, AOSCA (2010) [Footnote 10: AOSCA. 2010. Chet Boruff, Chief Executive Officer, Association of Official Seed Certifying Agencies, Public Comment on DEIS for GT Alfalfa.], [Footnote 11: Lowry, G. 2010. Stewardship initiatives to protect our non-GMO seed markets. Pages 27-33, in Proceedings for the 2010 Winter Seed School Conference of the Western Alfalfa Seed Growers Association. January 17-19, 2010, Las Vegas, Nevada.] has developed a new seed production protocol for the production of alfalfa seed. The new protocol is

tailored to meet the needs of seeds destined for export, organic and other non-GT market channels where biotech traits are expressly excluded [Footnote 11: Lowry, G. 2010. Stewardship initiatives to protect our non-GMO seed markets. Pages 27-33, in Proceedings for the 2010 Winter Seed School Conference of the Western Alfalfa Seed Growers Association. January 17-19, 2010, Las Vegas, Nevada.]. Meeting the specific and incremental requirements of this "special" AOSCA certification program allows the seed producer to label the seed with a statement certifying adherence to the AOSCA program. A very similar program for sweet corn seed was initiated by the Idaho Crop Improvement Association several years ago, and has greatly facilitated sweet corn seed export to markets sensitive to adventitious presence of biotech traits. There will be a yet to be determined administrative cost for this certification, paid to the individual state's seed certification organization. For some companies there may be incremental efforts required to improve and monitor quality control in seedstock production, seed handling and seed processing. Many of these quality control parameters are components of the new AOSCA protocol. There may also be a seed production premium paid to seed growers that meet the specific isolation and crop history requirements of the program [Footnote 12: Alfalfa seed and forage growers in the Imperial Valley of California have asked for and received from Monsanto, a special non-GT alfalfa zone that prohibits GT alfalfa seed sale and planting in the area without extraordinary isolation from other alfalfa. This area produces a large percentage of the alfalfa seed exported from the United States to global markets.].

It should be noted there is currently very limited organic seed production in the United States due primarily to the high risk of significant insect damage due to Lygus spp. and other insect pests. There is, however, a significant amount of alfalfa seed production for export markets.

Over 80 percent of U.S. alfalfa seed exports are of non-dormant varieties, with seed destined for Argentina, Saudi Arabia, Mexico, or other countries with long growing seasons and mild winters. Most of the non-dormant alfalfa seed sold in export markets is produced in California. The Imperial Valley of California produces more than 75 percent of the California alfalfa seed export market, and is currently recognized by the industry as a de facto GE-free alfalfa seed production zone5. To further facilitate alfalfa seed production for AP sensitive markets, NAFA RRA Best Management Practices require that the companies producing GE alfalfa respect any GE-free alfalfa seed production zone designated as such by a consensus of local seed producers. Recognition and designation of such zones will be based on the requirements of each state. It is envisioned that the local state seed certification agency would play an active role in administering programs of this nature [Footnote 5: NAFA. 2008. Coexistence for Alfalfa Seed Export Markets. NAFA Coexistence Document. Adopted June 2008. Available at http://www.alfalfa.org/pdf/CSExportSeed.pdf (accessed Feb. 24, 2010).].

As several organic, export or other GT-sensitive seed (and hay) commenters have previously stated that they have no (zero, nil) tolerance for GT alfalfa in their crops, such extraordinarily pure seeds can be produced domestically using stringent seed production protocols to ensure product quality claims of extraordinary genetic purity (i.e., "GE-free"). In addition to the use of planting seed that is free of the GT trait, GE-sensitive growers should also continue practices such as avoiding contact with non-organic crops through the use of buffer zones and cleaning seed handling and field equipment before use. Additionally, organic growers should continue to plant organic crops into land that is organically qualified and that has no recent history of GT

alfalfa cultivation.

Practical and effective recommendations and stringent, science-based, market-sensitive standards are published and available to support the non-GT seed (and forage) industry and to assist individual growers in identifying appropriate fields for seed growing (AOSCA, 2010) [Footnote 5: NAFA. 2008. Coexistence for Alfalfa Seed Export Markets. NAFA Coexistence Document. Adopted June 2008. Available at http://www.alfalfa.org/pdf/CSExportSeed.pdf (accessed Feb. 24, 2010).], [Footnote 6: NAFA. 2008. Coexistence for Alfalfa Hay Export Markets. NAFA Coexistence Document. Adopted June 2008. Available at http://www.alfalfa.org/pdf/CSExportHay.pdf (accessed Feb. 24, 2010).], [Footnote 11: Lowry, G. 2010. Stewardship initiatives to protect our non-GMO seed markets. Pages 27-33, in Proceedings for the 2010 Winter Seed School Conference of the Western Alfalfa Seed Growers Association. January 17-19, 2010, Las Vegas, Nevada.]. It is documented that all growers in certain geographies, for example Touchet, Washington and Imperial Valley, California, have collectively and voluntarily opted to produce only non-GT alfalfa (for hay and seed), creating de facto non-GT alfalfa areas to enable the future growing of export and other non-GT domestic alfalfa seeds. (Comment Number: APHIS-2007-0044-7620-27)

Response: APHIS acknowledges the comment. Section 3.2.2 of appendix S has been expanded to provide further discussion of potential impacts of GT alfalfa deregulation on supply of alfalfa seeds. The FEIS contains added analysis of an additional alternative that includes isolation distances and geographical restrictions for GT alfalfa.
In regard to adventitious presence in seed stock, see the response to comment APHIS-2007-0044-9936-7 for issue 3.3. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
In addition we must protect our farmers. GE alfalfa can and will contaminate non –GE alfalfa and organic alfalfa (alfalfa has a 3 mile pollination radius). We have already seen what GE soybeans and corn have done to many farmers in the U.S. Many have been put out of business by Monsanto. We need to stop this cycle! This will also decrease our sales to other countries. Many countries have already put their own bans on Genetically Engineered and Modified crops for good reasons. (Comment Number: APHIS-2007-0044-7866-2)

Response: In regard to impacts on international trade, see the response to comment APHIS-2007-0044-3404-1 for issue 5.4. In regard to gene flow, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
The USDA claims that consumers will not reject GE contamination in organic alfalfa if the contamination is unintentional or if the transgenic material is not transmitted to the end milk or meat product. This is simply not the case. I am a Canadian consumer of U.S. organic foods and

food ingredients and I care deeply about the integrity of certified organic foods, and GE is fundamentally not organic.
The GE contamination of organic alfalfa would severely impact the entire organic system in the U.S. and Canada, especially because many different types of organic farmers plant alfalfa to improve soil fertility. This important technique makes it possible to farm successfully without using chemical fertilizers. Contamination by GE alfalfa would eliminate this valuable tool, causing severe economic and agronomic costs to organic farmers.
I care about the livelihoods of small-scale organic farmers, and the future of organic farming in North America.
Farmers' have a fundamental right to sow the seeds of their choice but this choice can be eliminated by GE contamination. This happened in Canada when prairie organic grain farmers had to stop growing canola because there was no way to prevent contamination by cross-pollination with GE canola during the growing season, even if farmers could find uncontaminated seed for planting.
Organic farming is a good environmental choice. It provides healthy food grown without pesticides or GE organisms, and it builds better soil. The future of organic farming is threatened by GE alfalfa.
As a consumer, I care about the contamination of organic foods from GE alfalfa.
The USDA should reject the deregulation of GE alfalfa to protect organic farming and food in the U.S. and Canada, and protect the U.S. organic food trade to Canada.
You can submit your letter (Docket No. APHIS-2007-0044) at:
www.regulations.gov/search/Regs/home.html#submitComment?R=0900006480a6b7a1
For more information, action and background: www.cban.ca/alfalfa
This action alert was produced by the Canadian Biotechnology Action Network (CBAN) and the Saskatchewan Organic Directorate (SOD (Comment Number: APHIS-2007-0044-8159-3)

Response: APHIS acknowledges the comment. Regarding the preference of organic producers and consumers for products free of genetically modified material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding the impact of unintended presence of genetically modified material in organic products under the National Organic Policy, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the impact on small farms, see response to comment APHIS-2007-0044-4913-7 for issue 5.1. APHIS expanded the analysis of impacts on U.S. exports in appendix R of the FEIS to include a brief discussion of potential impacts on organic export markets with particular attention to Canada.

Comment Excerpt Text:
ISSUE THREE The loss of foreign markets for US produced Alfalfa seed. The economic impact on the alfalfa seed industry by the release of RR Alfalfa was not adequately analyzed in the environmental impact statement.

The executive summary states: “To the extent that GT Alfalfa deregulation reduces foreign demand for US exports, alfalfa hay and seed production previously destined to foreign markets may be channeled to the domestic market.” Page R2 E15

This is really a roundabout way of saying that the export market for US alfalfa seed will be lost

and since more that 50% of the US alfalfa seed production has been for export this will be a huge loss for alfalfa seed producers and the alfalfa seed industry..

And;"As the domestic market for non-GT alfalfa hay and seed is expected to decrease with GT alfalfa deregulation, US production is likely to substitute imports." Page R2 E15

What does that mean?

US alfalfa forage producers who are sensitive to RR contamination will import seed from other sources than the U.S. This will further reduce the demand for US produced alfalfa seed.

Monsanto and Forage genetics admit that there will be contamination and suggest that the accepted contamination tolerance should be 1%. Other countries will not accept this. Who is going to compensate the US alfalfa seed grower and seed companies for their financial damage due to loss of market?

The USDA should list the countries that won't accept GM contaminated seed. Some countries will accept GE feeds and food with a small tolerance for GMO but they will not accept seed that has even a trace of GMO. (See table V7 on page V35) (Comment Number: APHIS-2007-0044-9537-3)

Response: APHIS has expanded its discussion of the impact of unintended presence of genetically engineered material in alfalfa seed exports in appendix R of the FEIS to consider levels of tolerance in importing countries.
Regarding the legal liability for unintentional presence of GE content in non-GE crops, see the response to comment APHIS-2007-0044-6376-1 for Issue 5.1.

Comment Excerpt Text:
The USDA does not, for example, need to change its conclusions in the EIS relating to intended purposes (alfalfa grown for organic, non-GMO or export-bound, seed or specialty food markets), or any other biotech crop it reviews. A particular intended use of exports, for example, is a primary concern of the US Soybean Export Council, which is responsible for billions of dollars in annual trade to overseas markets. The export barriers to entry led US soybean growers and processors (represented by the American Soybean Association, United Soybean Board and National Oilseeds Processors Association, "ASA-USB-NOPA") to develop a policy (the "eleven-point plan") that dictates a closed-loop identity-preservation (CLIP) standard for varieties lacking regulatory approval in major export markets. Biotech soybeans produced by Dupont-Pioneer (the high-oleic soybean) have been grown in the US with regional launches in compliance with this stewardship system. As a result, upcoming new varieties of biotech soybeans that lack regulatory approval in major markets overseas should be marketed in the United States only if there is a system that meets CLIP's eleven points. (Comment Number: APHIS-2007-0044-9968-12)

Response: APHIS acknowledges the comment. Although trade associations work to solve problems, government has a role in developing solutions as well

Comment Excerpt Text:
The United States and its grain-exporting allies have yet to achieve a globally recognized tolerance for adventitious presence of GM products in a world where a zero tolerance regulatory import standard (enforced via genetic testing and mandatory disclosure laws) is increasingly prevalent.
The European Union cites a multilateral environmental agreement that became law on September 11, 2003, the Cartagena Protocol on Biosafety, to justify its "precautionary approach" to regulatory approval of biotech crops as a global standard. Paired with this delay-ridden approval process, has a zero tolerance standard for any biotech genetic event that lacks approval. In contrast to the United States, the European Union has attempted to address tolerances in seed purity, only to find opposition to any number other than zero (i.e., less than the limit of testing). The European Union will use testing centers to track each GM event, forcing destruction of food based on traces of any unwanted DNA. These policies are spreading to other nations that are key trading partners of the United States, with even more extreme standards emerging. For example, China has adopted an arguable "zero tolerance" for GM-food labels, which is even stricter, on paper, than the European Union's standard of 0.9% (but China's enforcement policy has been spotty to non-existent, particularly compared to the EU).
EU-style strict traceability was actually proposed for RR Alfalfa by the District Court, but rejected as commercially impracticable. Such tracing to zero tolerance should not be imposed on biotech crops sold in the US, without first finding a genuine threat to consumer or animal health (or environmental, not purely economic, impacts). For the economic impacts to exports or intended-purpose crops (organic, non-GMO, export-bound etc.), there is simply no legal or logical need for USDA to become involved beyond the scope stated in its EIS. USDA has historically relied on industry stewardship supplemented by grower associations and the grain trade (e.g., the North American Export Grain Association et al.) to manage such impacts. (Comment Number: APHIS-2007-0044-9968-13)

Response: APHIS acknowledges the comment. Although trade associations work to solve problems, government has a role in developing solutions as well.

5.5 Issue 5.5 – Impacts on Other uses of Glyphosate

No comments are associated with this issue.

5.6 Issue 5.6 – Social Impacts

Comment Excerpt Text:
As a consumer, I care about the contamination of organic foods and crops, and I expect USDA to do everything the agency can to protect organic farmers and consumers. The organic industry provides many benefits to society: healthy foods for consumers, economic opportunities for family farmers and urban and rural communities, and a farming system that improves the quality of the environment. However, the continued vitality of this sector is imperiled by the complete absence of measures to protect organic production systems from contamination and subsequent environmental, consumer, and economic losses. USDA must reject the deregulation of GE alfalfa and protect the integrity of organic (Comment Number: APHIS-2007-0044-0752-1)

Response: APHIS acknowledges the comment. See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
I am strongly opposed to the allowing of Monsanto Corporation to sell genetically modified alfalpha. It has been amply demonstrated that genetically modified crops are able to spread their genes to neighboring, non-modified crops, either through pollen spread, or intentional contamination.
Buying organically raised meat, milk and eggs will be made much more difficult and costly.
I feel that more research will demonstrate a link between GM plants and the weakening of field crops could be shown.
Multiple instances of farms being contaminated by pollen from GM fields many yards apart are being seen, in Canadian rape (canola) fields, and others. Farmers are being visciously driven from business by Monsanto, through no fault of their own. Monsanto is the soul provider of GM seeds and thus a threat to try to maximize their own profits by raising prices, threats of lawsuits for even accidentally contaminated crops.
There is also very little research to prove that GM crops are not a potential hazard to human health.
For these reasons I ask that Monsanto not be allowed to put the consumers of the world at risk by releasing GM alfalpha.
Norman Hodge
(Comment Number: APHIS-2007-0044-0892-1)

Response: APHIS acknowledges the comment. Regarding the comment on purchasing organic products, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the comment on market seed concentration and monopoly power, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0. In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).In regards to the need for an independent review into the health and safety of GT alfalfa, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
As a consumer, I urge you to reject Monsanto's GE alfalfa. I care about the integrity of the food I eat, and don't want organic and other non-genetically engineered crops to be contaminated by genetically engineered alfalfa.
Specifically, in regards to Docket: APHIS-2007-0044, I suggest you not approve GE alfalfa for the following reasons:
The USDA's draft Environmental Impact Statement dismisses the significance of widespread contamination of organic and non-genetically engineered alfalfa crops, and further dismisses organic consumers' interest in maintaining the integrity of organic crops.

Consumers have a right to choose to eat non-genetically engineered foods, and farmers have a right to sow the crops of their choice, without threat of contamination. The approval of genetically engineered alfalfa, will inevitably lead to contamination of other crops and the food supply.
Therefore, I urge you to reject the approval of genetically engineered alfalfa (Comment Number: APHIS-2007-0044-0897-1)

Response: APHIS acknowledges the comment. Regarding the comment on consumer preference for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for this issue. Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.
In regard to gene flow, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
*Tell USDA That You Care About GE Contamination of Organic Crops and Food:

USDA claims that there is no evidence that consumers care about contamination of organic alfalfa and alfalfa-derived foods with Monsanto's GE Roundup Ready alfalfa.

- Prohibition of genetic engineering (GE) is a fundamental tenet of the Organic Standard. In fact, USDA's failure to exclude GE crops from the first version of the organic rule was one of the main reasons that 275,000 people filed public comments in 1997-- the largest outpouring of public participation in the history of U.S. administrative procedure. Consumers care deeply about organic integrity, and genetic engineering is fundamentally at odds with organic. More than 75% of consumers believe that they are purchasing products without GE ingredients when they buy organic.[i] (Comment Number: APHIS-2007-0044-0948-1)

Response: APHIS acknowledges the comment. See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
*Tell USDA You Will Reject GE Contaminated Alfalfa and Alfalfa-Derived Foods:

USDA claims that consumers will not reject GE contamination of organic alfalfa if the contamination is unintentional or if the GE material is not transmitted to the end milk or meat product.

- The Organic Standard requires that livestock feed for animals used for meat, milk, eggs, and other animal products is 100 percent organic. Protecting organic alfalfa, the main source of feed for the organic dairy industry, is crucial to the health of that important sector of U.S. agriculture. Additionally, as the Court found in the lawsuit that required this EIS, to "farmers and consumers organic means not genetically engineered, even if the farmer did not intend for his crop to be so engineered." Whether or not the end product is impacted is not the issue. Farmers' fundamental

right to sow the crop of their choice is eliminated when it is contaminated with transgenes, and so is the public's ability to support meaningful organic food and feed production. The public's trust in the integrity of the organic label is essential to the continued vitality of the organic foods industry. Tell USDA you reject GE contamination of organic by any means or at any stage of sustainable food production. (Comment Number: APHIS-2007-0044-0948-2)

Response: Regarding the comment on consumer preference for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
*Tell USDA That Harm to Small and Organic Farmers is Significant:

USDA concludes that GE alfalfa will cause production to shift to larger farms (that can afford built-in isolation distances) and conventional growers who are not threatened by GE contamination, but that these economic shifts are not significant.

- Small, family farmers are the backbone and future of American agriculture and must be protected. Organic agriculture provides many benefits to society: healthy foods for consumers, economic opportunities for family farmers and urban and rural communities, and a farming system that improves the quality of the environment. However, the continued vitality of this sector is imperiled by the complete absence of measures to protect organic production systems from GE contamination and subsequent environmental, consumer, and economic losses. (Comment Number: APHIS-2007-0044-0948-7)

Response: APHIS acknowledges the comment. Regarding impacts on small farms, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding impacts of GT alfalfa deregulation on organic agriculture, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0..

Comment Excerpt Text:
NCGA believes that the evidence we have presented here, much of which has not been considered by APHIS in their EIS, indicates that GE alfalfa creates clear plant pest risks and thus by law requires regulation. We have presented evidence that APHIS clearly asked for in its EIS including information related to the economic impacts on organic and conventional farmers as a result of deregulation and evidence that clearly shows that organic consumers, which is nearly ¾ of all Americans, purchase organic products because they are GE free. The contamination of organic fields from GE alfalfa will thus result in an economic loss to organic farmers in international and domestic markets and demonstrates clear risks to such farmers. (Comment Number: APHIS-2007-0044-11018-18)

Response: APHIS acknowledges the comment. Regarding the comment on consumer preference for products free of genetically engineered material, see the response to comment

APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding impact of GT alfalfa deregulation on U.S trade, see response to comment APHIS-2007-0044-3404-1 for issue 5.4. In regard to plant pest risk determination, see the response to comment APHIS-2007-0044-9936-38 for issue 11.16.

Comment Excerpt Text:
It is clear that the organic industry continues to be a vibrant and increasing component of U.S. food and agriculture, and it is also evident that the average organic consumer is diversifying. New research from OTA also suggests that the organic consumer is as strong as ever, despite difficult economic situations in the United States. In fact, evidence demonstrates that the "organic consumer" is nearly ¾ of all Americans, demonstrating that organic purchasing is no longer a niche market. Nearly three-quarters (73 percent) of U.S. families buy organic products at least occasionally, and mainly for health reasons. As well, while U.S. families are making efforts to reduce their spending by eating out less, they appear to be purchasing more food to be prepared in the home and for many families this means purchasing more organic products. Compared to one year ago, almost one in three U.S. families reports that they are actually buying more organic foods (OTA 2009b).

One of the largest sections of the EIS that lacks sufficient data for APHIS to make informed decisions on the deregulation of GE alfalfa relates to consumer sensitivity to GE content in food. APHIS recognizes that, "demand for GE foods or for foods free of GE content is very difficult to estimate" (EIS pg 58). The majority of the studies cited by APHIS come primarily from a few authors. Additional evidence demonstrates clearly that consumers do have preferences about genetic engineering and food products- quite clearly indicating that genetic engineering is a process that deeply concerns the American people and is generally not accepted.

Cardello et al. (2007) examined consumer perceptions of foods processed by innovative and emerging technologies and found that for all consumer groups tested, the food processes and production methods that were viewed most negatively was genetic modification and irradiation. Such results were consistent with previous studies conducted by Cardello which found that genetic modification was among the greatest concerns that U.S. consumers had for novel and emerging food technologies (Cardello 2000, Cardello 2003, Cardello et al. 2007).

This concern for genetic modification has been shown in additional studies where people were asked to eat GM and non GM food. Jaeger et al. (2004) conducted research where people were given non-GM cookies and had the opportunity to switch their cookie to a GM cookie. In all cases, participants needed to be paid, often considerable amounts, in order to switch their cookies to GM (Jaeger et al. 2004). Other economic-based research found that consumers associated a utility advantage with purchasing non-GM tomatoes to an average premium of $0.39 a pound, implying that consumers would be willing to purchase non-GM tomatoes at a price $0.39 higher than the price of GM tomatoes (Bukenya and Wright 2007). In 2003, Kaneko and Chern conducted telephone surveys to assess willingness to pay to avoid GM foods. Their results found that respondents were willing to pay premiums of 41.2%, 31.4%, 40.9%, and 52.5% of the base price to avoid GM vegetable oil, GM cornflakes, GM-fed salmon, and GM salmon respectively.

Notably, this research indicates that American consumers are willing to pay more for animal products fed non-GM food, not merely just a non-GM animal itself. This has direct implications for the deregulation of GM alfalfa, which is a product consumed by dairy and beef cows.

Evidence from potential U.S. export markets also indicates a strong aversion to GM food. Batrinou et al. (2008) examined the acceptability of GM corn by young people in Britain. In their study, 63 percent of participants refused to even taste a single piece of a GM corn chip, even though it was approved for consumption in the European Union. Research to examine the perceptions of South Korean attitudes towards GM food demonstrates that nearly 2/3 either "somewhat disapprove" or "strongly disapprove" of GM plants and more than ¾ "somewhat" or "strongly disapprove" of GM animals (Nayga et al. 2006). Kaneko and Chern (2004) found that Japanese consumers are willing to pay a premium between 30-40% for non-GM food. Chern et al. (2002) found that there was a willingness to pay to not consume GM vegetable oil of 55-69% of participants in Norway, 50-62% in America, 33-40% in Japan and 17-21% in Taiwan. (Comment Number: APHIS-2007-0044-11018-4)

Response: APHIS acknowledges the comment. Regarding the comment on consumer preference for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding impact of GT alfalfa deregulation on U.S trade, see response to comment APHIS-2007-0044-3404-1 for issue 5.4. References provided in comments to the DEIS were revised and incorporated to the FEIS when containing new and reliable information relevant to the analysis.

Comment Excerpt Text:
The Organic Consumer: Committed to Health and GE Free Food

Existing research shows that people in both the United States and throughout the world have strong preferences about GM food and in many cases actively seek to avoid it and pay a premium for being able to do so. Organic consumers also care deeply about GM food. APHIS notes, "One of the unique attributes of organic foods, and one reason consumer demand for organic foods is increasing is the intended absence of GE ingredients in the process of producing them" (APHIS pg. 60). Yet, despite this acknowledgement APHIS also notes in several places that they do not have data to suggest that organic consumers purchase organic food because it is free of genetic modification. For example, APHIS states that, "consumer preferences for organic over GE foods are influenced in part by philosophical factors that are likely unrelated to unintended cross fertilization of feed crops with GE materials" (APHIS 135). Furthermore, APHIS asserts that there is no evidence to support the claim that "consumers of organic alfalfa demand alfalfa free from any unintended presence of GT traits."The assumption of APHIS that organic consumers, which again, now represent nearly ¾ of all Americans, do not purchase organic food because it is free of GM is inaccurate based on research conducted by the organic industry. Further, evidence demonstrates that organic consumers are increasingly aware of the fact that organic does not contain GM organisms and are purchasing organic food because of this. According to the Hartman Group, 2/3 of organic consumers identified organic products as being free of genetic modification, up 5 percentage points from 2006. Most consumers of organic

products identified health as the number one reason to purchase organic food. However, the Hartman Group also found considerable other reasons that people purchase organic food including concern, "that genetically modified crops might cross-pollinate with non-genetically modified crops, further damaging the food supply and biological diversity" (Hartman 2008). This demonstrates that in fact organic consumers do care about unintended contamination and choose organic products because they are not genetically contaminated.

[See original submission letter for Figure 2. Reasons for Buying Organic Foods and Beverages 2008. The Hartman Group. The Many Faces of Organic 2008.]

Most notably, the Hartman Group found that organic consumers purchase organic products overwhelmingly for health reasons. The top three reasons people buy organic foods and beverages—which include dairy milk—are: avoiding pesticides, growth hormones and antibiotics and genetically modified products (Figure 2). While GM avoidance is among the top 3 reasons people purchase organic, the Hartman Group also found that this figure rose considerably between 2006 and 2008 (Figure 3). In 2006, 32% of consumers purchased organic food to avoid GM organisms, which rose to 41% in 2008. This indicates that consumers are increasingly aware of GM contamination and making organic purchased based on the understanding that they are free of GM organisms. NCGA strongly encourages APHIS to recognize this data and consider the evidence that consumers purchase organic product because they are free of GM products.

[See original submission letter for Figure 3. Reasons to Purchase Organic Food, Changes Between 2006 and 2008. The Hartman Group. The Many Faces of Organic 2008.] (Comment Number: APHIS-2007-0044-11018-5)

Response: APHIS acknowledges the comment. Regarding the comment on consumer preference for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding impact of GT alfalfa deregulation on U.S trade, see response to comment APHIS-2007-0044-3404-1 for issue 5.4. References provided in comments to the DEIS were revised and incorporated to the FEIS when containing new and reliable information relevant to the analysis.

Comment Excerpt Text:
Ecological Restrictions to Co-Existence

As previously presented, organic farmers stand to be adversely affected by the introduction of GM crops such as GE alfalfa. The economic losses that organic and conventional farmers will face from the introduction of GM crops go far and beyond a limitation on land available for cultivation. Non-GM farmers stand to lose evident market premiums for non-GM products if their products are cross contaminated by GE products. According to APHIS, there is no evidence to suggest that, "current organic practices and GT alfalfa stewardship are insufficient to minimize unintended presence." NCGA believes that there is considerable scientific evidence to suggest quite the opposite- current GM management practices are not nearly sufficient to prevent

contamination of organic and conventional alfalfa production. Further, NCGA strongly disagrees with the concept put forth by APHIS that, “potential environmental impacts due to gene flow from GT alfalfa to cultivated or feral alfalfa are considered by APHIS to be no different from cultivation of conventional alfalfa and the resulting potential for gene flow from conventional alfalfa” (APHIS pg. 98). Clearly, as proven earlier, organic and conventional consumers purchase organic products or non-GM products because they wish to avoid GM organisms. Thus, contamination of organic and conventional products with GM organisms stands to fundamentally undermine the integrity of organic and GE free systems which consumers demand and pay a premium for. Thus, gene flow and other environmental damage resulting from GE alfalfa will deeply affect organic farmers’ ability to be certified organic, and further undermine the ability of organic and conventional consumers who wish to not purchase GE food to make purchasing decisions. (Comment Number: APHIS-2007-0044-11018-7)

Response: Regarding the comment on consumer demand for products free of genetically engineered material and the comment on the impact of unintended genetically engineered material on organic certification, see the response to comment APHIS-2007-0044-11689-2 for this issue. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
This file contains 24,017 letters from organic activists in opposition to genetically modified alfalfa.
The USDA's Environmental Impact Statement on genetically engineered alfalfa paves the way for the unregulated commercialization of Monsanto's Roundup Ready alfalfa. As a consumer of organic food, I strongly oppose this action because it will result in the genetic contamination of organic food.
USDA concedes that "consumer perceptions of organic food safety may be an important driver for consumer substitution of organic for conventionally produced food," but then claims that there isn't evidence that U.S. consumers are as strongly affected by food safety concerns as Europeans, as if U.S. consumers don't care enough to buy organic. As an organic consumer myself, I can tell you that I DO care. (Comment Number: APHIS-2007-0044-11034-1)

Response: APHIS acknowledges the comment. Regarding the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.
In regard to gene flow to organic fields, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Organic Consumers Do Not Want And Will Reject GE Contaminated Food

USDA claims that there is no evidence that consumers care about contamination of organic alfalfa and foods derived from Monsanto’s GE alfalfa. We know better. The prohibition of genetic engineering is a fundamental tenet of the Organic Standard. In fact, USDA’s failure to

exclude GE crops from the first version of the Organic Rule was one of the main reasons why 275,000 people submitted comments to USDA in 1997 — at the time, the largest outpouring of public participation in the history of U.S. administrative procedure. Consumers care deeply about organic integrity and GE agriculture is fundamentally at odds with organic. Consumers have established an implied zero tolerance for GE material in organic products, and this is reinforced by polling data showing that consumers buy organic food to avoid GE ingredients. A public opinion poll of organic consumers has shown that more than 75% of consumers believe that they are purchasing products without GE ingredients when they buy organic. [Footnote 1 Organic Community Comments to APHIS, Proposed Rule and Programmatic Environmental Impact Statement for the Introduction of Genetically Engineered Organisms, APHIS Docket 2008-002, June 29, 2009.] Another poll of "Consumer Attitudes and Behavior, Five Years Later & Into the Future," found that one of the top five reasons people buy organic is to avoid genetically modified products. [Footnote 2 The Hartman Group. (2006) "Consumer Attitudes & Behavior, Five Years Later & Into the Future."]The organic industry risks losing its credibility and markets if the USDA allows GE material to make its way into organic products.

In the DEIS, USDA also claims that consumers will not reject GE contamination of organic alfalfa if the contamination is unintentional or if the GE material is not transmitted to the end milk or meat product. Again, we strongly disagree. The Organic Standard requires that livestock feed fed to animals to produce meat, milk, eggs, and other animal products must be 100 percent organic. Protecting organic alfalfa, the main source of feed for the organic meat and dairy industry, is crucial to the health and survival of this important sector of U.S. agriculture. In a declaration to the U.S. District Court on the economic impacts of GE alfalfa, a dairy farmer disclosed that if his alfalfa forage were contaminated with RR genes, he would not be able to obtain organic or non-GE certification. Because he owns an organic dairy and food business, and because he is enrolled in a non-GE labeling and verification program, GE contamination would have a devastating impact on his business. [Footnote 3 Straus, Albert. (April 6, 2007) Declaration of Albert Straus in Support of Plantiffs Permanent Injunction, The United States District Court for the Northern District of California, San Francisco Division, Case No. C06-175 CRB.]

In the legal ruling that required USDA to draft an EIS, the Court found that to "farmers and consumers organic means not genetically engineered, even if the farmer did not intend for his [or her] crop to be so engineered." As the Court aptly concluded, whether or not the end product is impacted is not the issue. Farmers' fundamental right to sow the crop of their choice is eliminated when a crop becomes contaminated with transgenes and so is the public's ability to support organic farming, feed, and food production with their purchasing dollars. These are both interrelated and major concerns to the organic sector. Public trust in the integrity of the organic label is essential for the continued vitality of the organic foods industry and we have no doubt that consumers will reject GE contamination of organic food no matter how or why it occurs and at all stages of organic food production. (Comment Number: APHIS-2007-0044-11689-2)

Response: In regard to the comment on consumer demand for products free of genetically engineered material, the analysis contained in the DEIS supports the conclusion that consumers (and producers) of organic products care about the presence of genetically engineered material in organic products. Section 2.2.1 of appendix T of the DEIS states that "one of the unique

attributes of organic foods, and one reason consumer demand for organic foods is increasing, is the intended absence of GE ingredients in the process of producing them." Section 2.1.4 of appendix S of the DEIS recounts how the first version of the National Organic Program published by the USDA in 1997 did not exclude GE organisms and was later reformulated after over 270,000 comments were received from consumers, producers and other interested parties. Section 4.3 of the same appendix S in the DEIS explicitly recognizes the discontent of organic consumers and producers with the presence of GE content as a potential negative impact of GT alfalfa deregulation. The analysis in the DEIS, however, was unable to document any available evidence that this preference translated into decreased sales of organic products under the potential presence of genetically modified material. As stated in the Executive Summary of the DEIS: "The analyses found no GE-sensitivity in domestic sales of organic alfalfa; however, this does not mean that GE products are necessarily welcome by organic consumers or producers." Sections 2.2 and 2.3 of appendix T of the DEIS discuss the evidence and potential reasons for a lack of impact of this preference for products free from genetically engineered material on the demand (sales) of products with potential genetically engineered content. Despite this finding, the DEIS does analyze the impact on organic markets under the scenario of decreased demand for organic products due to GT alfalfa deregulation. This analysis is presented in appendix S of the DEIS. The discussion of these issues in Appendices S and T of the FEIS have been revised to include the relevant references provided by commenters to the DEIS.

In regard to the comment that organic certification will not allow for unintended presence of genetically engineered material, the analysis contained in the DEIS does not support this conclusion. The National Organic Program (NOP) does not allow Excluded Methods, *defined in* 7 CFR §*205.105 as* "a variety of methods used to genetically modify organisms or influence their growth and development by means that are not possible under natural conditions or processes and are not considered compatible with organic production [.]." The preamble to the NOP, however, states that the standard is based on process, not product, that other terms (such as GM-free) should not be used as replacement for the term organic, and, as stated in the Executive Summary of the DEIS, that "the presence of a detectable residue of a product of excluded methods alone does not necessarily constitute a violation of this regulation. As long as an organic operation has not used excluded methods and takes reasonable steps to avoid contact with the products of excluded methods [including genetically engineered crops] as detailed in their approved organic system plan, the unintentional presence of the products of excluded methods should not affect the status of an organic product or operation." (65 Federal Register 80556). This policy has been reiterated in a 2004 policy statement that clarifies that: "As to the status of the commodity, USDA's position is that this is left to the buyer and seller to resolve in the marketplace through their contractual relationship ." This stated, APHIS recognizes that segments of the organic markets might demand testing for presence of genetically engineered content and might reject products that reveal even low level presence of genetically engineered content. Appendix T of the FEIS describes a privately developed labeling initiative attempting to cater to this market (Non-GMO Project). The existence of this market segment is taken into consideration in the analysis of the impacts of GT alfalfa deregulation in appendix S and chapter IV of the DEIS and FEIS.

Comment Excerpt Text:

Organic Consumers Do Not Want And Will Reject GE Contaminated Food

We have millions of consumers that choose Clif Bar products because they are certified organic. We research the organic market, we talk to our consumers, we follow national and international studies of consumer preferences. We know that consumers care deeply about the integrity of organic foods and the USDA organic label. Of all the organic food sectors, consumers care most deeply about organic dairy which relies on organic alfalfa.

In 1997, 275,000 people spoke up against GMOs in organic food and farming. The awareness and concern among consumers has grown even more since that time. USDA also claims that consumers will not reject GE contamination of organic alfalfa if the contamination is unintentional or if the GE material is not transmitted to the end milk or meat product. Again, we strongly disagree. The Organic Standard requires that livestock feed fed to animals to produce meat, milk, eggs, and other animal products must be 100 percent organic. Protecting organic alfalfa, the main source of feed for the organic dairy industry, is crucial to the health and survival of this important sector of U.S. agriculture. A farmer, commenting to the U.S. District Court, noted that if his alfalfa forage were contaminated with RR genes, he would not be able get organic or non-GE certification. Because he owns an organic dairy and products business and because he is enrolled in a non-GE labeling and verification program, GE contamination would have a devastating impact on his business. [Footnote 1 Straus, Albert. . (April 6, 2007) Declaration of Albert Straus in Support of Plantiffs Permanent Injunction, The United States District Court for the Northern District of California, San Francisco Division, Case No. C06-175 CRB.]

In the legal ruling that required USDA's EIS the Court found that to "farmers and consumers organic means not genetically engineered, even if the farmer did not intend for his [or her] crop to be so engineered." Whether or not the end product is impacted is not the issue. Farmers' fundamental right to sow the crop of their choice is eliminated when a crop becomes contaminated with transgenes. So is the public's ability to support meaningful organic food and feed production. Public trust in the integrity of the organic label is essential to the continued vitality of the organic foods industry and we have no doubt that consumers will reject GE contamination of organic by any means or at any stage in organic food production. (Comment Number: APHIS-2007-0044-11788-4)

Response: Regarding the comment on consumer preference for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Organic Consumers Do Care About GE Contamination and Will Reject GE Contamination of Organic Alfalfa
APHIS claims that there is no evidence that consumers care about contamination of organic alfalfa and alfalfa-derived foods. When it comes to GE food, most U.S. consumers are not aware of the extent that GE foods have entered the marketplace. Consumer awareness of

biotechnology, however, has generally increased over the last decade, even though most consumers remain confused over the science.[Footnote 1: Falk MC, Chassy BM, Harlander SK, Hoban TJ, McGloughlin MN, Akhlaghi AR. 2002. Food biotechnology: benefits and concerns. J Nutr.132(6):1384-90.] According to a 2006 report on GE markets, consumer demand for non-GE food remains steady due to consumer concerns over the safety of GE products, while farmers continue to fear GE contamination of their crops.[Footnote 2: The Organic & Non-GMO Report 2006. Writing Solutions, Inc. 6(8)
]
However, in the U.S. significant gains in the organic industry can be viewed as a consumer shift to non-GE food. In 1998, the USDA received over 275,000 comments mostly from consumers outraged that the agency would authorize certified organic food production to include genetically modified organisms, among other materials and practices, counterintuitive to organic principles. Since current regulations prohibit GE in organic agriculture, consumers are assured that by buying organic they are in fact avoiding GE food. Conversely, consumers are unable to identify GE food in their local supermarkets. Consumer right-to-know should require that information be made available so each individual or group may make food choices based on their own values.[Footnote 3: Thompson, PB. 1997. Food biotechnology's challenge to cultural integrity and individual consent. Hastings Cent Rep. (4):34-8.] It is unclear how APHIS came to the conclusion that consumers do not care about GE, when consumers are essentially unable to choose non-GE food from GE food, other than switching to organic. In fact, more than 75% of consumers believe that they are purchasing products without GE ingredients when they buy organic.[Footnote 4: Organic Community Comments to APHIS, Proposed Rule and Programmatic Environmental Impact Statement for the Introduction of Genetically Engineered Organisms, APHIS Docket 2008-002, June 29, 2009.] A more accurate measure of consumer preference is the shift to organic food.
Consumer demand for organic has, inarguably, increased significantly over the last decade. USDA Economic Research Service notes that consumers prefer organically produced food because of concerns regarding health, the environment, and animal welfare, and are willing to pay the price premiums established in the marketplace.[Footnote 5: USDA. 2009. Organic Agriculture: Organic Market Overview. Economic Research Service. Available at http://www.ers.usda.gov/briefing/organic/demand.htm] Consumers of organic food tend to itemize organic purchases in the following order: dairy, fruit and vegetables, prepared foods, meats, breads and juices, according to a 2008 report,[Footnote 6: The Hartman Group. 2008. The Many Faces of Organic 2008. Available at http://www.hartmangroup.com/publications/reports/74] with U.S. households containing organic food and products rising from 57 percent in 2006 to 59 percent in 2007, with the number of core users increasing from 16 percent in 2006 to 18 percent in 2007.[Footnote 7: Natural Marketing Institute (NMI). 2008. Organic Consumer Trends Report (OCTR)] Organic dairy is important to many organic consumers and criticism of the industry has been at the forefront of the organic community for many years. The treatment and grazing of animals, and the use of vaccines and hormones have been heavily debated. In light if the sensitivity of this particular sector of organic agriculture, the agency should be more prudent in protecting organic feed (alfalfa) and thus, organic dairy from contamination.
A quick look at the docket issued for this action yielded over 3,000 comments, most of which

are from average consumers who are very concerned and upset that the agency chooses to blatantly ignore their concerns about GE food and GE contamination. Many have expressed that the only way to avoid GE food is to purchase organic. Others are outraged that their organic dairy and meat may soon be contaminated with GE materials. The proposal to deregulate GE alfalfa will certainly threaten not only organic and non-GE alfalfa, but also contaminate organic dairy and meat which rely on alfalfa. Based on the comments so far received by the agency, it would seem that consumers do in fact care about GE and organic integrity. Therefore it is imperative that the agency protect organic integrity by restricting the proliferation of GE crops into the environment. (Comment Number: APHIS-2007-0044-11960-5)

Response: APHIS acknowledges the comment. Regarding the comment on consumer preference for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. References provided in comments to the DEIS were considered and incorporated to the FEIS when containing new and credible information relevant to the analysis

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Comment Excerpt Text:
The Draft EIS maintains that there is no evidence that consumers, especially those that buy organic products, care about the contamination of food products by genetic engineering (GE) and, as a result, any such contamination would not result in lowered demand. Thus, USDA concludes that there would be no real impact on the domestic demand for conventional or organic dairy and beef products or sprouts. However, Consumers Union hereby presents new poll data that indicates that organic consumers care greatly about GE contamination.
The EIS also states that the Food and Drug Administration (FDA) has "concluded" that there is no risk to human health from GE alfalfa. However, the FDA has not made any conclusions on the human health risks of GE alfalfa because FDA does not have a premarket safety approval process. The conclusion that the GE alfalfa is safe is Monsanto's.
Consumers Union believes that the current draft EIS is not adequate and urges that GE alfalfa not be deregulated until the economic and health impacts have been more fully investigated. (Comment Number: APHIS-2007-0044-12036-1)
Response: Regarding the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regards to the need for an independent review into the health and safety of GT alfalfa, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0. The authority of USDA, FDA and EPA in regulating genetically engineered organisms is discussed in section I of the DEIS.

Comment Excerpt Text:
Consumers concerned about GE contamination
USDA argues that there is no evidence that consumers care about the issue of GE contamination of food products and so, there would be no domestic economic implications of approval of GE alfalfa. As the EIS states, USDA has "concluded that the deregulation of GT [glyphosate-tolerant] alfalfa would likely have no impact or minor impact on the domestic demand for conventional or organic dairy and beef products . . . there is insufficient evidence on the

sensitivity of domestic demand to the presence of GE products, and any existing preference for non-GE foods would likely not translate to a reduction in demand. Furthermore, other genetically engineered crops (e.g., corn, soybeans, canola) have been deregulated in the United States for a number of years with no substantial drop in demand for conventionally produced dairy products or meat." As the EIS states, certified organic foods have "had to contend with the risk of GE material accidentally spreading from deregulated cultivars of soybeans, corn, and canola to organic crops. Despite the potential for unintended cross-fertilization, however, organic food sales in the United States continue to grow at a rapid rate."

There are a number of problems with USDA's thinking on the topic of consumer concerns over genetic engineering. USDA argues they have no evidence that consumers of organic products are concerned about the issue of GE contamination of such products. Yet strong evidence exists in USDA's own records. In 1997, USDA asked for comment on whether GE should be allowed in organic. Some 275,000 people filed public comments to USDA, with the vast majority opposing use of GE in organic production. USDA listened to the public and prohibited use of GE inputs in organic production in the organic rule that was finalized. This clearly shows that consumers of organic food are concerned with GE.

A survey recently conducted by Consumer Reports National Research Center found that US consumers remain concerned about the issue of contamination of organic foods by genetic engineering. Our poll, conducted in the first week in February, 2010, asked consumers about their level of "concern with organic foods crops that are contaminated by genetic engineering." Over half (53%) of the respondents said they bought organic foods. Of the organic food buyers, some two-thirds (66%) were concerned (either "extremely," "very," or "somewhat") about contamination of organic food products by GE. Interestingly, half (50%) of those who don't buy organic food said they were concerned about the GE contamination issue. This survey clearly shows that consumers, especially those that buy organic, are concerned with the issue of GE contamination.

USDA takes the lack of a "substantial drop in demand for conventionally produced dairy products or meat"—even though GE corn, soybeans and canola have been used in conventional dairies for over a decade—as evidence that consumers don't care about GE contamination of food products. USDA also believes that since organic foods sales continue to rise at a rapid rate, even though there could be contamination in organic soy, corn and canola, consumers of organic food products are not that concerned about the GE contamination issue. An alternative explanation for these finding could be that many consumers may be unaware of the contamination. Unlike Europe and many Asian countries, the US has no mandatory labeling of genetically engineered food. Consumers may therefore erroneously believe that there is no contamination. Part of the reason could also be that there has been very little media attention or independent studies on the issue of the extent of GE contamination of organic food products.

GE contamination of organic can have economic impact

USDA also appears to be ignoring the evidence that there could be significant economic impacts of commercialization of GE alfalfa. A paper presented at the 16th World Congress of the International Federation of Organic Agriculture Movements in 2008, "The economic impacts of GM contamination on the organic sector," includes a number of examples from the US of adverse economic impacts of GE contamination. In 1998, Terra Prima, a Hudson, Wisconsin food company, had to recall 87,000 bags of its Apache Organic Tortilla Chips, when testing by a laboratory in Germany found traces of GE corn. At a FDA hearing in Oakland, California in 1999, Melodi Nelson, the vice-president of Terra Prima testified that the 87,000 bags represented

their entire output, valued at $500,000. In 2001, the Union of Concerned Scientists estimated that GE contamination of organic corn crop could cost organic corn farmers $90 million per year. Testing of organic and Identity Preserved grain at grain elevators in North Dakota and Minnesota have revealed that 2% - 5% of the grains have been rejected due to GE contamination.
In 2004, testing of 20,000 papaya seeds from Big Island of Hawaii, 80% of which came from organic farms and the rest from backyard gardens or wild trees, found a contamination level of 50%; testing of organic papayas from Oahu found contamination levels to exceed 5%. Indeed, GE contamination was also found in the stock of non-genetically engineered seeds being sold commercially by the University of Hawaii. The problem of GE contamination of organic papaya has lead to a large price differential between organic and GE papaya, with the conventional, non-GE papayas selling for more than the GE papaya, but less than the organic papayas. In 1997, before the GE papayas were introduced, Hawaiian farmers received an average of $1.23 per kilograms. In 1998, after approval of the GE papaya, that price crashed to $0.89 per kilo since major markets such as Japan and Canada stopped buying papayas. At a retail farmers market in Maui in November 2005, organic papaya sold for $3.20 while the GE papaya sold for $0.99. Also, exports of Hawaiian papayas have dropped precipitously since the introduction of GE papayas. Hawaiian papaya exports to Japan fell from $10.3 million in 1998 to $4.6 million in 2005. (Comment Number: APHIS-2007-0044-12036-2)

Response: Regarding the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding the impacts of mandatory labeling, see the response to comment APHIS-2007-0044-6353-8 for issue 5.6. References provided in comments to the DEIS were considered and incorporated in the FEIS when containing new and credible information relevant to the analysis.

Comment Excerpt Text:
APHIS admits that GE crops accidently contaminate organic products but finds no evidence that this is impeding the development of the organic sector (p. 135-136). They assert no consumer demand for GE free food and that their "philosophical" preference for GE food is unrelated to accidental cross-fertilization. I disagree with APHIS on both counts. Consumers do care. Indeed they pay higher prices specifically to avoid things like GE contamination and they expect to get what they are promised. And they have a right to expect that, whether "philosophical", physical, spiritual, or other WIse. (Comment Number: APHIS-2007-0044-12428-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
First, the buyers and customers that USDA certified organic farmers serve demand food that is free of contamination with genetically engineered (GMO) ingredients. In addition, the USDA National Organic Program requires that food marketed as organic be free from GMO ingredients. Thus, accidental cross-fertilization of organic crops with genetic material from GMO varieties of the same crop, which leads to the presence of transgenic material in the organically managed crop, can make that crop unacceptable to organic consumers. Organic producers have had their

crops rejected by both domestic and export markets because the crops contained detectable traces of transgenic (GMO) material, from contamination that was beyond the farmers' control. Thus, APHIS errs when it states on page 135 of its EIS regarding GMO alfalfa, that "there is no evidence that organic consumers demand products free from the unintended presence of GE traits." This erroneous belief leads to the incorrect conclusion that such accidental cross-pollination does not have a significant economic impact on organic producers. The impacts are potentially serious, and can spell economic ruin for the producer. (Comment Number: APHIS-2007-0044-1687-1)

Response: APHIS acknowledges the comment. Regarding the comment on consumer demand for products free of genetically engineered material and the comment on the impact of unintended genetically engineered material on organic certification, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on international trade, see the response to comment APHIS-2007-0044-3404-1 for issue 5.4. Regarding the impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Please uphold Organic standards and help protect Organic farmers by regulating genetically altered and modified organisms. Organic should always mean GMO free, even in feed. I am a citizen of this country and my voice should be just as loud, if not louder than Monsanto's. GMO's are a new technology with the ability to taint other crops, organic farmers should be your #1 priority. GMO needs more research and more safety studies before being used in the main food stream (Comment Number: APHIS-2007-0044-2212-1)

Response: APHIS acknowledges the comment. See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

In regard to the need for an independent review into the health and safety of GT alfalfa, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
I very much do NOT want to consume food that is genetically engineered (GE) or has ingredients that have GE's in them. Further, I do not want to eat dairy or meat products where the cow or other animal has eaten GE's. GE's have not been sufficiently studied and what studies there are indicates that GE's are harmful. Short of banning them (my first choice) at least the public should know what products have GE's or were raised with GE's.
Please do NOT approve GE alfalfa as being Roundup Ready. Please do not approved ANY food items for people or animals that have GE's (Comment Number: APHIS-2007-0044-2218-1)

Response: APHIS acknowledges the comment. See the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to the need for an independent review into the health and safety of GT alfalfa, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
I strongly object to the application of GE alfalfa or other genetically modified materials in our food supply. Our family actively supports organically grown and certified food and the application of genetic engineering in general and particularly to organically grown foods is intrusive into our rights. We urge the USDA to resist corporate or other pressure to allow GE alfalfa into the food chain. The statement by USDA that "there is no evidence that organic consumers care about GE contamination" is false; we are one of many who strongly care and strongly object (Comment Number: APHIS-2007-0044-2221-1)

Response: APHIS acknowledges the comment. Regarding the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
This new patent does nothing that to give free hand to a company to achieve monopoly to cultivation of this plant and to bully farmers that would consider otherwise. We are too far here to speak of pesticide free cultivation of this plant which in any under developed country is one of the species that does not need even once manual or chemical measures to contain weeds. (Comment Number: APHIS-2007-0044-2225-3)

Response: Regarding seed market concentration see the response to comment APHIS-2007-0044-2225-3 for issue 5.0. Regarding presence of weeds in alfalfa, see response to comment APHIS-2007-0044-11037-10 for issue 7.2.

Comment Excerpt Text:
This comment refers to Docket No. APHIS-2007-0044.
The new Genetically modified Round-Up-Ready Alfalfa by Monsanto should not be allowed to be produced. It will have an environmental impact on Organic producers which could contaminate Organic farming areas. There is no reason that Organic farmers should be the ones burdened with the responsibility to assure that their farms have not been contaminated by the Genetically modified Round-Up_Ready Alfalfa. This would greatly increase the price of orgainc farming and therefore increase the price for organic products purchased by the consumer. They are already quite expensive. There are more and more people becoming aware of the health benefits provided by eating organic. To jeopardize their ability to purchase these products by increased costs and possible contamination that may be extremely difficult to avoid is not wise. (Comment Number: APHIS-2007-0044-2231-1)

Response: APHIS acknowledges the comment. Regarding the impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:

5. The Skagit Valley Co-op has followed specific buying guidelines since our founding 36 years ago, which state that it will not carry products made with harmful or artificial ingredients. The Skagit Valley Co-op member-owners choose to join and pay equity into the Co-op because they trust and believe in the Co-op's mission to offer local healthy food. A central part of this mission is to provide organic products that are free of GE ingredients. Our Co-op brand integrity is intimately tied to this promise that we make our consumers. The deregulation and unfettered commercial planting of GE, RR Alfalfa threatens our ability to choose organic and non-GE sources of dairy and meat products. If the yogurt, cheese, milk, and meats we sell contain GE contamination, or if we are unable to sell these products due to contamination issues, we stand to lose the confidence of our customer member-owners and the good will that we have developed over the past 36 years. (Comment Number: APHIS-2007-0044-2421-3)

Response: APHIS acknowledges the comment. Regarding the impact on organic and downstream markets see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
During the past year especially, we have received comments from member- owners deeply concerned about GMO ingredients in our products. We must answer to our customer base, and we regret that we do not have better answers to assure the families who want to make informed consumer choices. Many Co-op member-owners trust our buying guidelines and assume that our store is currently free of GE foods. We have done extensive outreach about the absence of sufficient labeling regulations that identify GMO products. GE agri-business lobbying has defeated numerous efforts to provide US consumers with the product labeling that they need to make informed choices at the grocery store. We have lent our support to the Non-GMO project, as the first viable attempt to identify and label Non-GMO verified products on grocery shelves. This however, is not enough for many consumers, and we have received threats of boycott and picketing if we do not immediately remove all GE ingredients from our shelves (Comment Number: APHIS-2007-0044-2421-8)

Response: APHIS acknowledges the comment. Regarding impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding APHIS authority with respect to labeling see response to comment APHIS-2007-0044-0416-1 for issue 2.0. Regarding the potential impacts of mandatory labeling, see response to comment APHIS-2007-0044-6353-8 for issue 5.6. APHIS expanded the analysis of the impact of deregulation of GT alfalfa on organic markets in appendix S of the FEIS, based on the comments received on the DEIS, including recognition of the growth of private marketing initiatives such as the "Non-GMO Project" and increased analysis of testing as a requirement in accessing sensitive markets.

Comment Excerpt Text:
I care very strongly about organic milk and organics in general. Please don't contaminate the alfalfa. (Comment Number: APHIS-2007-0044-3206-1)

Response: APHIS acknowledges the comment. Regarding the impact on dairy, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Please DO NOT approve the commercial use of genetically engineered alfalfa, which will inevitably threaten the viability of organic alfalfa and, consequently, organic meat and dairy. My friends and family and I care about GE contamination and our right to GMO-free organic foods. We hope you do too!
More and more, all kinds of people are concerned about protecting food from genetic modification and dangerous pesticides. Even though many are just beginning to educate themselves about the importance of organic and locally-produced foods, it is a strong national movement and a sign of progress. In supporting this vision of the future you will guarantee better health and happier, stronger communities. Please support organic farmers and organic food-- we're depending on them-- and don't approve GE alfalfa! (Comment Number: APHIS-2007-0044-3213-1)

Response: APHIS acknowledges the comment. Regarding the impact on meat and dairy, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
I live in a local farm community, and we grow and eat organic foods. We eat these foods because it delivers more nutrients than conventional agribusiness grown food. Whether or not the perception or notion exists that people do not really buy organic is superfluous. Our CHOICE to eat foods that are organic and unaltered is being compromised because of the greedy and short sided motivations of the largest SEED and GM manufacturer. (Comment Number: APHIS-2007-0044-3239-2)

Response: APHIS acknowledges the comment. See the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
The USDA stated "There is no evidence that consumers care about GE contamination of organic alfalfa."
Here's your evidence -- I am a consumer, and I care! I don't want to be Monsanto's guinea pig any longer! (Comment Number: APHIS-2007-0044-3255-1)

Response: See response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Genetically engineered or modified foods are a monopoly, and they take away the hope of anyone ever trying to achieve the "American Dream" that we all valued so greatly as a free nation. (Comment Number: APHIS-2007-0044-3255-5)

Response: APHIS acknowledges the comment. See the response to comment APHIS-2007-0044-2225-3 for issue 5.0.

Comment Excerpt Text:
Please, please do NOT approve GE alfalfa for commercial use. I am a mother to 3 small children and I am trying my absolute hardest to feed them natural and healthy food. This is becoming ever more difficult. I plead with you on behalf of myself, my children and all the other families out there to please do not approve GE alfalfa. I am very much concerned and involved and want you to know without a doubt that I care not only about the impact of GE alfalfa, but of also the contamination of other non-GE alfalfa. (Comment Number: APHIS-2007-0044-3260-1)

Response: APHIS acknowledges the comment. See the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
It was stated by your agency in an environmental impact statement on this crop that "There is no evidence that organic consumers care about GE contamination." That is a patently false statement. (Comment Number: APHIS-2007-0044-3278-2)

Response: See response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Really...Can we dilute the organic name even more? Those of us who choose to purchase organic milk for our families from reputable organic farmers don't want GMO Alfalfa. It may seem like a small issue, but it is huge. Diluting organic and NON-GMO standards is the sole result of big business wanting to cash in on a growing and profitable market. There are enough people in our country who don't care about GMOs or Organics. Don't dilute our small but important piece of the organics. Please please...I want to feed my children healthy and natural foods and I do so by relying on organics/farmer's markets and local goods. (Comment Number: APHIS-2007-0044-3281-1)

Response: APHIS acknowledges the comment. See the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
I am writing regarding the Environmental Impact Statement (EIS) on Genetically Engineered "Roundup Ready" Alfalfa.
I am an American who eats organic and am convinced that once GE alfalfa is introduced, its contamination of non-GE plants - including organic - is inevitable. And because alfalfa is fed to dairy cows and other livestock, contamination puts organic dairy and meat at risk, too! This is not acceotable to me and makes me feel that I do not have a choice in the foods I consume.
I want the USDA to protect organic food and farmers from GE contamination, and NOT TO APPROVE Monsanto's GE Alfalfa. I care about GE contamination and my right to GMO-free organic foods. (Comment Number: APHIS-2007-0044-3285-1)

Response: APHIS acknowledges the comment. Regarding the impact on meat and dairy, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I am writing to express my strong objections to your plan to approve Roundup Ready Alfalfa. I drink organic milk whenever possible and use organic dairy products, as well as grains, produce and meats. If this product is allowed to be on the market, it will contaminate all alfalfa through drift, as is the case in soybeans, and allow Monsanto to sue any farmer that does not buy their product and is found to have drift contamination. Plenty of consumers care about this issue. This will only have negative results for animal and human health and organic farming. Why are you on Monsanto's side? How about being on the side of the American consumer? (Comment Number: APHIS-2007-0044-3288-1)

Response: Regarding the impact on downstream food crops (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of non-GE or organic alfalfa with GT-alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I want to object to the introduction of GE Alfalfa, it used to be that I could wash the pesticides off food - now pesticides are being engineered into the food itself with unknown long-term effects. This GE alfalfa will eventually contaminate organic feedstock and I don't want my child exposed to milk/ meat contaminated with GE products.
I do give a damn - the producers of these foods know it and that's why nothing is labelled as GE - please don't approve the release of GE alfalfa. (Comment Number: APHIS-2007-0044-3291-1)

Response: Regarding the impact on downstream food crops (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the need for an independent review into the health and safety of GT alfalfa, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
As a member of the public and contrary to the apparent belief of the USDA, I do indeed care about buying products that have not been altered by adding genes of other species. Further, although we live on a low income, being retired, my husband and I buy
only organic fruit, vegetables, meat and grains. I think the proliferation of Round-up-resistant crops and patented seed will hurt all the smaller farmers that provide our food. Please, let's pay attention to the desires of people like us as well as to those who point out that the long-term

environmental danger of genetically manipulated plants is more important than big agribusiness getting more money. (Comment Number: APHIS-2007-0044-3292-1)

Response: APHIS acknowledges the comment. Regarding the comment on public perception on buying products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
I care about GE contamination and I have the right to GMO-free organic foods. (Comment Number: APHIS-2007-0044-3311-1)

Response: APHIS acknowledges the comment. See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
The USDA is inaccurate. In their EIS, the USDA states "There is no evidence that consumers care about GE contamination of organic alfalfa." I do care and want my food supply protected. Please do not approve the use of GE alfalfa. I count on the USDA to protect American grown food. I don't want to have to buy food from other countries in order to get quality we have today. (Comment Number: APHIS-2007-0044-3316-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Studies have shown a clear link between glyphosate and non-Hodgkins lymphoma (Journal of the American Cancer Society), and have found that glyphosate damages and kills human cells even at diluted levels far below recommendations (American Chemical Society). Glyphosate/Roundup also is used on GE soybeans and GE corn, so the USDA's remark that it has no evidence organic consumers care about GE contamination involves more than just Roundup Ready alfalfa.
Stop allowing our food to be contaminated and supporting the insurance companies who then charge astronomical rates to deal with medical bills
Stop creating illness and early deaths
Stop poisoning our children
(Comment Number: APHIS-2007-0044-3332-1)

Response: Regarding the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to the link between glyphosate and health effects, see the responses to comment APHIS-2007-0044-2243-1 for issue 6.0.

Comment Excerpt Text:

Claims made in USDA's Environmental Impact Statement (Docket No. APHIS-2007-0044 on genetically modified alfalfa), states that there is no evidence that consumers care about contamination to organic alfalfa and alfalfa-derived foods from Monsanto's GMO Roundup Ready alfalfa. We believe this statement is inaccurate. Exclusion of genetic modification (GM) is a fundamental tenet of the USDA/NOP Organic Standard. As a manufacturer of only certified organic products we are touched by organic consumer opinion on a daily basis. We received over 200 inquiries or comments about genetic engineering in 2009. Not one of those comments indicated that genetic engineering would be acceptable, and instead were either demands that we keep genetic engineering out of our products, or thanking us for doing this. (Comment Number: APHIS-2007-0044-3528-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Whole Foods Market is the leading retailer of organic and natural foods in the United States. We currently operate more than 265 stores in the United States. We currently employ 53,000 Team Members and had sales of $8 billion in fiscal year 2009.

As a business dedicated to the integrity of organic and natural food, we are deeply troubled by the claims in USDA's Environmental Impact Statement on genetically modified alfalfa (Docket No. APHIS 2007 0044). Specifically, USDA claims that there is no evidence that consumers care about contamination to organic alfalfa and alfalfa derived foods from Monsanto's GMO Roundup Ready alfalfa. This strongly contradicts our experience as an organic retailer, and know very well that our shoppers care deeply about avoiding GMOs in the foods they buy. Accordingly, we have gone to great lengths to keep GE ingredients out of organic products and our private label products.

Our business is founded on strict core values and quality standards. We believe that food in a natural and purest state is the best food available, and our stores operate on strict ingredient based standards which ensure that the products we sell match our customers' expectations for natural food. Our team members and customers are passionate about the quality of their food, and we know that they care very deeply about the issue of genetically engineered food ingredients. In fact, a poll of our shopper just last summer found that more 80% said they would seek out nonGE products with clear labeling, and
would be willing to pay more for these products. (Comment Number: APHIS-2007-0044-3540-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
There is evidence for consumer resistance to transgenic foods (USDA - The First Decade of Genetically Engineered Crops in the United States, 2006), and those concerns are more prevalent among consumers who purchase USDA organic certified products for the expressed reason of not consuming transgenic foods. According to USDA, nearly 1% of the total alfalfa hay acres in

2005 were organic alfalfa hay (USDA-ERS, 2005; USDA-NASS, 2007). Any evidence of GT alfalfa hybridization with other Medicago spp, would deeply erode consumer confidence in USDA Organic certified products that use organic alfalfa, such as organic dairy, which was worth $2.7 billion in 2006 (Organic Trade Association Manufacturers Survey 2007). (Comment Number: APHIS-2007-0044-3576-4)

Response: APHIS acknowledges the comment. See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
I understand that the U.S. Department of Agriculture (USDA) declares there is no evidence that organic consumers care about GE contamination. I disagree.
I, and hundreds of thousands of other organic consumers care deeply about the contamination of our food by GE plants.
This country should be doing everything it can to support the development of a healthy organic alternative to chemical agriculture. That's the only way to guarantee food security and the ongoing health of our food and our land. It is outrageous that Americans cannot count on their own regulatory bodies to protect their right to unadulterated foodstuffs. Make no mistake: we care. We care very much. (Comment Number: APHIS-2007-0044-3578-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Being transparent and truthful to consumers is one of our most important values in gaining their trust and patronage. If the USDA grants approval to this application to market genetically modified alfalfa, it shuts out not only the organic and independent farmers who rely upon the USDA to fairly apply the law to farming, but to the organic consumer, who has proven over time to care about preserving non-GMO crop status. (Comment Number: APHIS-2007-0044-3597-3)

Response: APHIS acknowledges the comment. Regarding consumer preference for non-GMO crops, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Contrary to the USDA's statement that "there is no evidence that consumers care about GE contamination of organic alfalfa," as a regular purchaser of organic goods I am strongly opposed to allowing Monsanto's GE alfalfa on the market. The USDA's statement only shows their ignorance of a large portion of consumers as well as their apparent disregard for obtaining educated feedback.
Release of other GE products have only made it more difficult to obtain wholesome products and insure that consumers will always have viable options. (Comment Number: APHIS-2007-0044-3680-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
I understand you have said "There is no evidence that consumers care about GE contamination of organic alfalfa." That is a pile of crap!!! I care absolutely, and everyone I know also cares absolutely. For your agency to even utter such an outright lie says you are NOT protecting our resources appropriately. And, the ability of our farmers to grow true organic crops and to produce true organic dairy and other foods is truly important to me and to our country. You fools should wake up and protect that right, or you should be thrown out of your cushy government jobs!@!! (Comment Number: APHIS-2007-0044-3755-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Just a note to let you know MANY people care about GE contamination! (Comment Number: APHIS-2007-0044-3785-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Contrary to your statement,..."There is no evidence that consumers care about GE contamination of organic alfalfa."... we do care and care very much! If we lose truly organic alfalfa, due to cross contamination, we have lost the entire battle in the organic field. (Comment Number: APHIS-2007-0044-3877-1)

Response: Regarding the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
The USDA states "There is no evidence that consumers care about GE contamination of organic alfalfa." I know that I do care. I dont want to be Monsanto's guinea pigs!
GMO food is known to be a health risk and contaminates organic crops. (Comment Number: APHIS-2007-0044-3906-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.
In regards to the need for an independent review into the health and safety of GT alfalfa, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0 In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
In the Environmental Impact Statement, the USDA says consumers don't care about genetically engineered contamination of organic alfalfa. WE DO CARE!!! I do not want the organic milk and other organic products to have the possibility of having contaminated alfalfa, which would be inevitable if the USDA allowed genetically engineered alfalfa to be produced. More and more people are using organic products, and their wishes should be taken into consideration. We should always have a choice in terms of the quality of food we wish to purchase. (Comment Number: APHIS-2007-0044-3963-1)

Response: Regarding the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding the impact on downstream food crops (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
I just read that the USDA's recent draft of their Environmental Impact Statement (EIS) says that "There is no evidence that consumers care about GE contamination of organic alfalfa." I don't know where they're looking for this evidence, but maybe they should post a blog regarding the most current decisions that they need to make and get actual feedback from the public in order to get evidence. Perhaps a survey...
If this information is already on their site, it's not obvious or easy to find. (Comment Number: APHIS-2007-0044-3969-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
When I learned of the following statement, I felt great alarm:
"In their EIS, the USDA states "There is no evidence that consumers care about GE contamination of organic alfalfa."
Consumers do care very much about GE contamination of organic alfalfa and other crops! Even though it is rarely mentioned in mainstream media, there is still a lot of awareness that cross-contamination occurs, rendering the term "organic" meaningless, and that nobody really knows what the long-term effects of GE will be.
If the public were more educated, you would hear a deafening outcry against GE foods. Right now the deck is clearly stacked in favor of industry heavyweights and against people who eat food. I hope you will rethink your mission. (Comment Number: APHIS-2007-0044-4101-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
To say that organic consumers don't care about GE contamination is irresponsible and shoes a serious disconnection from the American public.

We DO care, and we are VERY concerned with every aspect of GE foods - how they effect our bodies, how they effect the food chain long term, how they effect the ecosystem due to the natural pollination system, how non-GE organic farmers are effected by GE and copywrited plants' pollen polluting their crop, etc. (Comment Number: APHIS-2007-0044-4138-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
"There is no evidence that consumers care about GE contamination of organic alfalfa." This statement is false why dont you try asking individuals their opinions on the subject matter first. There is no comprehensible reason for any foods to be Genetically Engineered. The simple fact is the chemicals and altered food sold to individuals in this country are banned and illegal in other countries. Countries oppose these means of handling their food for a reason. I oppose foods that are Genetically Engineered. (Comment Number: APHIS-2007-0044-4205-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
My family cares about GE contamination. We would like stricter control over genetically modified foods and protect organic foods from contamination. More thorough labeling would be nice too. Thank you so much for your consideration! Keep up the good work. (Comment Number: APHIS-2007-0044-4213-1)

Response: See the response to comment APHIS-2007-0044-11689-2 issue 5.6. Regarding mandatory labeling, see response to comment APHIS-2007-0044-6353-8 for this issue.

Comment Excerpt Text:
"there is no evidence that organic consumers care about GE contamination." It ends, "To let USDA know you do care about GE contamination. Genetically engineered foods should be a choice by the consumer. I do not want genetically modified foods as a part of my diet. Keep it out or ORGANIC FOOD! (Comment Number: APHIS-2007-0044-4214-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Please stop the use of genetic grains. I have the right to buy organic foods and this threatens my future food supply and that of my Children and yours. Once contamination is done to non genetically altered crops it can not be reversed on a widespread basis. I am a medical professional and I beg you to stop this bill. (Comment Number: APHIS-2007-0044-4215-1)

Response: APHIS acknowledges the comment. Please note this EIS informs a decision to regulate a forage crop variety. No new legislation is involved, nor are genetically engineered grains involved in the decision. Regarding the comment on future food supply, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Dispite what you might think, consumers DO care about GE Alfalfa. It you allow GE alfalfa to be grown it will contaminate non-GE alfalfa. This means that all the dairy and meat we consume will also be contaminated. I strongly oppose the use of GE alfalfa and urge you to reconsider your stance on the matter. (Comment Number: APHIS-2007-0044-4216-1)

Response: Regarding the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding the impact on downstream food crops (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I was horrified to hear that genetically modified alfalfa might soon be approved for use. Genetically modified crops inevitably contaminate regular crops, creating a domino effect that is almost impossible to stop. Not only does this monopoly on crops hurt farmers, it also angers consumers. I DO NOT want to drink milk that came from cows that ate genetically modified alfalfa. When I buy organic milk, I should be assured that it is indeed organic with minimal pesticide residue and genetically modified components, even down to the cow's feed. Please do not allow genetically modified alfalfa to be fed to cows. In my eyes and in the eyes of many, it would mean the end of organic milk. And it would mean a lot of angry consumers. (Comment Number: APHIS-2007-0044-4218-1)

Response: Regarding the impact on downstream food crops (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
This is not acceotable to me and makes me feel that I do not have a choice in the foods I consume.
I want the USDA to protect organic food and farmers from GE contamination, and NOT TO APPROVE Monsanto's GE Alfalfa. I care about GE contamination and my right to GMO-free organic foods. (Comment Number: APHIS-2007-0044-4223-2)

Response: Regarding the comment on impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the comment on consumer preference for GMO-free organic food, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
We would like to register our opposition to the approval of Monsanto's genetically modified alfalfa for nonregulated status.The Draft Environmental Impact Statement reportedly says that there are not enough consumers interested in organic food sources for the USDA to block the approval of genetically modified alfalfa. We are VERY interested in organic food sources. Please protect our freedom to protect our health by having access to organic food! (Comment Number: APHIS-2007-0044-4224-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
As a consumer of entirely organic food I care about GE Alfalfa and the effect it will have on the food I eat and the milk I drink. I will absolutely not purchase or consume any product that is contaminated or derived from GE Alfalfa! Alfalfa is widely used in organic farming and feed. Please do not let this contamination occur. It is the USDA responsibility to protect the organic farmer which in turn protects the consumers. I will not be Monsanto's science project. Let's keep food real! Is that too much to ask? (Comment Number: APHIS-2007-0044-4225-1)

Response: Regarding the impact on downstream food crops (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Similarly, this EIS does not protect consumers rights to non-GE and organic foods. (Comment Number: APHIS-2007-0044-4896-3)

Response: See the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Social Aspects of Organic Farming. “The analysis found no GE-Sensitivity in domestic sales of organic alfalfa”. I found this section to be curious, since it is abundantly clear that organic producers clearly do not want GE alfalfa to be present in their system. While GE detection per se does not disqualify their crop from certification per-se, according to NOP, growing non-GE crops is both a requirement of certification, and a strong preference of their consumers. If nothing else, the hundreds of comments reacting to the draft EIS should be used by APHIS to acknowledge this fact. The key issue is not whether the sensitivity is there, but whether simple steps can be taken to make sure that the introduction of a GT-crop by their neighbors would not

significantly impact their ability to farm in the manner of their choosing – to maintain their organic certification, and to satisfy their customers that they are growing non-GE alfalfa. It's also curious why APHIS didn't consider the social aspects of export hay or export seed growers (which are a greater sensitive market than organic). (Comment Number: APHIS-2007-0044-4913-8)

Response: Regarding the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Impacts of GT alfalfa deregulation to export growers are discussed in appendix R of the Draft EIS.

Comment Excerpt Text:
I care deeply about our organic food supply. I only buy organic meat, organic fruit and organic vegetables. I go out of my way to avoid any food products that include GMO ingredients. I strongly urge you not to pass this, the ramifications to our food supply would be drastic, and in my opinion, unwelcome.
Thank you,
Rebecca Crane
(Comment Number: APHIS-2007-0044-5208-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
I do not want genetically modified food in my food supply. I choose to eat food that is not genetically modified. As you know, seeds spread and GMO seeds contaminate other fields. I do not want to eat cows or pigs or chickens that have eaten GMO alfalfa. Since the inception of GMO food, auto-immune diseases have increased dramatically in this country. GMO food is not safe for consumption - human or animal. I am not part of your science experiment. Do not allow GMO Alfalfa into the food supply (Comment Number: APHIS-2007-0044-5210-1)

Response: Regarding the impact on downstream food crops (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. In regards to the health impacts of GE alfalfa, see the response to comment APHIS-2007-0044-11034-2 for issue 6.1.

Comment Excerpt Text:
Hello, please do not let round up ready alfalfa into the food chain.
I am against this product and do not want to eat food that has been genetically engineered. I especially do not want to have more of the food chain taking in round up.
This is out of control. Where does the USDA think all the millions of gallons of round up are running off to? - Our water supply, not to mention all the plants in the water (that fish eat) that are being killed by the round up. We need LESS chemicals in the environment, not more. The

USDA should be protecting us from chemicals, not sanctioning their use and degrading the environment - and the population.
Thank you. Julian Catford
(Comment Number: APHIS-2007-0044-5219-1)

Response: APHIS acknowledges the comment. In regards to the effects of GE crops on biota, see the response to comment APHIS-2007-0044-5219-1 for issue 4.0 (paragraph 2). Regarding the commenter's overall concern about health and safety, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
Thank you for the opportunity to comment on the EIS for glyphosate tolerant alfalfa. My family chooses organic products because we support sustainable agriculture as a very important solution to some very difficult current issues. There is no room for GE alfalfa in the agricultrual landscape of our country. Unintentional contamination of non-GE crops is very likely and will undermine the USDA National Organic Program. To release yet another bio-tech crop that will only increse the use of pesticides is unconscionable. Please consider the far-reaching effect this product will have (Comment Number: APHIS-2007-0044-5222-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to the adventitious presense of non-GE or organic alfalfa with GT-alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I am so tired of government agencies sneaking regulations in behind the consumer's back. Of course consumers do not want any genetically modified food. Most FAT consumers don't even know what they are!
If you want to sell it, you should be required to label your food as such. This way, the consumers will show you how much they are not interested by simply not buying it.
Stop the cancer causing junk and watch out for the new smarter, healthier American coming to a store near you!
Thanks.
Charlene (Comment Number: APHIS-2007-0044-5231-1)
Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Think about this.... The big picture? We know that genetically modified corn and soybeans have invaded farms where they have not been planted by the farmers. We know that Monsanto has successfully sued these farmers for patent infringement. Worst of all, we know that these strains have proliferated where they have not been invited or wanted.
The bigger picture, and perhaps the "match-point" for Monsanto?... field contamination of pure plantings by genetically modified plants = the end of the organic movement, which is currently, I believe at a tipping point in consumer demand.

I care about my foods. I grow what I can from seeds that I either save myself or obtain from suppliers of organic heirloom varieties. I see our food becoming less and less recognizable. I witness the lavor value and nutrient content of supermarket chicken, pork and beef being compromised by modern growing methods, methods that neither help small local farms, nor provide for a humane existence for these animals.
Let me be very clear. I care deeply about the quality of the food I eat myself and that consumed by the planet, and the people I know care. It is unfathomalbe to me that Monsanto was ever able to patent any living organism. Nature is chaotic by definition and genetically modified plants will find their way into areas where they are not wanted. I believe when this happens, the invaded farmer should be able to sue the Monsanto invader, not the other way around.
Further, it is not acceptable that approval of this strain be made without any kind of protections for the environment, consumers, or farmers who chose not to be a part of this uncontrolled experiment. The evidence is in on corn and soybeans and the only winner has been Monsanto.
Unacceptable. Unbelievable. Inconceivable. Irreversable!
Don't take my organic option away from me without my consent!
Sylvann Welcome
President, Welcome Endeavors, LLC; Sweet Traditions Kringles (Comment Number: APHIS-2007-0044-5233-1)

Response: Regarding impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for this issue. In regard to gene flow, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. Regarding the legal liability for unintentional presence of GE content in non-GE crops, see the response to comment APHIS-2007-0044-6376-1 for Issue 5.1.

Comment Excerpt Text:
I do NOT want my food genetically modified. It changes the natural structure of the plant. I want to feel assured that when I buy organic, I am NOT buying GMOs. Monsanto's seeds are contaminating the fields of organic farmers. This must stop.
I am relying on you, as my government, to do what's in the best interest of consumers, like me. Instead, we have allowed Monsanto to monopoliize our food industry over the last decade because of a lack of regulation.
Thank you for being on our side.
Sincerely,
Phyllis S. Myers
(Comment Number: APHIS-2007-0044-5238-1)

Response: Regarding the concern about diminished GMO-free organic products, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the monopoly comment, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa,, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:

I as a consumer and American citizen care about the food supply. I am deeply concerned about GE contamination of organic food and crops. It's your job to protect American citizens and our food. We want to know what we are eating and have the choice of GE food and non-GE food (Comment Number: APHIS-2007-0044-5248-1)

Response: APHIS acknowledges the comment. See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
please take note of a consumer objection to the approval of monsanto's genetically modified alfalfa! yikes! let me be clear: i don't want it!
when you,the government, take the position that not enough consumers care about organic food to justify blocking monsanto's petition, it frustrates me greatly. it perpetuates the distrust that the public has in the regulatory process and confirms our suspicion that special interests are given priority over thos of the general population.
thanks for considering my view,
maureen holz
(Comment Number: APHIS-2007-0044-5249-1)

Response: APHIS acknowledges the comment. Regarding consumer preference for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
please take note of a consumer objection to the approval of monsanto's genetically modified alfalfa! yikes! let me be clear: i don't want it!
when you, the government, take the position that not enough consumers care about organic food to justify blocking monsanto's petition, it frustrates me greatly. it perpetuates the distrust that the public has in the regulatory process and confirms our suspicion that special interests are given priority over those of the general population.
thanks for considering my view (Comment Number: APHIS-2007-0044-5254-1)

Response: APHIS acknowledges the comment. Regarding consumer preference for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
I and many others do care about GE alfalfa. I believe approving it for commercial use will jeopardize my ability to choose organically grown and raised food. This is an experiment we cannot undo once it is done. Please do not approve GE alfalfa (Comment Number: APHIS-2007-0044-5256-1)

Response: APHIS acknowledges the comment. See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Please do not deregulate Roundup Ready Alfalfa. I want truly organic products and Roundup Ready will contaminate organic farming, dairy and meat with GMO's (Comment Number: APHIS-2007-0044-5269-1)

Response: Regarding impacts on downstream sources (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I have been long concerned about GE crop contamination for its real threat to the purity and safety of our food system. Now that the USDA has acknowledged that GE contamination in alfalfa will adversely impact the organics industry and all affected please rule to forbid GE alfalfa production.
I feel strongly that the contamination of organic alfalfa, or any organic crop, from GE spores should be a top USDA priority in a world that suffers one ecological blow after another at the hands of big business. Please stand up for REAL food.
Any animal the eats GE grains or grasses passes something of them on through their meat or milk, making its way into thousands of consumer products. Consumers who are educated on this matter have long said keep GE ingredients out of my food, and so far only by purchasing organics has this been possible. But it's clear that organic crops and animals that eat them are threatened each time another GE crop gets planted.
Please support a true food economy and don't allow GE alfalfa to become another conquest by the biotech industry and another nail in the coffin of TRUE FOOD that feeds, nourishes and protects...naturally (Comment Number: APHIS-2007-0044-5281-1)

Response: Regarding impacts on downstream sources (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0 and APHIS-2007-0044-0677-1 for issue 6.1. In regard to nutritional quality of GT crops, see response to comment APHIS-2007-0044-0382-1 for issue 6.0. In regard to gene flow, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I do care about organic farmers and organic food. My health depends on it. People like myself with allergies cannot safely eat genetically modified food. I know of alot of consumers like myself who care about organic food, and understand it's value in our health and well being. Organic farmers and organic consumers do care about GE contamination. GE contamination undermines the very basis of foods being organic. How could we not care? It seems that profit

and greed are the motives of the willingness of GE people to make such a blatantly false statement: saying organic consumers don't care about GE contamination.
The fact that Roundup Ready alfalfa will be sprayed with the herbicide: Roundup (glyphosate): and that studies show a clear link between glyphosate and non-Hodgkins lymphoma (Journal of the National Cancer Society) and have found that glyphosate damages and kills human cells even at diluted levels far below recommendations (Journal of the National Cancer Society) makes me wonder how GE alfalfa could even be considered for approval.
We do care about the quality of organic foods, such as the milk, cheese, yogurt, and beef products from the cows. We do not want organic cows to eat GE contaminated alfalfa. Please support the health of our people. The health of our people is more important than the profits of the GE companies.
Thank you (Comment Number: APHIS-2007-0044-5284-1)

Response: Regarding consumer preference for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on downstream sources (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regards to concerns over glyphosate carcinogenicity, see the response to comment APHIS-2007-0044-4924-2 for issue 6.0. In regards to the link between glyphosate and health effects, see the response to comment APHIS-2007-0044-2243-1 for issue 6.0.

Comment Excerpt Text:
Hello- I am an organic consumer and I care that Glyphosate-Tolerant Alfalfa should ABSOLUTLEY be regulated!
Please don't misrepresent what we the people want.
Signed,
Voter,
Susan Ross (Comment Number: APHIS-2007-0044-5296-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
I'm writing to state my concern and the concern of many people I know regarding the use of GMO agriculture in the feed of live stock and being sold for human consumption. I'm a firm believer in natural and organic food and I don't not want what I eat contaminated with GMO products of any kind. (Comment Number: APHIS-2007-0044-5297-1)

Response: See the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
re: Dept of Ag environmental impact statement for genetically engineered alfalfa. How do you know "there is no evidence organic consumers care about GE contamination"? Have you asked? Did you do a survey? Of course we care! Genetically engineered alfalfa or any crop is dangerous, especially the ones that are Roundup Ready. Glyphosphate is clearly linked to non-

Hodgkins lymphoma, and causes damage and death in human cells at levels far below recommendations (Comment Number: APHIS-2007-0044-5299-1)

Response: Regarding the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to concerns over glyphosate carcinogenicity, see the response to comment APHIS-2007-0044-4924-2 for issue 6.0. In regards to the link between glyphosate and health effects, see the response to comment APHIS-2007-0044-2243-1 for issue 6.0.

Comment Excerpt Text:
Dear Sirs -
I am very concerned about genetically engineered foods entering our food supply. I do not want to eat them, nor have them contaminate other organically grown foods. Please stop allowing GE foods and animals into our food system.
Many thanks,
Marianne Hermanson
(Comment Number: APHIS-2007-0044-5300-1)

Response: In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I have been 98% eating organic for 10 years and am strongly against GE foods! Round-up is poisonous to the environment and breaks down people's immunity. Please stop the progression of sprays, toxins on our food. I care about organic foods passionately and plead for our legislators to block any bill allowing food to be sprayed with pesticides, Round-up, or any type of chemical. Thank you!
Dana Ames
(Comment Number: APHIS-2007-0044-5301-1)

Response: Regarding consumer preference for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regards to the impacts of GE crops on the environment, see the response to comment APHIS-2007-0044-5302-1 for issue 4.0.In regards to the link between glyphosate and health effects, see the response to comment APHIS-2007-0044-2243-1 for issue 6.0.

Comment Excerpt Text:
Please do not allow genetically engineered alfalfa to be approved. This will inevitably contaminate the organic produce that I purchase for my family, I steer clear of any products that contain any GE ingredients. This is especially important to my as some of my family have health challenges and it is well know that GE foods have been altered at the cellular level, and are no longer in the state that nature intended. This is NOT good for our bodies, our children's bodies,

or developing babies bodies. This seems to be a very thoughtless and irresponsible consideration, to allow for alfalfa, of all important staples for our livestock, our dairy cows to be genetically modified. It seems to me that people are catching on to the fact that the more genetically engineered agriculture we have, dispite what they have been assuring us, there is even more pesticide, herbicide, fungicide and fertilizer application. This has proven to be disasterous to our environment and the future of healthy soil. We need our soil to be healthy if we expect a healthy field, garden or livestock.

WE DO NOT want genetically engineered alfalfa! Please, for the sake of our children, do not approve this request (Comment Number: APHIS-2007-0044-5302-1)

Response: Regarding impacts on organic farming and downstream sources (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regards to the link between glyphosate and health effects, see the response to comment APHIS-2007-0044-2243-1 for issue 6.0. In regard to the impacts of GE crops on the environment, see comment APHIS-2007-0044-5302-1 under issue 4.0.

Comment Excerpt Text:
I care deeply about providing the people of our nation with nurtious, healthy food, both to feed our livestock and for ourselves. GE crops are NOT healthy for the environment, the livestock or the people. I do not support the USDA in allowing Roundup ready alfalfa to be grown. It is a disgrace that our government lacks compassion for the health of the people of this nation that they would go as far as allowing this crop to be grown in the US.
GE crops DO NOT yield more crops per square acreage. They are not healthier for livestock or for the people. They do however, endanger crops that have had a long environmental history so much so that our heirloom varieties have a high chance of becoming extinct.
I am here to tell you that I DO NOT SUPPORT THE USE OF GE CROPS. It was a false statement that the USDA said that consumers don't care about contamination organic alfalfa and alfalfa-derived foods with Monsantos GE Roundup Ready alfalfa. I CARE. I SUPPORT ORGANIC FOOD (Comment Number: APHIS-2007-0044-5305-1)

Response: Regarding the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regards to the health impacts of GE crops on livestock, see the response to comment APHIS-2007-0044-0362-1for issue 4.4 (paragraph 1).

Comment Excerpt Text:
I absolutely care about GE contamination and am very worried about it and not only with alfalfa but corn, soy etc. It also worries and offends me to think the USDA believes there is no evidence to show that organic consumers care about GE contamination. I do not want the government to allow the use of genetically engineered Roundup Ready Alfalfa. I am a professional gardener and will not use Roundup in my practice; I can't condone its use and especially, not on such a

grand scale. It's not safe and has been proven so. Do not cave to the pressures of big corporate farms; it's not safe for the workers or our environment. The impact will be huge. Please do the responsible thing and don't allow GE Alfalfa (Comment Number: APHIS-2007-0044-5311-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
As a consumer I DO NOT want to buy GE-alfalfa-derived meat and dairy products (or plant products, either). Although USDA claims there is no harm to consumers I understand that no studies of the effects of feeding GE alfalfa to livestocks have been conducted. It is unethical to leave farmers vulnerable to contamination of their crops nor should they be subjected to harrassment by investigators who find DNA from GE alfalfa mixed in with the farmer's crops. I understand that Monsanto's business practices DO NOT protect farmers from contamination and that USDA is ignoring evidence of contamination of canola, soy and corn. As GE alfalfa would significantly increase pesticide use, I DO NOT want increased Roundup use (Comment Number: APHIS-2007-0044-5314-1)

Response: Regarding the comment on consumer preference for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). For concerns about the safety of GT alfalfa and glyphosate to livestock, see response to comment APHIS-2007-0044-0382-1 and APHIS-2007-0044-0278-1.for issue 6.0.

Comment Excerpt Text:
It is an oxymoron to assume that those who support organic farms and eat organic food do not care about genetically modified crops. GM crops allow for increased use of pesticides, and may drive other varieties of the same crop out of existence, all of which is contrary to the intent of the organic movement, which is to treat the earth as a sustainable resource, and which expects that the animals we eat have been fed in a way that has not harmed the environment by encouraging more use of pesticides and contributing to a lack of genetic diversity in the food crops that feed the entire planet. GM crops benefit only the corporations who wish to reduce the world to beggary, and who seek to prevent farmers from growing and saving their own seeds (Comment Number: APHIS-2007-0044-5315-1)

Response: Regarding the comment on consumer preference for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to gene flow, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
I always buy organic milk because I do not want any GMOs in it.

Do not allow roundup-ready alfalfa. It will contaminate the pastures where the cows producing my organic milk feed.
You are not working for Monsanto. You are working for me. I am a citizen of the United States. If you don't do what I tell you to do, I will fire you (Comment Number: APHIS-2007-0044-5316-1)

Response: In regard to gene flow, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
I care about GE contamination and do not want it in my food (Comment Number: APHIS-2007-0044-5317-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
I do care about the integrity of the organic label and the practices that support it. I feel the EIS study is wrong to assume that I will not change my buying practices regarding dairy and meat if I understand that their feed is no longer organic (which includes meaning that the feed has been grown from seeds that have been genetically modified/altered to tolerate branded (ROund up etc) herbicides.
I do not believe that industry best practices regarding the prevention of the spread or other contamination of GT/CM crops can be sufficiently rigorous given the variety of customers using them (Comment Number: APHIS-2007-0044-5318-1)

Response: Regarding the comment on consumer preference for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to gene flow due to unintentional mixing and distribution of seed, see the response to comment APHIS-2007-0044-10263-5 for issue 3.2.

Comment Excerpt Text:
don't want GMO food, and I want to know what foods contain GMO's. I don't want Roundup Ready genes in anything I eat. Our food supply is getting more and more suspect, our population is getting less healthy. I want locally grown, organic produce and our government has the responsibility to make sure healthy, organically grown food is available to all the people at reasonable prices.

I believe our government has the responsibility to protect small,local farms, because all of our lives may soon depend on it, if our own genes haven't already been damaged by the fooling around with GMO's.

It may take 20 or 30 years before the scientific community, government and health agencies recognize the dangers of GMO's and decide to act to protect the food supply, and by then it may

be too late to repair the damage to the humans being used experimentally to test the food supply, and small, local farms may be a thing of the past (Comment Number: APHIS-2007-0044-5327-1)

Response: APHIS acknowledges the comment. Regarding the impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to concerns about health effects of GT crops, see response to comment APHIS-2007-0044-0382-1 for issue 6.0.

Comment Excerpt Text:
We want our food supply to stay ORGANIC and NATURAL. Americans want organic foods. The fastest growing product lines in my local grocery store are the organic food products. Every time I shop, there are more organic products. This certainly would not happen unless many, many of us middle-class, average, mid-westerners voted for organic foods with our dollars. We do not want genetic modification of foods and plants used to produce foods (eg. alfalfa). (Comment Number: APHIS-2007-0044-5328-1)

Response: APHIS acknowledges the comment. Regarding impacts on organic farming/products, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Please use this message as evidence that I, as an organic consumer, DO care about GE contamination.
I am against the use of GE crops. Please don't allow the alfalfa crop to be genetically modified.
Sincerely,
Heather S White
(Comment Number: APHIS-2007-0044-5331-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Please DO NOT APPROVE Monsanto's GE Alfalfa. I care about GE contamination and have a right to GMO-free organic foods (Comment Number: APHIS-2007-0044-5336-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
NO, please! I do care about GE contamination of organic alfalfa.
DON'T DO IT, please (Comment Number: APHIS-2007-0044-5341-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
I am a consumer who exclusively purchases organic
meat and dairy products for the primary reason
that I am trying to avoid genetically modified organisms.
I am extremely uncomfortable and concerned about the
introduction of GM alfalfa into the food supply.
This threatens existing non-GM alfalfa crops and
threatens the organic food supply for meat and
dairy.
I do not support the introduction of any new GM food
into the food supply and oppose this recommendation.
swalker@craterdiver.com
(Comment Number: APHIS-2007-0044-5344-1)

Response: See the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
USDA, in an environmental impact statement on genetically engineered (GE) alfalfa, declares there is no evidence that organic consumers care about GE contamination.
As an organic consumer, I am hereby providing evidence by this statement that I do INDEED care about GE contamination,and in this particular case, the possiblity of Roundup Ready Alfalfa being approved.
Studies have shown a clear link between glyphosate (Roundup) and non-Hodgkins lymphoma (Journal of the American Cancer Society), and have found that glyphosate damages and kills human cells even at diluted levels far below recommendations (American Chemical Society).
Glyphosate/Roundup also is used on GE soybeans and GE corn, so the USDA's remark that it has no evidence organic consumers care about GE contamination involves more than just Roundup Ready alfalfa. (Good grief --- how could there possibly be any doubt that GE contamination is not a primary concern for organic consumers?)
USDA admitts that an economic analysis shows GE alfalfa will hurt the organic industry and small farmers but it fails to analyze or suggest any possible protections for organic.
Alfalfa isn't a crop that people eat directly, but if you eat yogurt, cheese, milk, ice cream or beef and if you believe that "we are what they (cows) eat" then it's critically important. (Comment Number: APHIS-2007-0044-5346-1)

Response: Regarding consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding the impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to concerns over glyphosate carcinogenicity, see the responses to comment APHIS-2007-0044-4924-2 for issue 6.0. In regard to the link between glyphosate and health effects, see the response to comment APHIS-2007-0044-2243-1 for issue 6.0.

Comment Excerpt Text:

I am a consumer of organic produce, meat, dairy, and other products. I am very concerned with GE contamination of crops and about overuse of pesticides.Please do not approve Glyphosate-tolerant alfalfa. (Comment Number: APHIS-2007-0044-6201-2)

Response: Regarding impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presense of non-GE or organic alfalfa with GT-alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
As an orgainic consumer, I care about GE contamination and am against government approval of the GE alfalfa that the USDA wants to approve which is Roundup Ready. Please take another look at what this means for the health of our nation and the cost of medical care for diseases caused by these GE plants. (Comment Number: APHIS-2007-0044-6205-1)

Response: Regarding consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
We would finally like to again assert and expand upon a point originally made in our 2008 letter: the general public has essentially been locked out of this debate, due to lack of widely available information, as well as lack of legally mandated signage and labeling. If the public were privy to the GE crop issue, beneficial arguments and possibly different results might ensure. We consider it unfair and tragic that most people, especially certain socio-economic groups, have no knowledge of, and therefore no part in this important debate. Yet they will live with the consequences of whatever legislation results. (Comment Number: APHIS-2007-0044-6353-8)

Response: APHIS acknowledges the comment. APHIS regularly updates our Web site regarding the status of lines being granted nonregulated status. Regarding the impact of labeling, section 2.3 of appendix T of the Draft EIS notes that "there is some debate on whether the absence of mandatory labeling for GE foods in the United States leaves the consumer less informed about the available choices than the current system of voluntary labeling with various authors suggesting this is not the case (Bansal and Ramaswami 2007, Huffman et al. 2002)." (p.T -15). In addition, APHIS does not have the authority to regulate labeling of genetically modified products. As discussed in section I of the DEIS, the U.S. Food and Drug Administration (FDA) is responsible for ensuring the safety and proper labeling of all plant-derived foods and feeds, including those developed through genetic engineering such as glyphosate-tolerant alfalfa.

Comment Excerpt Text:
It is not true that organic consumers don't care about GM alfalfa. We do not want to eat dairy or meat products from animals that have eaten GM-contaminated alfalfa! We are what they eat. Please reconsider. (Comment Number: APHIS-2007-0044-6631-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
I am writing to assert that there is in fact evidence that organic consumers do care about GE contamination. I submit myself and my family as evidence. We care VERY much.
GE contamination is a grave concern to us. (Comment Number: APHIS-2007-0044-6635-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
I'm writing to express my dismay that the US Department of Agriculture is under the misguided perception that consumers don't care about GE contamination. As a consumer who has been purchaing organic food since 1982, I don't GE food on my plate. I'm willing to pay more for my food to avoid pesticides and believe in and support the organic industry and small farmers. (Comment Number: APHIS-2007-0044-6735-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
As I consumer, I do not want to buy meat or dairy products from GE-alfalfa fed cattle. There has not been sufficient evidence that this is safe. The GE-alfalfa could contaminate other fields and living produce that we consume. Also, smaller local farmers will suffer from these changes. Please reconsider, we have a right to know what exactly is in our food! (Comment Number: APHIS-2007-0044-6736-2)

Response: Regarding consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to gene flow, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
3.The EIS implies that there is no damage if organic crops are contaminated by GMOs because the crops can still be sold as organic. The reasoning is that the certification of organic products are certifications and if you don't test the product it is still organic even if it is contaminated by GMOs. How disingenuous! (the kindest word I could think of). Consumers want GMO free products. I want GMO-free products! (Comment Number: APHIS-2007-0044-6761-2)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
I am a consumer of organic foods, a small organic farmer, and have direct experience with the National Organic Program regulation as an Organic Farm Inspector for Oregon

Tilth, Inc., a USDA accredited organic certifying agency.
I am writing to express my objection to the APHIS Draft Environmental Impact Statement (DEIS) decision to allow deregulation of glyphosate tolerant alfalfa. The DEIS fails to adequately account for the adverse impacts deregulation will inflict on organic farmers. The DEIS also incorrectly minimizes the concerns consumers of organic alfalfa hay and organic alfalfa seed crops have about the contamination of these organic products. (Comment Number: APHIS-2007-0044-6769-3)

Response: Regarding consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
I am an organic consumers who cares deeply about the GE contamination of organic food in America. I vote with my dollars by buying organic, and I beleive that organic, by definition, must mean non-GE. I will reject food that has been GE, including food, such as dairy and meat, that has eaten GE food.
I am convinced that most organic foods provides superior nutrition and health benefits compared with conventional foods. The consumption of certain organic foods can prevent many of the diseases caused by a western diet. Thus, organic farming is extremely important to the future health of this country. The risk to small and organic farmers posed by GE alfalfa is significant, since contamination of the organic farms will happen.
Thanks for listening and protecting the people. We are the reason your agency exists. You must protect the organic farmers and all farmers who which to grow non-GE crops. (Comment Number: APHIS-2007-0044-6784-1)

Response: Regarding consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regards to the link between glyphosate and health effects, see the responses to comment APHIS-2007-0044-2243-1 for issue 6.0. In regard to the adventitious presence of non-GE or organic alfalfa with GT-alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Organic consumers do care about GE contamination. That is why we eat organic food --to minimize exposure to glyphosate. As a cancer survivor I am very aware of the connections to what I eat and cancer. I think that once a person experiences this, they find a new awareness of the causes of cancer. (Comment Number: APHIS-2007-0044-7058-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:

Please use this comment as proof that as an organic consumer I DO care about GE contamination (Comment Number: APHIS-2007-0044-7070-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
I am an organic consumer. I choose to protect myself and my family from the insane gamble that is the irreversible GM tinkering with our food supply.
USDA concedes that "consumer perceptions of organic food safety may be an important driver for consumer substitution of organic for conventionally produced food," but then claims that there isn't evidence that U.S. consumers are as strongly affected by food safety concerns as Europeans, as if U.S. consumers don't care enough to buy organic. As an organic consumer, I can tell you that I DO care.
GMO-contamination of organic alfalfa is inevitable if the Obama Administration successfully commercializes Monsanto's GM alfalfa. This will mean that organic milk will no longer be safe from GMOs. This would, without my permission, take away my right to time-tested pure food and long-term health for myself and my family and replace it with a product that is designed only to give short-term profit to a corporation. (Comment Number: APHIS-2007-0044-7239-1)

Response: Regarding consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on downstream sources (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Consumers like myself are going to want to avoid Roundup Ready alfalfa, but according to the EIS, we don't have that right because, "At the present time, there is no policy regarding the unintended presence of GE material in organic products or food, consistent with the fact that the NOP is a process-based program for certifying a farm or production system as organic, and not a product-based program that tests or certifies individual products as organic."
The USDA's EIS needs to take the contamination of organic crops very seriously. If there is any risk of contamination, Roundup Ready alfalfa should NOT be allowed. (Comment Number: APHIS-2007-0044-7239-3)

Response: APHIS acknowledges the comment. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I am outraged that the USDA is even Considered allowing something genetically modified to enter the category of Organic foods. The very purpose of going to the extent of purchasing

products labeled "organic" is to ensure that what my family consumes is as close to nature as possible without having to grow it myself. I feel betrayed by those who are supposed to be looking out for our safety. I will have to go into subsistence farming if this gets approved (Comment Number: APHIS-2007-0044-7243-1)

Response: APHIS acknowledges the comment. Regarding organic certification, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
We as consumers do not want genetically modified alfalfa, we do not want gm organic food. This is the main reason we buy organic, we buy organic to stay away from genetically modified food. We are willing to pay extra for it also, it has better nutritional value, tastes better and we are totally against genetic modification of any food.
We only eat organic grass fed beef, if you allow the genetic modification of alfalfa all of the alfalfa will be contaminated. The use of genetically modified crops and the pesticides, herbacides and fertilizers are killing the pollenators, thus eventually going to kill us.
We the consumers are speaking with our pocketbooks on this subject, we are a large majority of the population. Organic is the only market expanding in these hard economic times, this should let you know how the consumers feel about gm products, we don't want them and we will not buy them.
Please keep this in mind when you decide on this issue (Comment Number: APHIS-2007-0044-7244-1)

Response: Regarding consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to the effect on pollinators, see comment APHIS-2007-0044-5338-1 under issue 4.0 (paragraph 2). In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
In a report you said that I do not care enough to contact you to block Monsanto's modified alfalfa seeds. Indeed I do care so do many of friends family. I do not want unidentifiable GMO's in my food chain in any way shape or form (Comment Number: APHIS-2007-0044-7245-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
i am completely against the roundup ready alfalfa. the idea that the usda puts forth that consumers don't care about genetically modified foods is preposterous. most consumers are not sufficiently informed about what is going on in these areas. once again, i am against the roundup ready alfalfa! (Comment Number: APHIS-2007-0044-7248-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
As a citizen of the United States, I do not want to be forced to change the biological make-up of the foods I eat.....which is what will eventually happen through the use of GM plants. Please learn from past situations when a plant looked like a good idea but turned out to be a problem....like multi-floral rose. Years from now when you realize, as many Americans already have, that genetic modification is a terrible idea in many ways, it will be too late and the harm will be unchangeable. Your job is to uphold the health and safety of the American people, not the monopolistic businesses. Not only do I expect you to protect our well-being by refusing to approve further GM plant products, I expect you to begin a process of ridding the United States of the GM plants which are currently here (Comment Number: APHIS-2007-0044-7251-2)

Response: APHIS acknowledges the comment. Regarding impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Approval of GM alfalfa also takes away choice from consumers. Currently, there is no labeling on food products to show what items contain GM ingredients or meat products come from animals fed GM crops. Consumers want products free of GM ingredients, not more! (Comment Number: APHIS-2007-0044-7258-2)

Response: Regarding impacts on organic farming/products, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
I am writing to ask that GM Foods would be labeled.
I need to know what I am eating and I refuse
to eat modified foods.
I have heard about rat's not being able to reproduce
after eating GM corn. How can that be good for people? Cancer is on the rise is this one of the reasons? (Comment Number: APHIS-2007-0044-7260-1)

Response: APHIS acknowledges the comment. In regard to concerns over glyphosate carcinogenicity, see the responses to comment APHIS-2007-0044-4924-2 for issue 6.0. In regards to the link between glyphosate and health effects, see the responses to comment APHIS-2007-0044-2243-1 for issue 6.0.

Comment Excerpt Text:
I support the rights of farmers to grow the crops of their choice, and GE contamination makes that impossible (Comment Number: APHIS-2007-0044-7266-4)

Response: See the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Please, no GMO seeds in Organically labeled foods. ORGANIC CONSUMERS DO NOT WANT THIS. Please don't force this on us. This is not the right role of government, to create markets for big agriculture at the expense of the Consumer. We have an organic label for a reason. My son and I are allergic to the GMO corn but not the organic - there is a reason for that. Please keep genetically modified as far from the organic label as possible (Comment Number: APHIS-2007-0044-7267-1)

Response: In regard to impacts on organic farming/products, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for issue 5.2. In regard to allergenicity of GT alfalfa, see response to comment APHIS-2007-0044-9547-1 for issue 6.0.

Comment Excerpt Text:
Consumers like me are going to want to avoid products from sources fed Roundup Ready alfalfa, but according to the EIS, we don't have that right because, "At the present time, there is no policy regarding the unintended presence of GE material in organic products or food, consistent with the fact that the NOP is a process-based program for certifying a farm or production system as organic, and not a product-based program that tests or certifies individual products as organic." The USDA's EIS needs to take the contamination of organic crops more seriously. As long as there is a risk of contamination, Roundup Ready alfalfa shouldn't be allowed.
Thank you for the opportunity to submit these comments. (Comment Number: APHIS-2007-0044-7272-2)

Response: Regarding organic certification, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.
In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Limitation of consumers' freedom of choice. On page S-15, the following statements are made:
· Consumer preferences for organic over GE foods are influenced in part by ethical and environmental factors that are likely unrelated to unintended presence of feed crops with GE material;
· In surveys, U.S. consumers often suggest a preference for non-GE foods;
· U.S. consumers show relatively little knowledge of their own consumption of GE products;
· Product labels in the United States typically do not indicate presence or lack of GE material;
The last point is not true; certified organic foods contain no GMOs and consumers are aware of this – this is why they pay a premium for them. Foods are also labeled, if possible, “made without GM ingredients.”
Organic meats are raised without GM feed, and this is publicized. Polls consistently show that consumers would prefer to have all GM foods labeled as such. It is true that foods that do contain GMOs are never labeled as such because consumers will perceive them as inferior.

Consumers have expressed a clear preference for non-GM foods. However, they often remain ignorant of exactly which foods contain GMOs because processors either decline to label, or do not know (or want to know) if their raw materials are contaminated with GMOs. The Draft EIS concludes that consumers are ignorant of what is in their food, and they will not know about GMO contamination because there is no labeling, so the issue of GMO contamination is moot. No Spray Zone strongly rejects any such assertion. If contamination of organic alfalfa occurs, our members, and certainly many consumers, will be very upset. We should not be creating a situation where more feedstock contamination will destroy the ability of organic farmers to certify their livestock and consumers are unsure of what they are purchasing. (Comment Number: APHIS-2007-0044-7408-3)

Response: APHIS acknowledges the comment. Regarding the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Annie's has offered natural and organic foods for more than 20 years, and has gained a strong reputation for providing only the highest-quality products. That's why we are deeply troubled by claims in USDA's Environmental Impact Statement (Docket No. APHIS-2007-0044) on genetically modified alfalfa. Specifically, USDA claims there is no evidence that consumers care about contamination of organic alfalfa and alfalfa-derived foods from Monsanto's GMO Roundup Ready alfalfa. This strongly contradicts our experience.
As food producers, we are keenly aware of what consumers expect of organic and natural products. Just as they rely on organic products to be free of pesticides, artificial colors and preservatives, our consumers also count on organic foods to be non-GMO. Exclusion of genetic modification (GM) is a fundamental tenet of the Organic Standard, and polls show that more than 75% of consumers believe that they are purchasing products without GM ingredients when they buy organic.
In order to meet our consumers' expectations and retain their trust, we must work to keep GMOs out of our products. As cultivation of GM corn, soy, canola, sugar beets and cotton becomes increasingly widespread, we have had to adopt new quality control measures and implement testing programs to identify GM. Protection of our products, and our brand's high reputation, comes at a cost to our company. In fact, threat of GMO contamination, and the subsequent loss of consumer trust, has become so severe that Annie's has begun working with the Non-GMO project. This program will help us mitigate risk of contamination but is not a substitute for government regulation and protection. Deregulation of GM alfalfa, an insect pollinated perennial crop carrying high risk of seed and forage contamination, would further add to our economic and testing burden. Furthermore, contamination could eventually make it impossible to produce non-GMO organic animal products. (Comment Number: APHIS-2007-0044-7688-1)

Response: Regarding consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for this issue. Regarding impacts on organic farming/products, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I am writing as a consumer to let you know I do not approve of Genetically Engineered alfalfa. I want regulations banning the use of round-up ready alfalfa. If GE alfalfa is allowed, then my family is impacted as it comes down the food chain in our meat and dairy. I am a parent and concerned citizen urging you stop GE alfalfa and other crops from happening. (Comment Number: APHIS-2007-0044-7866-1)

Response: APHIS acknowledges the comment. Regarding impacts on downstream sources (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
I am extremely concerned that the USDA is considering allowing glyphosate-tolerant alfalfa to be sold as organic. I want to be able to choose whether or not I consume yogurt, cheese, milk, ice cream or beef from livestock that's been fed glyphosate-tolerant alfalfa.
As a cancer patient, I am especially concerned about my diet. I'm happy to pay extra for organic foods, but in doing so, I want to be sure that the organic meat and dairy products doesn't contain glyphosate-tolerant alfalfa.
No one is required to buy or to produce organic food, so organic standards should be what the consumers want them to be.
Once again, I DO NOT want glyphosate-tolerant alfalfa to be sold as organic. (Comment Number: APHIS-2007-0044-7928-1)

Response: Regarding impacts on downstream sources (e.g., meat and dairy), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding impact on organic certification, see response to comment APHIS-2007-0044-11689-2 for issue 5.6

Comment Excerpt Text:
Wedge Co-op customers spend over $30 million in our Co-op and our members purchase 80% of our organic product sales. Our members view organic foods as healthful and of the highest quality. Currently the USDA organic seal is seen as trustworthy in a marketplace where there is a general mistrust over labels, a lack of transparency and some level of outrage over government's perceived failure to enforce food safety regulations.
If alfalfa is contaminated through the release of a genetically engineered version of alfalfa, our customers will no longer trust the organic label, which will seriously impact our business. As our business is impacted, so are the farmers and their communities.
Our customers will not only mistrust the label, but will believe the USDA has undermined it's own program. (Comment Number: APHIS-2007-0044-7948-1)

Response: Regarding impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or

organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Most of the organic food we eat in Canada is imported from the U.S.. I am deeply concerned that the U.S. may allow plantings of GE alfalfa which I know will result in the contamination of organic alfalfa in the U.S. and Canada. I do not want to eat GE foods which is one reason why I choose to buy certified organic food. (Comment Number: APHIS-2007-0044-8159-1)

Response: Regarding impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
As a natural and organic food distributor, we are deeply troubled by the claims in USDAs Environmental Impact Statement (Docket No. APHIS-2007-0044) on genetically modified alfalfa. Specifically, USDA claims there is no evidence that consumers care about contamination of organic alfalfa and alfalfa-derived foods from Monsantos GMO Roundup Ready alfalfa. This strongly contradicts our experience as a natural and organic food distributor, as our customers are keenly aware of what constitutes a natural or organic product.
Our customers count on our natural and organic products to be GMO free. In order to meet their expectations and trust, we must work to keep GMOs out of the products that make up our inventories. Loss of customer trust in one brand would affect all natural and organic brands, as a ripple effect would spread throughout the industry. As the cultivation of GM corn, soy, canola, sugar beets and cotton has become increasingly widespread, our suppliers have had to adopt quality control measures to ensure the integrity of their products. These measures come at a price, and the threat of GMO contamination has become so severe that some of our suppliers have joined the Non-GMO Project. The Non-GMO Project is working to mitigate contamination, but government regulation and protection are needed to ensure consumer trust in the products we distribute to natural retailers throughout the country.
Although the USDA claims that consumers will not reject GM contamination of alfalfa if the contamination is unintentional or if the transgenic material is not transmitted to the end milk or meat product, our experience, based on knowledge of our customers expectations, contradicts this. In addition, although current technology for GM testing is limited to identification of proteins and, therefore, does not identify GM from feed in end animal products, there is no scientific proof that the contamination does not pass through. In order to protect our business, and our industry, a conservative approach is required. The USDA must not deregulate GM alfalfa (Comment Number: APHIS-2007-0044-8311-1)

Response: Regarding consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on organic farming/products, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
The Agency's claim that there is no evidence that consumers care about GE contamination of their organic food and crops is wrong.
Speaking as both an organic consumer and a representative of members of an organization committed to sustainable agriculture, I can say without doubt that Consumers DO CARE. I.C.A.R.E. members buy organic foods to avoid eating GE foods and foods grown with toxic, synthetic pesticides. For I.C.A.R.E. members, these buying choices are not only personal decisions based on health reasons, they are an important political statement: buying organic is a vote against the kind of industrial growing (I won't honor it with either the name of "farming" or of "agriculture") that aided and abetted the cancerous growth and spread of the CAFOs that have ravaged our rural communities—without plentiful supplies of pesticide-soaked and fertilizer-hungry GE corn and soy, CAFOs could not exist—and in favor of community-building sustainable agriculture. I.C.A.R.E. members recognize that organic provides many benefits to society including healthy foods; economic opportunities for family farmers, urban and rural communities, businesses small and large; and a farming system that improves the quality of the environment so that it can sustain future generations. Instead of rubber-stamping an EIS statement for GE alfalfa that is nothing but fluff, USDA must heed the lessons about unintended consequences provided by the history of GE corn and soy: in the past, GE crops have had severe, long-term ecological consequences—from dramatic changes in the structure of seed markets and huge reductions in the genetic diversity of available seed to global-scale food system alterations (G.E. corn and soy facilitated the spread of the incredibly unhealthy so-called "Western" diet)—and, contrary to USDA's current, naïve EIS statement, there is every reason to believe that GE alfalfa will have similar effects. (Comment Number: APHIS-2007-0044-8397-1)

Response: Regarding the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding cases of deregulation of other genetically engineered crops and their relevance for the analysis of the potential consequences of GT alfalfa deregulation, see response to comment APHIS-2007-0044-9936-10 for issue 11.15.

Comment Excerpt Text:
USDA claims that consumers will not reject GE contaminated organic alfalfa if the contamination is "unintentional" or if the GE material is not transmitted to the end milk or meat product—the Agency is wrong. The Organic Standard requires that livestock feed for meat and milk production is 100% organic; if consumers know their "organic" food has been contaminated (accidentally or otherwise), they will reject it. As the Court found in the lawsuit that mandated the drafting of this EIS: "[for]farmers and consumers organic means not genetically engineered, even if the farmer did not intend for his [her] crop to be so engineered." Whether or not the end product is found to be contaminated is not the issue — we don't want to grow or eat GE food! Farmers' fundamental right to sow the crop of their choice is eliminated when it is GE contaminated (more on this below) and so is the public's ability to support meaningful organic

food and feed production. Consumers like I.C.A.R.E. members will reject GE contamination of organic food at any stage of food production. (Comment Number: APHIS-2007-0044-8397-3)

Response: Regarding the comment on consumer demand for products free of genetically engineered material and the comment on the impact of unintended genetically engineered material on organic certification, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
The USDA's Environmental Impact Statement on genetically engineered alfalfa paves the way for the unregulated commercialization of Monsanto's Roundup Ready alfalfa. As a consumer of organic food, I strongly oppose this action because it will result in the genetic contamination of organic food. USDA concedes that "consumer perceptions of organic food safety may be an important driver for consumer substitution of organic for conventionally produced food," but then claims that there isn't evidence that U.S. consumers are as strongly affected by food safety concerns as Europeans, as if U.S. consumers don't care enough to buy organic. As an organic consumer myself, I can tell you that I DO care. (Comment Number: APHIS-2007-0044-9204-2)

Response: Regarding consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on organic farming/products, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the adventitious presence of non-GE or organic alfalfa with GT-alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
GMOs work against feeding a hungry world
The most authoritative evaluation of agriculture, the International Assessment of Agricultural Knowledge, Science and Technology for Development,[28] determined that the current GMOs have nothing to offer the goals of reducing hunger and poverty, improving nutrition, health and rural livelihoods, and facilitating social and environmental sustainability.
The report was a three-year collaborative effort with 900 participants and 110 countries, and was co-sponsored by all the majors, e.g. the World Bank, FAO, UNESCO, WHO. In reality, GMOs reduce yield,[29] increase farmers dependence on multinationals, reduce biodiversity, increase herbicide use, and take money away from more successful and appropriate methods.
In developing nations, GMOs can be catastrophic.
In India, for example, Monsanto convinced hundreds of thousands of farmers to take out high interest loans to pay for expensive GM cotton seeds and associated chemicals. Inconsistent yields left desperate farmers unable to even pay back their loans. The UK Daily Mail estimates that an astounding 125,000 indebted GM cotton farmers committed suicide.[30] (Comment Number: APHIS-2007-0044-9298-13)

Response:

APHIS acknowledges the comment, which is outside of the scope of this EIS analysis.

Comment Excerpt Text:
By avoiding GMOs, you help create a tipping point to drive them out of our food supply
Because GMOs give no consumer benefits, if even a small percentage of us start rejecting brands that contain them, GM ingredients will become a marketing liability. Food companies will kick them out.
The tipping point can come quickly.
In Europe, for example, within 10 weeks of a high profile GMO safety scandal that hit the papers in 1999, virtually every major food company committed to stop using GM foods. In the US, a consumer rebellion against genetically modified bovine growth hormone used on dairy cows has also reached a tipping point. Drugged milk and/or yogurt has been rejected by Wal-Mart, Starbucks, Dannon, Yoplait, and about 60 of the top 100 dairies so far.
The Campaign for Healthier Eating in America is designed to achieve a tipping point against GMOs in the US. The number of non-GMO shoppers needed is probably just 5 percent of the population.
They key is to educate consumers about the documented health dangers and provide a Non-GMO Shopping Guide, to make avoiding GMOs much easier. Thus, by choosing healthier non-GMO brands, and telling others about GMOs so they can do the same, we can quickly reclaim a non-GMO food supply.
Visit the Campaigns website for GMO educational materials to read, watch, listen to, and pass onto others. (Comment Number: APHIS-2007-0044-9298-14)

Response: APHIS acknowledges the comment. In regard to the link between glyphosate and health effects, see the response to comment APHIS-2007-0044-2243-1 for issue 6.0.

Comment Excerpt Text:
We don't know enough about genetically modified organisms to be putting them in the food chain, so I buy ONLY organic foods for my family. At the present time, there is no policy regarding the unintended presence of GE material in organic products or food, consistent with the fact that the NOP is a process-based program for certifying a farm or production system as organic, and not a product-based program that tests or certifies individual products as organic. I strongly encourage you to establish one!
USDA concedes that "consumer perceptions of organic food safety may be an important driver for consumer substitution of organic for conventionally produced food," but then claims that there isn't evidence that U.S. consumers are as strongly affected by food safety concerns as Europeans, as if U.S. consumers don't care enough to buy organic. As an organic consumer myself, I can tell you that I DO care. (Comment Number: APHIS-2007-0044-9423-2)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
I'm writing to respectfully alert you to the fact that I, along with tens of thousands of other citizens of this land, most assuredly do care about the integrity of the organic foods I purchase consume. Contrary to what you have apparently been advised, I most assuredly do expect my organic purchases to be free of genetically engineered products. And, contrary to your supposition regarding "our" purchasing habits, I do will continue to zealously avoid buying, using or in any way supporting genetically engineered food products. (Comment Number: APHIS-2007-0044-9558-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

5.7 Issue 5.7 – Irreversible Commitment of Resources

Comment Excerpt Text:
Finally, USDA concludes that GE alfalfa will cause production to shift to larger farms but that these economic shifts are "not significant." Small, family farmers are the backbone and future of American agriculture and must be protected. According to Farm Aid, thousands of small, family farmers are under extreme economic pressure and are pushed off their land each year. The very existence of the family farm is at risk and a shift in production from small farms to larger farms in the nation's fourth-largest crop substantially increases that risk. (Comment Number: APHIS-2007-0044-10002-3)

Response: See the response to comment APHIS-2007-0044-4913-7 for issue 5.1

Comment Excerpt Text:
The second consideration relates to the highly concentrated nature of the seed market. Experience in corn, soybeans and cotton demonstrates that farmers have ever fewer choices of high-quality conventional seed, as the biotechnology-pesticide companies buy up independent seed firms, preferentially offer higher-priced GM seed, and rapidly eliminate more affordable conventional varieties from their seed catalogs, and exert pressure on their licensees to do the same. This dynamic is exacerbated by the decline in public sector (land-grant university) breeding programs, which were once a major source of affordable seed to American farmers. As a result, farmers are often unable to find high-quality conventional seeds, and are constrained to purchase GM seeds with traits, such as the Roundup Ready trait, that they do not want. Once a farmer has purchased Roundup Ready seeds, the significant premium (double the price of conventional seed in the case of alfalfa) incentivizes use of the trait through application of Roundup. (Comment Number: APHIS-2007-0044-11037-15)

Response: See section IV I and Appendix S of theFEIS for a discussion of seed market concentration.

Comment Excerpt Text:
While it is beyond the scope of these comments to elaborate much further, we will point out that recent years have witnessed the beginnings of a backlash against Roundup Ready soybeans.

Many growers are turning away from the Roundup Ready system due to the sharp hikes in the price of RR seeds, the high cost of Roundup and additional herbicides needed to combat glyphosate-resistant (GR) weeds, and/or the ability to legally save and replant conventional soybean seed (which is illegal with patented RR seed).

The important point here is that there is a severe shortage of conventional soybean seeds. Demand is far outstripping supply in at least five states. [Footnote 3: See file entitled: Conventional seeds hard to find in demand-COLLECTION in supporting materials.] Many farmers who would like to buy conventional soybean seeds are not able to find them. In the case of Roundup Ready seed, this is a clear consequence of Monsanto's "biotech trait penetration" strategy, according to which lower profit-margin conventional seeds are phased-out in favor of more profitable GM seeds, in particular those with the RR trait. This strategy only becomes possible to implement in a concentrated seed marketplace, where the increasing market power of a few dominant seed providers takes precedence over farmer demand in determining which seeds are offered to American farmers. A sign of the seriousness of this problem is the ongoing Dept. of Justice investigation of seed industry concentration, which is focused particularly on the Monsanto Company, for anticompetitive practices. Declining choice of conventional and other more affordable seed varieties is one area of investigation. [Footnote 4: See file entitled: CFS-CTA Monsanto-DPL Merger Report Public Release Final in supporting materials, together with other related documents.] (Comment Number: APHIS-2007-0044-11037-16)

Response: See section IV I and Appendix S of theFEIS for a discussion of seed market concentration

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Comment Excerpt Text:
In the EIS, APHIS did not assess the potential for deregulation of RR alfalfa to lead to a decline in the availability of conventional alfalfa seed varieties. The few sentences in the EIS on "seed market concentration" are completely general in nature and contain no such analysis of the alfalfa seed market. In fact, APHIS mis-cites a study by USDA's Economic Research Service to the effect that seed industry concentration "has been accompanied by a decrease in the intensity of public research in crop variety development." [Footnote 5: EIS at 177-78, emphasis added.] In fact, what USDA's researchers actually said was as follows:

"…consolidation in the private seed industry over the past decade may have dampened the intensity of private research undertaken on crop biotechnology relative to what would have occurred without consolidation, at least for corn, cotton and soybeans." They add: "Also, fewer companies developing crops and marketing seeds may translate into fewer varieties offered" (Fernandez-Cornejo & Schimmelpfennig 2004, emphasis added).

Thus, APHIS not only fails to analyze the alfalfa seed market for potential impacts of deregulation on limiting conventional seed choices, but APHIS also distorts a USDA study pointing to this very possibility. (Comment Number: APHIS-2007-0044-11037-17)

Response: APHIS has expanded discussion of potential impacts on the seed industry in appendix S of the FEIS.

Comment Excerpt Text:
Although USDA says it supports "coexistence" of all types of agriculture, USDA fails to account for or adequately assess the direct and indirect impacts of GE contamination on both domestic[Footnote 2 Domestic sales of organic food sales are estimated at $23 million annually (2008), according to the Organic Trade Association (OTA), http://www.ota.com/pics/documents/01a_OTAExecutiveSummary.pdf (accessed 28 January 2010).] and export[Footnote 3 Organic exports are estimated at $125 million to $250 million annually, according to USDA's Economic Research Service (September 2009), http://www.ers.usda.gov/briefing/organic/trade.htm, (accessed 28 January 2010).] food markets. The Agency's draft EIS fails to even consider any future scenarios that would include regulatory and/or statutory protections from GE contamination for organic and conventional farmers and exporters leaving the organic industry and consumers of organic foods with no protections from GE contamination whatsoever.

Research has shown that transgenes cannot be recalled once released into the environment. [Footnote 4 Marvier, Michelle & Rene C. Van Acker. (2005) "Can Transgenes be kept on a Leash?" Front Ecol Environ, 3, 2: 96-106. Altieri, M. A. (2005) "The Myth of Coexistence: Why Transgenic Crops are not Compatible with Agroecologically Based Systems of Production.", Bulletin of Science, Technology & Society, 25, 4: 366.] Acknowledgement of this simple yet important fact has been omitted from USDA's draft EIS along with an assessment of what measures, if any, can be taken to fully protect organic and conventional agriculture from contamination, loss of markets, and a farm's right to sow the crop of her or his choice, provided that it does not impinge upon the rights of others. (Comment Number: APHIS-2007-0044-11788-5)

Response: Regarding the impact of GT alfalfa deregulation on domestic sales of organic food, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the impact of GT alfalfa deregulation on U.S exports, the DEIS discussed the impact on export markets in appendix R. The FEIS refined this discussion in section 2.2.1 of appendix R, further discussing levels of tolerance for unintended presence of genetically engineered material in feed and seed in importing countries. Regarding regulatory or statutory protections for organic and conventional farmers, the FEIS contains added analysis of an additional alternative that includes isolation distances and geographical restrictions for GT alfalfa.
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In regard to gene flow, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
USDA should NOT approve genetically engineered crops that benefit one large company at the expense of family farms. USDA concludes that GE alfalfa will cause production to shift to larger farms (that can afford built-in isolation distances) and conventional growers who are not threatened by GE contamination, but that these economic shifts are not significant. This is a

continuation of the "get big or get out" policy that has caused myriad problems over the last several decades, and it needs to stop! (Comment Number: APHIS-2007-0044-11969-5)

Response: See the response to comment APHIS-2007-0044-4913-7 for issue 5.1

Comment Excerpt Text:
Lastly, patents on Roundup Ready technology transfer unfair liability risks to farmers. Many liability questions remain unanswered by our regulatory and judicial systems, including who should pay for damages caused by unwanted transgenic material and who owns seed contaminated by patented traits. Unless laws governing patents on plant genetics are reformed, farmers who don't plant Roundup Ready crops are responsible for protecting their fields from transgenic contamination. USDA does not require Roundup Ready alfalfa growers to plant buffer areas, and Monsanto, the owner of Roundup Ready technology, enforces a strict contract called a Technology Agreement that shields the company from liability.
Monsanto is the largest seed company in the world. Its patented transgenic traits are in more than 90 percent of U.S. soybeans and cotton planted, and more than 80 percent of U.S. corn. Adding another major field crop to the line of Roundup Ready products extends Monsanto's grip over a large segment of our food production system.
The organic industry has always been concerned with the integrity of its products, and currently GE crops, including Roundup Ready alfalfa, may be the biggest threat to maintaining crops and products that meet the collective vision of what constitutes a truly organic agriculture. Although both the organic and biotechnology industries acknowledge that transgenic material is moving into fields and markets where it is not allowed or wanted, little has been done to address the problem through regulatory processes and enforcement.[Footnote 16: Hubbard, Kristina. 2006. Protecting the Integrity of Organic Food in the Face of Genetic Engineering:
The Case of Roundup Ready Alfalfa, University of Montana Master of Science Thesis.]
Protecting the integrity of organic seed and feed sources can begin with a more careful and thorough analysis of the economic and environmental effects of Roundup Ready alfalfa. (Comment Number: APHIS-2007-0044-12044-8)

Response: Regarding the impact of GT alfalfa deregulation on organic markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the legal liability for unintentional presence of GE content in non-GE crops, see the response to comment APHIS-2007-0044-6376-1 for issue 5.1.

Comment Excerpt Text:
Further study is needed to prove GT crops are safe for human consumption before it is deregulated.
I would like to stress that this action, if approved, cannot be undone. If scientific evidence at a later date finds that genetically modified food is harmful to human health and the environment, GT alfalfa will be impossible to remove. Biotech and chemical products that were not stringently tested and therefore assumed to be safe have been shown time and time again to be toxic,

including the banning of DDT in 1973 due to thinning of bird eggs, the banning of PCBs in 1979 due to human and animal toxicity, and the ongoing phase out of CFCs, which deplete the ozone layer, by 2020. (Comment Number: APHIS-2007-0044-2325-7)

Response: APHIS acknowledges the comment.
In regard to gene flow, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0 In regard to the need for an independent review into the health and safety of GT alfalfa, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
The contamination of non-genetically engineered alfalfa crops will result in the eventual contamination of alfalfa seed stock, through cross pollination and/or admixture. Since the use of genetically engineered seed is prohibited in certified organic agriculture, it will become increasingly difficult to impossible for farmers to find seed which does not contain genetically engineered DNA. Further, the farmers will risk cross-pollination of their crops from neighbouring contaminated stands and roadside plants. Organic certification rules require that farmers take measures to eliminate any contamination from genetically engineered plants that may occur on their farms. In practice, this will mean that in order to maintain organic certification, alflafa will not be able to be grown on organic farms. (Comment Number: APHIS-2007-0044-2380-2)

Response: APHIS acknowledges the comment. Regarding the impact of unintended presence of genetically modified material in organic products under the National Organic Policy, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the impact on organic and non-GT markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0
In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
The contamination of non-genetically engineered alfalfa crops will result in the eventual contamination of alfalfa seed stock, through cross pollination and/or admixture. Since the use of genetically engineered seed is prohibited in certified organic agriculture, it will become increasingly difficult to impossible for farmers to find seed which does not contain genetically engineered DNA. Further, the farmers will risk cross-pollination of their crops from neighbouring contaminated stands and roadside plants. Organic certification rules require that farmers take measures to eliminate any contamination from genetically engineered plants that may occur on their farms. In practice, this will mean that in order to maintain organic certification, alflafa will not be able to be grown on organic farms. (Comment Number: APHIS-2007-0044-2741-2)

Response: APHIS acknowledges the comment. Regarding the impact of unintended presence of genetically modified material in organic products under the National Organic Policy, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the impact on organic and non-GT markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0

In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
If GM alfalfa is allowed to be grown without any protections, there is no doubt alfalfa will follow the dangerous road that other GM crops have experienced. Commercialization of GM corn, soybeans, canola and other crops has diminished farmers choices in what seeds they have access to. For those crops GM introduction has resulted in historic increases in seed prices and the loss of independent seed companies. These developments have significant implications for alfalfa and farmers have been forced to utilize seed varieties with multiple traits farmers dont even need. Lower cost seed is no longer in the marketplace. (Comment Number: APHIS-2007-0044-6811-5)

Response: APHIS acknowledges the comment and has expanded the discussion of potential impacts on the seed industry in appendix S of the FEIS.

Comment Excerpt Text:
Continued Availability of Non-GT Parent Lines

In the District Court's Order requiring APHIS to prepare an EIS prior to deregulating GT alfalfa, the court expressed concern regarding the continued availability of non-GT alfalfa for production and consumption following deregulation of GT alfalfa. Geertson Seed Farms v. Johanns, No. C06-01075 CRB, 2007 WL 518624 (N.D. Cal. Feb. 13, 2007). FGI recommends that APHIS expand its discussion of the continued availability of non-GT alfalfa to more fully address the concerns raised by the District Court.

The production of non-GT alfalfa seed and forage both rely on continued availability of non-GT parent seed, with non-detectable levels of the GT trait. Although it is unknown to what future extent GT alfalfa will be adopted by U.S. growers, there is a clear consensus in the industry that there will always be a market (domestic and international) for non-GT varieties developed and produced in the United States5, [Footnote 6: NAFA. 2008. Coexistence for Alfalfa Hay Export Markets. NAFA Coexistence Document. Adopted June 2008. Available at http://www.alfalfa.org/pdf/CSExportHay.pdf (accessed Feb. 24, 2010).], [Footnote 7: NAFA. 2008. Coexistence for Organic Alfalfa Seed & Hay Markets. NAFA Coexistence Document. Adopted June 2008. Available at http://www.alfalfa.org/pdf/CSOrganic.pdf (accessed Feb. 24, 2010).]. There is no reason to believe that industry and/or university alfalfa breeders will not continue to develop varieties for these markets.

The production of Breeder seed generation (Syn1) alfalfa seedstock is often done in a screen cage to exclude incoming pollinators, so there should be no new incremental effort required to avoid low level gene flow from neighboring GT alfalfa seed or hay production. The production of Foundation (Syn2) alfalfa seedstock requires adherence to AOSCA standards, which include extraordinary isolation from all neighboring alfalfa (seed, hay or uncultivated sources). The standard Foundation seed required isolation of 900 feet is often sufficient to eliminate gene flow

from neighboring GT alfalfa seed or hay production, but occasionally very low levels of adventitious presence are found1. When a non-detect standard for Foundation seed is adopted by the breeder, use of an additional isolation distance would decrease the risk of low level gene flow. As a general practice of stringent quality control, Breeder and Foundation seed is routinely evaluated for trueness-to-type, including a lack of off-types13. In the event of a low incidence of an off-type, such as presence of the GT trait in non-GT alfalfa, breeders routinely cull the off-type plants and repeat the variety seed increase. See DEIS, App. V at V-78. Adherence to AOSCA standards for certified seed production and attention to detail in quality control of seedstocks has been a successful strategy for high quality U.S. seed production by American seed companies. (Comment Number: APHIS-2007-0044-7620-28)

Response: APHIS acknowledges the comment and has expanded the discussion of potential impacts on the seed industry in appendix S of the FEIS.

In regard to isolation distances, see the response to comment APHIS-2007-0044-12348-2 for issue 11.4.

Comment Excerpt Text:
Consumers are going to want to avoid Roundup Ready alfalfa, but according to the EIS, we don't have that right because, "At the present time, there is no policy regarding the unintended presence of GE material in organic products or food, consistent with the fact that the NOP is a process-based program for certifying a farm or production system as organic, and not a product-based program that tests or certifies individual products as organic." (Comment Number: APHIS-2007-0044-9240-3)

Response: APHIS acknowledges the comment. Regarding consumer preferences and the impact of unintended presence of genetically modified material in organic and non-GT products, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
In an age of ecological imbalance and chemical intensive agriculture, approval of this and other GE crops is exactly in the wrong direction for our country's food supply to be heading. Any development which encourages the increased use of chemical controls only puts off the day we must reckon with our unwise choices and sadly depleted resources.
Further, specifically, the contamination of non-GE alfalfa by the engineered variety presents a point of no return beyond which many family farmers and organic growers will not stand a chance in raising food differently. This imposition will not be limited to the agriculture of the United States; contamination internationally is inevitable. These kinds of unintended consequences must be taken into consideration. (Comment Number: APHIS-2007-0044-9321-1)

Response: APHIS acknowledges the comment. Regarding the impact on organic and non-GT markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the

impact on international markets, see the response to comment APHIS-2007-0044-3404-1 in issue 5.4.
In regard to gene flow, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:

The problems of contamination for organic growers through comingling cannot be ignored. Organic farmers cannot tolerate any GE contamination of their alfalfa. If contamination is found, despite all of the precautions taken, the farmer will lose a certification and market that took years and hard work to establish. Losing this market affects both the farmer and his customers, who may have go farther for their organic hay and pay more for it. The long term result is to make organic food more expensive and to take away the right for consumers to choose what they want to eat because it is financially out of reach.

The EIS assumes that consumers will not reject GM contaminated of organic alfalfa if the contamination is unintentional or not transmitted to the end product. However, prohibition of GM is a fundamental tenet of the Organic Standard. This Standard requires that livestock feed for animals used for organic meat, milk, eggs and other animal products is 100% organic. Protecting organic alfalfa, the main source of feed for organic dairies is crucial to the health of that popular and important sector of U.S. agriculture. (Comment Number: APHIS-2007-0044-9882-10)

Response: Regarding the impact of GT alfalfa deregulation on organic and downstream markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding consumer preference for products free of genetically engineered content, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6

Comment Excerpt Text:
Just the potential for contamination can also be harmful to organic farmers. If GM alfalfa is deregulated, organic markets will need proof that the hay and seed they are buying is completely GM free. Therefore the organic farmer is under the burden to prove his or her crop is not contaminated. These tests are very expensive and cumbersome. If the alfalfa tests required are the same as requirements for other crops, farmers will have to have individual tests for each field and tests each time that field is harvested. In the case of alfalfa this could mean a multiple tests on the same field each year. (Comment Number: APHIS-2007-0044-9882-11)

Response: APHIS acknowledges the comment. Regarding the impact of GT alfalfa deregulation on organic and downstream markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. The analysis of testing for GT alfalfa content as a requirement or option for accessing GT sensitive markets has been added to appendix S of the FEIS.

Comment Excerpt Text:

Furthermore, the Court found in the lawsuit that required this EIS, to "farmers and consumers organic means not genetically engineered, even if the farmer did not intend for his crop to be so engineered." Whether or not the end product is impacted is not the issue. Farmers' fundamental right to sow the crop of their choice and consumers right to eat the food for their choice is eliminated when that food or the feed used to grow that food is contaminated with GM Alfalfa.

As we have seen in other species where GM crops have been deregulated, this deregulation eventually takes away the farmers' right to plant the crop of their choice. Seed developers begin to "stack" the best traits of the seed into the GM seed. In order to get the traits they need for their area, farmers are forced to buy traits they don't need at a higher cost. In some cases this requires planting GM crops where they are not wanted or needed in order to get a trait they DO need, but can only be found in the GM variety. (Comment Number: APHIS-2007-0044-9882-14)

Response: APHIS acknowledges the comment. Regarding the consumer preferences, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Discussion of impacts on alfalfa seed markets has been expanded in section IV.D of the FEIS.

Comment Excerpt Text:
The DEIS briefly discusses seed market concentration and concludes that the even the scant evidence discussed suggests "a possible negative impact of market concentration on future research and development." (DEIS at 178). Yet, research and development is not the only area that suffers from seed market concentration. The privatization and concentration of the worlds seed supply is a serious and continuously evolving problem, compounded with each new GE crop deregulation. "It is estimated that the top ten seed corporations around the globe hold 49-51% of the commercial seed market, and top ten agro-chemicals control 84% of the agrochemicals market. Likewise, all genetically modified (GM) seeds are bio-patented by multinational corporations and 13 commercial corporations own 80% of GM food market." [Footnote 67 Yamuna Ghale and Bishnu Raj Upreti, Concentration and Monopolisation of Seed Market: Impact on Food Security and Farmer's Rights in Mountains, available at http://docs.google.com/viewer?a=v&q=cache%3A3CPrhC0TuVIJ%3Awww.mtnforum.org%2Frs%2Fol%
2Fcounter_docdown.cfm%3FfID%3D2056.pdf+seed+market+concentration&hl=en&gl=us&sig=AHIEtbT wpX0MzR5HZZ8CUBA8qoWofinQvw&pli=1.]

With increased seed market concentration, the once diverse selection of conventional seed is disappearing. Farmers are finding it increasingly difficult to find conventional soy and corn seeds. [Footnote 68 CFS, Monsanto v. US Farmers, Jan. 13, 2005, available at http://truefoodnow.files.wordpress.com/2009/12/cfsmonsantovsfarmerreport1-13-05.pdf.] Farmers are forced to purchase GE seed and with that pay hefty technology fees and adhere to strict regulations stripping them of the age old practice of saving seed. For these and other reasons, the DEIS does not adequately address the cumulative impact of seed market concentration. The seed market concentration impacts of a deregulation of GT alfalfa is a significant cumulative impact. (Comment Number: APHIS-2007-0044-9936-21)

Response: APHIS acknowledges the comment. Regarding seed market concentration, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0. Discussion of impacts on alfalfa seed markets has been expanded in section IV.D of the FEIS.

5.8 Issue 5.8 – Farmer Costs (input costs)

Comment Excerpt Text:
Sirs, I am very much opposed to the approval of roundup ready alfalfa. As a dairyman and alfalfa grower for over 30 years, I have never wanted or needed to spray my alfalfa fields. Like a growing number of dairymen in my area, I now add grasses to my alfalfa seed. This is on the reccomendation of my dairy nutritionist and I am sold on it as are the cows.
There can be no doubt that contamination of non GMO alfalfa fields will occur. There are always areas of alfalfa fields that do not get cut before pollination, weather being the main reason. They have found the GMO corn gene in the native maize in remote areas Mexico. It is hard to believe that the GMO alfalfa gene won't cross a fenceline or road, and once the GMO genie is out of the bottle you can't put it back.
As far as profitability goes, the only ones making money off this will be, as in corn and soybeans, the manufacturers and sales businesses. Farmers need to ask themselves, are they really better off financially since the introduction of GMO corn and soybeans. High priced seed and high priced chemicals and the grain is worth the same price as before or less.
Conventional seed is becoming harder and harder to find as there are fewer seed varieties and seed companies to buy from. If left unchecked, farmers will be forced to buy there seed/chemical package from just 2 or 3 agribusiness giants.
The furure is in the seed. Thank you
Robert Mueller
(Comment Number: APHIS-2007-0044-0482-1)

Response: APHIS acknowledges the comment. Regarding the impact of GT alfalfa deregulation on non-GT markets, see response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the likelihood of gene flow, see response to comment APHIS-2007-0044-0482-1 for issue 3.1.

Comment Excerpt Text:
I take exception to in the DEIS for glyphosate tolerant alfalfa.
1. Alfalfa is somewhat tolerant of glyphosate now. Monsanto should not be allowed to take credit for what already exists. It should be known what is responsible for the current tolerance and Monsanto should not be allow to claim that tolerance.
2. Is there some reason the Monsanto seed cant be made mule sterile? Seems possible from a company that can alter genes.
3. Alfalfa can bloom in 20 days if the weather conditions are right. Escape stalks and those that are knocked down in the harvest process will bloom even quicker.
4. The claims that no till in roundup ready alfalfa help in controlling erosion are incorrect. No one tills alfalfa now except to level fields that are rough from gophers etc. Roundup ready alfalfa will receive the same treatment.
5. Bindweed is not removed with glyphosate. The weed claims are incorrect.

6. The cost of Round up Weather max is higher than using Diuron for winter annuals and Clethodim for grass. Cost is $2 per acre per year more for Weather Max.
7. A 6-year life of the stand amortized with 8% interest makes glyphosate tolerant fields cost $71.68 more over the 6 years. Assumes normal seed cost $3.00 per pound. The extra spent on glyphosate seed could be used to pay off debt or saved. About $6.20 per acre forever.
8. The better weed control from use of glyphosate is deceptive, because the people that have a problem now are not using what is available and already on the market. Conditions that prevent correctly timed and use of chemicals now will not change, like weather, timing and laziness or unwillingness to pay the cost.
9. I wonder if a study of the tree losses (Pine Ash Oak Etc.) has been looked into. Glyphosate is probably not the culprit, but the agrobactrium that injects the snippet of DNA into the alfalfa gene is also responsible for burls on the trees. It has been altered with salmonella DNA and may be responsible for the mutation of other disease (Comment Number: APHIS-2007-0044-0511-1)

Response: APHIS acknowledges the comment. In regard to the relative costs and returns of GT alfalfa farms compared to non-GT alfalfa farms, the DEIS compared costs and returns in appendix K, based on existing studies. As explained in appendix K of the DEIS, these comparisons were illustrative and not applicable to all situations. They were useful, however, in informing the analysis of potential scenarios under deregulation of GT alfalfa, and the factors involved in the adoption or not of GT alfalfa by producers.

In regard to timing of alfalfa forage harvest, see the response to comment APHIS-2007-0044-10263-7 for issue 3.1.
In regard to stand removal practices for GT alfalfa, see the response to comment APHIS-2007-0044-11037-28 for issue 7.1.

Comment Excerpt Text:
Re: Docket No. APHIS2007-0044
Regulatory Analysis and Development
PPD, APHIS, Station 3A03.8
4700 River Road Unit 118
Riverdale, MD 207371238
This comment refers to Docket No. APHIS0044, Draft Environmental Impact Statement, GlyphosateTolerant Alfalfa Events J101 and J163: Request for Nonregulated Status
I am a Certified Organic seed supplier of alfalfa and alfalfa hay for feed, I supply to Certified Organic dairies and I also supply organic sprouting seed to foreign markets.
I have been affected financially by the initial release of Round-Up Ready Alfalfa. I had a large order of alfalfa sprouting seed for overseas shipment cancelled in the spring of 2006. I have not been able to secure that customers confidence since genetically modified alfalfa was released in the United States. I am burdened with costs of testing for GM free status on each field and seed lot which requires multiple tests for accuracy. The cost of carrying the inventory and the possibility that this seed will hold no value or use for any market has created a financial ruin. With most alfalfa seed stands having to be replaced every 3 to 4 years under the certified organic rotation requirements I will have to test and attempt to find GM free seed stocks. This will prove

to be very costly for both the farmer and the seed company. This will result in excess development and relocation costs for those producing the seed. With no natural barriers that can control seed pollination contamination this will ultimately result in the loss of seed availability which results in loss of seed companies and consolidation which is an economic loss to the entire food system.
I also provide Certified Organic alfalfa hay to Organic Dairy Producers. This market will diminish due to the fact of expensive and excessive testing for alfalfa producers and the dairy producers. Upon the continued release of Round Up Ready alfalfa, burdensome testing for both the supplier and the dairy producer will leave t

Attached file:

Re: Docket No. APHIS—2007-0044
Regulatory Analysis and Development
PPD, APHIS, Station 3A—03.8
4700 River Road Unit 118
Riverdale, MD 20737—1238
This comment refers to Docket No. APHIS—0044, Draft Environmental Impact Statement, Glyphosate—Tolerant Alfalfa Events J101 and J163: Request for Nonregulated Status
I am a Certified Organic seed supplier of alfalfa and alfalfa hay for feed, I supply to Certified Organic dairies and I also supply organic sprouting seed to foreign markets.
I have been affected financially by the initial release of Round-Up Ready Alfalfa. I had a large order of alfalfa sprouting seed for overseas shipment cancelled in the spring of 2006. I have not been able to secure that customer's confidence since genetically modified alfalfa was released in the United States. I am burdened with costs of testing for GM free status on each field and seed lot which requires multiple tests for accuracy. The cost of carrying the inventory and the possibility that this seed will hold no value or use for any market has created a financial ruin. With most alfalfa seed stands having to be replaced every 3 to 4 years under the certified organic rotation requirements I will have to test and attempt to find GM free seed stocks. This will prove to be very costly for both the farmer and the seed company. This will result in excess development and relocation costs for those producing the seed. With no natural barriers that can control seed pollination contamination this will ultimately result in the loss of seed availability which results in loss of seed companies and consolidation which is an economic loss to the entire food system.
I also provide Certified Organic alfalfa hay to Organic Dairy Producers. This market will diminish due to the fact of expensive and excessive testing for alfalfa producers and the dairy producers. Upon the continued release of Round Up Ready alfalfa, burdensome testing for both the supplier and the dairy producer will leave the dairy producer no choice but to source other, more expensive and less efficient protein feed sources. This will result in the exclusion of alfalfa as a rotational soil-building crop for organic producers which is known to be one of the best rotational fertility use crops.
I am asking the courts to uphold the decision to not release GM alfalfa. I have already incurred actual financial and career losses due to this being approved for a short time.
Blaine Schmaltz
Rugby, ND
(Comment Number: APHIS-2007-0044-10349-1)

Response: APHIS acknowledges the comment. Regarding impacts on U.S trade, see response to comment APHIS-2007-0044-3404-1 in issue 5.4 . Regarding requirements for testing for GT alfalfa content in accessing GT sensitive markets, see response to comment APHIS-2007-0044-0693-1 for issue 5.9.

Comment Excerpt Text:
This comment refers to Docket No. APHIS-2007-0044.
The new Genetically modified Round-Up-Ready Alfalfa by Monsanto should not be allowed to be produced. It will have an environmental impact on Organic producers which could contaminate Organic farming areas. There is no reason that Organic farmers should be the ones burdened with the responsibility to assure that their farms have not been contaminated by the Genetically modified Round-Up_Ready Alfalfa. This would greatly increase the price of orgainc farming and therefore increase the price for organic products purchased by the consumer. They are already quite expensive. There are more and more people becoming aware of the health benefits provided by eating organic. To jeopardize their ability to purchase these products by increased costs and possible contamination that may be extremely difficult to avoid is not wise. (Comment Number: APHIS-2007-0044-2231-1)

Response: See response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
I BELIEVE RRA COULD HAVE FAVORABLE SIGNIFICANT IMPACT ON THE AVAILABILITY OF ALFALFA ON BOTH COMMERCIAL AND LARGE SCALE PRODUCERS. CONVENTIONAL SEED FOR THE ORGANIC HAY MARKET PRODUCED FOR THE GROWING DEMAND BY CONSUMERS WILL REQUIRE THAT SELECTED STATES OR REGIONS BE SET ASIDE FOR CLEAN NON-GE ALFALFA SEED FOR THIS MARKET. THE FMV OF SEED COULD BE IMPACTED WITH RR SEED. EXAMPLE-THE COST OF SECOND GENERATION RR SOYBEAN SEED COMMERCIALIZED IN 2009 HAS A SIGNIFICANT PRICE INCREASE ANNOUNCED BY MONSANTO COULD GO AS HIGH AS A 42% INCREASE. (Comment Number: APHIS-2007-0044-2247-1)

Response: APHIS acknowledges the comment. Regarding the impact on alfalfa markets see response to comment APHIS-2007-0044-9882-1 for issue 5.0. The FEIS expanded the analysis to include an additional alternative which are fully described in chapter II of the FEIS.

Comment Excerpt Text:
We haven't raised and Roundup Ready alfalfa as of yet. Our Neighbor has. His fields grow big and full, and without weeds except on the edges. I would be able to do the same. I know that the cost is more but the cost down te line evens out. (Comment Number: APHIS-2007-0044-3234-1)

Response: APHIS acknowledges the comment. Regarding relative costs, see response to comment APHIS-2007-0044-0511-1 for issue 5.0.

Comment Excerpt Text:
1. Alfalfa seed growers raising GM alfalfa will not have the option of saving any of their seed back to plant next year's crop. Since Monsanto will be the exclusive patent holders of the GM alfalfa, farmers caught saving any seed back for future planting will be subject to lawsuits by Monsanto. Just look at what has happened to farmers growing soybeans. Farmers interested in growing GM alfalfa should watch what is happened to their colleagues who are growing corn, soybean, or canola. These farmers are now worse off financially and socially for having taken on this new crop. How can Monsanto promise anything else? (Comment Number: APHIS-2007-0044-3548-2)

Response: APHIS acknowledges the comment. Regarding the legal liability for unintentional presence of GE content in non-GE crops, see the response to comment APHIS-2007-0044-6376-1 for issue 5.1.

Comment Excerpt Text:
I produce pasture-raised sheep for local consumption on pastures that have never had pesticides or comercial fertilizers applied to them. I've used alfalfa as a feed suppliment during breeding as well as during the last trimester before lambing. I would not like to have to guard against and probably pay extra to aviod "round-up ready" versions of alfalfa pellets. "Round Up Ready" versions of alfalfa should NOT be deregulated (Comment Number: APHIS-2007-0044-5204-1)

Response: APHIS acknowledges the comment. Regarding impacts of GT alfalfa deregulation on non-GT producers, see response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
As a small certified organic producer for 12 years, we've observed the true intent of organic farming becoming less an ecological and sustainable approach than it is a focus for agribusinesses. We grow alfalfa and produce, with the goal of providing our customers quality products. We are very concerned about the prospect of being unable to provide this transparency to our customers with the advent of GE alfalfa.
The USDA has said that its basic mission is "protecting American agriculture," which suggests that the future of organic agriculture should be included in all decisions related to genetically modified alfalfa, a contaminant for our organic alfalfa. So little evidence exists as to the safety and solid research of genetic engineering. What of the the ecological implications in related species in the wild (seedstock precursors)?
We need to protect all farmers and the livihoods of those who choose not to grow RR alfalfa. (Comment Number: APHIS-2007-0044-7256-1)

Response: APHIS acknowledges the comment. Regarding impacts of GT alfalfa deregulation on organic producers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In

regard to gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
ISSUE SEVEN Differences in Quality

Differences in quality are discussed but it is stated that "…one cannot systematically attribute higher quality to GT alfalfa over conventional alfalfa, since sometimes conventional weed control systems can be quite effective." And, "The limited evidence presented here suggests that while there is the potential for higher quality forage from GT alfalfa, one cannot systematically assume higher quality attributable to GT alfalfa over conventionally produced alfalfa.' Again, quoted from the impact statement page K-15

In table K-10 "Scenarios for GT Alfalfa":

The total operating cost/acre for conventional alfalfa is shown to be $685 per acre. This number ($685) was lifted from table K3 and apparently from table K1 "other cultural costs" (the cost for seed is figured at a seeding rate of 30 lbs per acre @ $3 per pound. The total operating cost for GT alfalfa was $619 per acre. Why are the total operating costs for GT alfalfa less than conventional alfalfa? Apparently the seed cost used for the GT alfalfa seed was figured at 12 lbs per acre seeding rate! Table K3 shows herbicide cost at $71 per acre. The figure $71 per acre as herbicide cost for conventional alfalfa is extremely high considering that only 17-22% of alfalfa is EVER treated with a herbicide. If the table was corrected, conventional alfalfa would have the profit advantage over GT alfalfa every time even if you give GT alfalfa a quality advantage. (Comment Number: APHIS-2007-0044-9537-7)

Response: The total operating costs for GT alfalfa reported in Table K-10 of appendix K of the DEIS are less for GT alfalfa because of less expenses typically associated with less herbicide use, all else being equal. The assumptions used in this analysis are described in appendix K of the DEIS. Herbicide costs for conventional alfalfa hay production in presented in Tables K-3 and K-10 of the DEIS are those reported by the University of California Cooperative Extension study reported in appendix K of the DEIS. As explained in appendix K of the DEIS, this is an illustrative exercise not applicable to all situations. It is useful, however, in informing the analysis of potential scenarios under deregulation of GT alfalfa, and the factors involved in the adoption or not of GT alfalfa by producers

5.9 Issue 5.9 – Honey Industry

Comment Excerpt Text:
I live in the San Luis Valley, Colorado where alfalfa is a major agricultural crop. Much of the alfalfa grown here is exported out of the Valley as hay for dairy feed. I am concerned that the introduction of genetically modified (GM) seed would contaminate the crops of those who choose to grow organic alfalfa and could place a burden upon organic growers to test their hay before selling to dairies who produce organic dairy products.

How can growers who choose to grow GM crops ensure they will not adversely impact those who choose not to grow GM crops? I don't think that's possible. Even though many commercial growers harvest before alfalfa goes to seed, some plants always escape cutting.
Additionally, the San Luis Valley has a number of honey producers who depend upon alfalfa. I believe GM alfalfa could also adversely affect this industry.
The San Luis Valley has some of the poorest counties in Colorado. There is a growing trend among growers to switch to organic production methods as a way to create a value-added agricultural industry to help our economy. I believe that GM crops would destroy this option and this indirectly affect larger communities.
I am not convinced that we fully understand the impacts GE alfalfa seed could have upon wild relatives of alfalfa and do not believe it is appropriate to potentially affect the gene pool of these plants.
Finally, I am concerned that the use of GM seed would increase use of pesticides and add to the growing problem of weeds resistant to glyphosate. We have seen similar problems in other areas of the country with other crops. Why would we not expect that to occur with GM alfalfa also? (Comment Number: APHIS-2007-0044-0693-1)

Response: APHIS acknowledges the comment. The analysis of testing for GT alfalfa content as a requirement or option for accessing GT sensitive markets has been added to appendix S of the FEIS. Regarding the impact on the honey industry, see the response to comment APHIS-2007-0044-5287-1 for issue 5.9. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to the evolution of glyphosate-resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for issue 3.6.

Comment Excerpt Text:
The EIS does not consider the financial losses or impact on the farmers/ranchers who are hay/seed producers within the states of North Dakota, South Dakota, Nebraska, Kansas, Eastern Montana, Eastern Wyoming, Utah and California. In these areas, when environmental conditions will not support full re-growth of alfalfa after a cutting, the short growth is left to bloom for honey bee pasture and to produce some common seed. It is these agriculturalists who will lose their ability to produce these short stand seed crops.
The EIS does not indicate the potential losses to the support industries of the above, such as seed cleaners, seed dealers and distributors.
The EIS does not reflect upon the foraging impact losses or financial losses of honey bee keepers who will have lost the above mentioned summer and late season bee pasture.

The EIS misinterpreted the concerns of some of the honey bee keepers. They were not simply asking whether RR alfalfa pollen/nectar is the cause of colony collapse, they were in fact concerned about the impact of losing millions of acres of foraging ground for their bees due to the presence of RR alfalfa. According to the Best management Practices Stewardship Program advocated by FGI, the isolation distance for honey bees from blooming RR fields must be 3 miles.
The EIS does not show the financial impact on the users of the above seed. RR alfalfa seed was priced much higher than other alfalfa seed. (Comment Number: APHIS-2007-0044-12038-2)

Response: APHIS acknowledges the comment. Appendix S of the DEIS analyzes impacts on seed markets. In response to comments on the Draft EIS, APHIS expanded the discussion of this issue in section IV.D. of the FEIS. APHIS' analysis of impacts of GT deregulation on honey producers in the DEIS has been expanded in section 3.2.2 of appendix S of the FEIS to consider the potential impact on honey producers from the loss of foraging ground. Please note that the suggested isolation distance of 3 miles is for GE and non-GE alfalfa fields, not honey bees. In regard to timing of alfalfa forage harvest, see the response to comment APHIS-2007-0044-10263-7 for issue 3.1.

Comment Excerpt Text:
As Chairman of the American Honey Producers Association (AHPA) Washington Legislative Committee, I want to go on record opposing APHIS granting the Monsanto Company "Non-regulated
Status" - for GE Glyphosate - Tolerant Alfalfa.
GE alfalfa would be a disaster for the bee industry. Alfalfa is the primary source of nectar for honey in
many states. Without it, it will be very difficult to maintain healthy colonies. It will not only be a disaster
for beekeepers, but it will severally impact farmers who grow common alfalfa. In the wet years, farmers
grow alfalfa for tonnage. In a medium year, they go for tonnage and/or seed and on a very dry year, of
which there are many in the upper Midwest, they will try to salvage the bottom line by going for seed.
This is where beekeepers come in. If farmers go for seed, we're there to pollinate.
If one company, Monsanto, gains a monopoly on alfalfa seed, farmers will lose the option of going for
hay and/or seed production. This will create a significant adverse effect on both farmers and beekeepers. In fact, if pollen from a GE field of alfalfa, is moved by bees to an adjacent field of common alfalfa, and it will happen, the farmer with common alfalfa, infected with the GE gene will not
be able to legally sell seed from it. It's obvious, with alfalfa being a perennial plant, that in a few short
years, the GE genes will be in all the alfalfa and every farmer with seed to sell will have to pay royalties
to Monsanto as it will carry the GE gene. Bees will be an oxymoron. Cussed for spreading the gene
and sought after to ensure pollination and a good seed set.
I don't want this letter to be construed that I'm against all GMO crops. Round-up ready soybeans have
been a great boon to soybean farmers. However, research is starting to reveal the GMO crops may not
be as healthy as once thought. If this proves true, a diet of GE corn and GE alfalfa in milk cows will

only compound the problem. We may be able to get it out of the corn, but it's going to be next to impossible to get it out of the alfalfa. Let's not start something we may not be able to finish. Granting Monsanto Company "Non-regulated Status" for GE Alfalfa would not be good for America's
farmers, beekeepers and consumers. We ask, in your considered judgement to deny Monsanto's petition. (Comment Number: APHIS-2007-0044-12286-1)

Response: APHIS acknowledges the comment. The analysis of testing for GT alfalfa content as a requirement or option for accessing GT sensitive markets is expanded in appendices S and R of the FEIS. Regarding the impact on the honey industry, see the response to comment APHIS-2007-0044-5287-1 for issue 5.9. In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. In regard to the need for an independent review into the health and safety of GT alfalfa, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
I am a retired commercial beekeeper and own a farm in South Dakota. I am
past president of the American Beekeeping Federation, a Nation~
Association.
My father started our beekeeping business. He acquired his frrst colony ~
twelve years ofage, in 1902. Two brothers and I helped to build the operatio
up to 5,000 colonies. The business is now owned and operated by thre
beekeepers· who purchased the business fOUf years ago, after they wer
working with us for about 25 years.
My wife and I purchased the 800 acre farm 35 years ago. We now lease th
farm on a share crop basis. Our crops are Alfalfa, sunflowers, soybeans, cor
and wheat. Some Genetically Modified (GM) crops are grown on our farm.
We grow alfalfa for forage. However when weather conditions are favorable
For alfalfa seed production, the alfalfa plants are left to seed. This is
Common practice by many farmers and many thousands of pounds of seed ar
Harvested this way and this accounts for a significant portion of the US see
Production. Farmers often grow their own seed and the surplus seed is sold t
Other individuals and/or to local seed companies.
Since I am both a farmer and a beekeeper, I am very disturbe4
that APHIS is proposing to grant non-regulated status for GE alfalf
lines J101 and J163 to Monsanto. In reality, this will &D!!!
mono)!olistic control of alfalfa seed production to one Comnany.
If GE alfalfa is released into the environment, I sincerely believ
problems will surface that are being overlooked at this time.
Alfalfa is a perennial! If approved, it would be the first GE perennial plat
to be released into the environment! GM genes from this modified alfalfa wi
spread to other conventional alfalfa by cross-pollination. Since it is
perennial, GM genes from these plants will be multiplied across hills, fence~
ditches to other alfalfa on a continuous transgression for endless years t
come. Any attempt to create buffer zones will be ineffective and not b

practical.
If one farmer plants GE alfalfa, since bees are responsible for eros
pollination, there will be a reluctance, on the part of the neighbor alfalf
grower, to have bees on his farm, when he tries to grow conventional alfalf~
(I have already been given this notice by a landowner). So, at this poin1
neither alfalfa farmer could produce seed. The frrst because he signed
contract with Monsanto which prohibits him from leaving the GE alfalf
bloom and/or harvesting any seed. The second farmer because he cannc
produce seed without the pollinators. And, if he decides to produce seel
anyhow (with bees) the seed produced will be contaminated with the GE gent
Then this seed cannot be sold for sprouts, organic and/or possible even a
common seed.
Colony Collapse Disorder (CCD). Just this last week, I learned of a goo
beekeeper who had 1020 colonies ofbees this last season who now lost all bu
140 colonies. There are all too many experiences like this. Many beekeeper
believe that lack of proper "nutrition" may be part of the problem. They ar
trying to supplement the diet of the bees in the colonies with a polleJsubstitute to try to maintain
healthier bees. They ask, is the "Mono-culture
within agriculture that has been developed during recent years, possibly pat
of the problem? Does pollen from GE plants have less nutrition for bees
Research dollars have been limited at US Bee Labs. Research on nutrition i:
GE pollens and lack of variety of pollens from wild flowers has been on
low research priority list. What are other side effects on bees from GE plants'
Threatened and Endangered Species (T&E)_Should honey bees be place~
on to this list?
About one-third of our food supply depends upon pollination
There also is a benefit to our environment from bees in addition to our foOl
supply. I believe that bees are our "Achilles Heel"!
Migratory Beekeeping See page 38 of the "Draft Environmental Impac
Statement - November 2009"
This National map shows that most of the alfalfa that is grown in the USA i
grown in about the Northern two thirds of the country. Considering all ofth,
problems that Beekeepers have in trying to maintain healthy bee colonies,
believe that approval of GE alfalfa would be too much for them to cope witt
Beekeepers now generally keep their bees in the South during the Winter an~
in the North during the Summer. So, most bees are moved to Dod deeen.
upon ,lfalfs that is left to bloom for a verY very importagt period of time,
I sincerely request that you do not grant non-regulated status to Gl
alfalfa lines JIOI and J163.
Please do Dot associate my view about the GE perennial plant @Ifalfg wit]
sugar beets. Sugar beets do not bloom the frrst year and by the end of tb
season are fully harvested. Then new seed is again planted for the ne,
season. So, since the area of seed production for beets is limited to a vet:
small area, I hope with proper oversight, it would be manageable.
Donald R Schmidt
(Comment Number: APHIS-2007-0044-12297-1)

Response: APHIS acknowledges the comment. Regarding impact of GT deregulation on seed market concentration, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0. Regarding the impact of unintended presence of genetically engineered material on organic seed markets, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding the impact on the honey industry, see the response to comment APHIS-2007-0044-5287-1for issue 5.9. In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. In regard to the risk to T&E species, see the response to comment APHIS-2007-0044-9936-27 for issue 4.1. In regard to the Colony Collapse Disorder (CCD) in bee colonies, see the response to comment APHIS-2007-0044-5338-1 for issue 4.0 paragraph 2.

Comment Excerpt Text:
Roundup Ready alfalfa threatens the honey industry. (Comment Number: APHIS-2007-0044-2301-4)

Response: See the response to comment APHIS-2007-0044-5287-1 for issue 5.9.

Comment Excerpt Text:
I am a beekeeper and I am against the releasing GMO alfalfa into the environment and then forcing everyone to modify their organic practices. This is lunacy. Please wake up to the reality that is being forced onto our world. Think of your responsibility to your children and grandchildren. Our farming practices have proved unharmful for millenia. Please do not allow this to happen, without the resposibility being placed on the Monsanto Company, not everyone else. (Comment Number: APHIS-2007-0044-4222-1)

Response: APHIS acknowledges the comment. Regarding the legal liability for unintentional presence of GE content in non-GE crops, see the response to comment APHIS-2007-0044-6376-1 for issue 5.1.

Comment Excerpt Text:
I am a small beekeeper located in Wisconsin (one of the top 10 honey production states). The loss in honeybees last year was 50%. We are still unsure of the reason, but GMO corn may be a culprit. Until we can determine for a fact that genetic modification of forage crops is not contributing to the decline of honeybees, we cannot afford to authorized another crop.
At a minimum, I am requesting that USDA extend the comment period to allow more commentary on something that may radically effect an insect that is necessary for the production of food crops. (Comment Number: APHIS-2007-0044-5067-1)

Response: In regard to the Colony Collapse Disorder (CCD) in bee colonies, see the response to comment APHIS-2007-0044-5338-1 for issue 4.0 paragraph 2. In regard to the request to extend the comment period on the DEIS, see the response to comment APHIS-2007-0044-0948-8 for issue 2.4.

Comment Excerpt Text:
THE MINNESOTA HONEY PRODUCERS ASSOC. REPRESENTS 95% OF THE HONEY BEE COLONIES IN MN. OUR MEMBERS ARE BEEKEEPERS OF A FEW COLONIES TO COMMERCIAL BEEKEEPERS OF LARGE NUMBERS OF COLONIES. THIS ORGANIZATION IS OVER 100 YEARS OLD. DURING THAT CENTURY OF BEEKEEPING, OUR SERVICES INCLUDED POLLINATION, EDUCATION, RESEARCH, AND PROMOTION. WE CONTINUE THAT TRADITION TODAY. THE MHPA IS STRONGLY OPPOSED TO APHIS GRANTING THE PETITION BY FORAGE GENETICS INTERNATIONAL AND MONSANTO FOR NONREGULATED STATUS OF GENETICALLY ENGINEERED GLYPHOSATE-TOLERANT (GT) ALFALFA J101 AND J163. IF ONE LARGE COMPANY IS PERMITTED TO GAIN A "MONOPOLISTIC CONTROL" OF ALFALFA SEED, MANY FARMERS WILL LOSE THE OPTION OF GROWING ALFALFA FOR HAY OR SEED PRODUCTION. ALSO THE LIABILITY FOR INTRODUCTION OF GT ALFALFA INTO THE ENVIRONMENT SHOULD BE BORN BY THE COMPANY SELLING THE GT ALFALFA SEED. THE RESULT OF WIDE SPREAD USE OF THESE TOW PRODUCTS J 101 AND J163 WILL BE IMMENSELY HARMFUL TO THE POLLINATORS OF MN. THE ALFALFA FIELDS ARE IMPORTANT FORAGE AREAS FOR FOOD FOR ALL TYPES OF BENEFICIAL POLLINATORS. IN ADDITION, KILLING THE WHITE DUTCH CLOVER, ALSIKE, AND OTHER BLOOMING PLANTS WILL HAVE A VERY NEGATIVE AFFECT ON POLLINATORS THAT ARE ALL READY DISAPPEARING AT ALARMING NUMBERS. THE POLLINATORS NEED PRECIOUS NATURAL PLANTS FOR A BALANCED DIET OF FOOD FOR CONTINUED GOOD HEALTH. IIN TURN, WE NEED THE POLLINATORS FOR A CONTINUED FOOD SUPPLY. WHAT MAY APPEAR TO BE A MOVE FORWARD IN SCIENCE, COULD BE A MOVE BACKWARD IN TERMS OF THE GOOD FOR OUR PLANET. AGAIN, TO RESTATE OUR POSITION, THIS ORGANIZATION IS IN OPPOSITION TO GRANTING THIS PETITION. RESPECTFULLY SUBMITTED, DARREL J. RUFER, PRESIDENT OF THE MN HONEY PRODUCERS ASSOC (Comment Number: APHIS-2007-0044-5287-1)

Response: APHIS acknowledges the comment. APHIS' analysis of impacts of GT deregulation on honey producers in the DEIS has been expanded in section 3.2.2 of appendix S of the FEIS to consider the potential impact on honey producers through changes in seed markets and the demand for pollination services. Regarding the legal liability for unintentional presence of GE content in non-GE crops, see the response to comment APHIS-2007-0044-6376-1 for issue 5.1.In regard to the Colony Collapse Disorder(CCD) in bee colonies, see the response to comment APHIS-2007-0044-5338-1 for issue 4.0 paragraph 2.

Comment Excerpt Text:
The following comments pertaining to the registration of glyphosate tolerant Alfalfa are submitted by the National Honey Bee Advisory Board (NHBAB). The NHBAB was formed approximately one year ago by the American Beekeeping Federation and the American Honey Producers Association in order to address issues of concern related to bees and pesticides. At the annual conventions of both the American Beekeeping Federation and the American Honey Producers Association in January 2010, motions were made and passed to oppose the registration

of Genetically Modified Alfalfa. Alfalfa is a crop with widespread usage from coast to coast. Honey bees rely on these fields both for the nectar and pollen from the alfalfa plants as well the other blooming species of plants in the fields. Pollinators today are imperiled. Managed honey bee colonies have experienced excessive losses affecting the very viability of an entire industry. The specific reasons for this general decline, as well as the specific reasons for the phenomenon of CCD has received much media attention yet still remains as undiagnosed. Genetically modified plants are a very new technology. Due to the novel and largely untested nature of the technology, questions are raised as to the safety of their use. Utilizing the "precautionary principle," many countries, including Japan and the EU, will not allow GM products. Nectar and pollen produced by these plants have never been fully tested to determine their effects on the pollinators that are attracted to and feed upon them while accomplishing the essential function of pollination.When weighing all the considerations of such a new and untested technology, it is important to do a risk/benefit analysis. Allowing the genetically modified seed will allow a particular company to sell their trademarked product for corporate profit. Farmers will be able to apply Roundup to remove non GM plants from their field. Pollinators will be exposed on a national scale to an additional potential danger, at a time when we may already have reached a tipping point.
The National Honey Bee Advisory Board believes that the "risks" are too great, and the potential "benefits" too small to allow the widespread use of genetically modified alfalfa at this time. We believe that approval of this product would negatively impact pollinators when we are already experiencing alarming decline. The request for Nonregulated Status for Glyphosate-Tolerant Alfalfa should be denied, and existing fields of Genetically Modified alfalfa should be destroyed. (Comment Number: APHIS-2007-0044-8406-1)

Response: Regarding impacts on honey producers, see the response to comment APHIS-2007-0044-5287-1 for issue 5.9. In regards to the Colony Collapse Disorder (CCD) in bee colonies, see the response to comment APHIS-2007-0044-5338-1 for issue 4.0 paragraph 2.

Comment Excerpt Text:
We urge not only that the Request for Nonregulated Status for Glyphosate-Tolerant Alfalfa Events J101 and J163 be denied, but also that existing plantings of GT alfalfa be destroyed. About one-third of our food supply depends upon pollination, which is provided by both managed honey bee colonies as well as native pollinators. Both of these benefit from alfalfa that is left to bloom. Common alfalfa is grown by farmers in many states, and those farmers allow a significant amount of the common alfalfa to mature to bloom and produce seed, providing nectar and pollen forage for pollinators in the area.
Alfalfa is an important source of nectar and pollen for honey bees. Beekeepers need locations such as alfalfa fields to place their colonies during the pollination "off-season." Nothing prepares honey bee colonies for pollination season as does a good nectar source, such as alfalfa fields. With the pressures on the health of honey bee colonies through problems such as Colony Collapse Disorder, nectar sources such as alfalfa are vital to the health of American honey bee colonies.
Studies have shown that attempts to prevent the flow of pollen from GT alfalfa to conventional alfalfa are impractical. Even the most careful grower will inadvertently allow some GT alfalfa

plants to mature to bloom occasionally. Pollen from those plants will be carried by pollinators to adjacent conventional alfalfa plants (Comment Number: APHIS-2007-0044-9016-1)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for issue 3.1. In regard to the Colony Collapse Disorder (CCD) in bee colonies, see the second paragraph of the response to comment APHIS-2007-0044-5338-1 for issue 4.0.

Comment Excerpt Text:
A Colorado study (Bob Hammon, et.al.) found that GT alfalfa pollen was carried as far as 1.7 miles away to conventional alfalfa plants. The investigators said: "Honey bees were probably the most important species involved in long-distance pollen transport." Then they added: "Most of these bees are apparently feral since only one hobby beekeeper could be located in the area." It is not necessary to have dozens of managed colonies of honey bees nearby to effect the pollen flow. It will be accomplished by bees extant in the area.
If GT alfalfa, a perennial, could be planted near common alfalfa fields, the genetically engineered genes would spread into the plantings of common alfalfa and production of common alfalfa seed may be adversely affected by the presence of GT alfalfa genes and the GT alfalfa genes would spread uncontrollably year after year.
Additionally, we are also concerned that if one large company is permitted to gain "monopolistic control" of alfalfa seed, many farmers will lose the option of growing alfalfa for hay and/or seed production, so the beekeeping industry will then suffer loss of alfalfa acreage that may be left to bloom and loss of "goodwill" of the land owners where the bees are located
Again -- we urge not only that the Request for Nonregulated Status for Glyphosate-Tolerant Alfalfa Events J101 and J163 be denied, but also that existing plantings of GT alfalfa be destroyed (Comment Number: APHIS-2007-0044-9016-2)

Response: APHIS acknowledges the comment. Regarding impact on the honey industry, see response to comment APHIS-2007-0044-5287-1 of issue 5.9. In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
The EIS assumes that pollinating insects, like bees can be controlled in nature. These insects travel many miles to collect and deposit pollen and the idea that farmers can control their neighbor's beehive locations or natural movement of insects is short sighted.

The EIS also failed to analyze the impact of introduction and widespread use of GM alfalfa (and the associated increase in the use of Roundup on alfalfa fields) on bees and on both conventional and organic honey producers. (Comment Number: APHIS-2007-0044-9882-13)

Response: APHIS acknowledges the comment. Regarding impact on the honey industry, see response to comment APHIS-2007-0044-5287-1 for issue 5.9. In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

6.0 Issue 6 – Human Health and Safety Impacts

Comment Excerpt Text:
It is unfortunate that continual public support for the elimination of Genetically Modified Organisms has fallen on deaf ears when it comes to the U.S. government.
However, I still wish to be among those citizens that voice their dissaproval of GMO's. With the blatant lack of independent (i.e. not Monsanto or other in-house) human health and safety testing, and the rise in food-related allergies, autism, obesity, etc. it would be who of the government to MAKE ABSOLUTELY certain that GMO's are NOT responsible for allergic reactions and other negative effects on the body as a result of consumption.
We are talking about the manipulation of genes, genes which code for the subsequent expressions of proteins, etc. How, with good conscious can the government rule that there is "no significant difference" between traditional breeding methods and transgenic methods?
It is with great hope that I submit to you my vote for the continuation of "REGULATION" on Glyphosate Tolerant Alfalfa (Comment Number: APHIS-2007-0044-0278-1)

Response: Regarding the commenter's statement about a need for independent human health and safety testing of GT alfalfa, section I.B of the DEIS described how three federal agencies are responsible for regulating biotechnology in the United States: USDA's APHIS, the U.S. Department of Health and Human Services' Food and Drug Administration (FDA), and the Environmental Protection Agency (EPA). The APHIS Biotechnology Regulatory Service's (BRS) mission is to protect America's agriculture and environment using a dynamic and science-based regulatory framework that allows for the safe development and use of genetically engineered organisms. FDA is responsible for ensuring the safety and proper labeling of all plant-derived foods and feeds, including those developed through genetic engineering such as glyphosate-tolerant alfalfa. EPA uses a registration process to regulate the sale, distribution, and use of pesticides in order to protect health and the environment. This registration process includes the registration of pesticides that are produced by organisms developed using techniques of modern biotechnology.

The comment does not include any specific sources for the statement about food-related adverse health effects, and thus APHIS cannot validate the accuracy of the comment. Section IV.E of the DEIS, however, provided an extensive analysis of potential adverse health effects and concludes that the current weight-of-evidence from similar GE crops such as GT wheat, GT soybean, GT corn, GT cotton, and GT sugarbeet suggests that the transgenic CP4 EPSPS protein present in GT alfalfa poses negligible risk to humans, livestock, and wildlife. Furthermore, most studies available in the scientific literature support the view that food from GT crops is substantially equivalent to non-transgenic crops. This section of the DEIS also provided an extensive analysis of glyphosate herbicide use—which might increase in response to the availability of GT alfalfa—and concludes that the use of this herbicide does not appear to result in adverse health effects. Furthermore, as addressed in an updated analysis in FEIS appendix V of potential changes in herbicide use due to the deregulation of GT alfalfa, there might be an overall decrease in the amount and number of other more toxic and persistent herbicides, which in turn would result in less overall risk to human health and the environment. See the response to comment APHIS-2007-0044-6240-2 for Issue 6.0 for additional discussion of this issue.

Comment Excerpt Text:
as an industry we need to have the roundup ready alfalfa back for use as soon as possible. This technology has many use including waterway protection buffer strip use for clean water in stream and rivers and for the dairy industry that needs top quality feed for the animals free of weed and grass to produce the most milk for comsumption at a time when this industry has seen lower price for milk and alot of growers leaving the industry because of finicial inpacts.I have been in the ag field for 30 years and have seen the reduction of chemical use because of the roundup technology with no harm to the enviroment or humans. (Comment Number: APHIS-2007-0044-0280-1)

Response: APHIS acknowledges the comment and notes that it is supported by section IV.E of the DEIS, which concludes that although glyphosate use will likely increase, there also might be an overall decrease in the amount and number of other more toxic and persistent herbicides, which in turn would result in less overall risk to human health and the environment. See the response to comment APHIS-2007-0044-6240-2 for Issue 6.0 for additional discussion of this issue.

Comment Excerpt Text:
I live in North Central Iowa, teach at North Iowa Area Community College in a Health Program and am extremely concerned about the prospects of Round-Up Ready (RR) alfalfa and the impact it would have on the health and well-being of my family, my neighbors, and farmers. From my perspective, Big Ag bureaucrats do not stop to think about the true environmental impact, soil health, human health, and the overall health of all living things when making decisions about approving the use of a product such as this.
I agree with many of my friends and family who believe that dollar signs drive this enterprise, not compassion, and most certainly NOT a concern for human health.
There are studies which show that nutritional value declines in GM crops; that the Cauliflower Mosaic Virus used in DNA recombination of RR crops is disruptive to the intestinal flora and reactivates other dormant pathogens in livestock. RR species have proven to be adeptly promiscuous in spreading their genetics, and if allowed will compromise all pure seed supplies of alfalfa in only a handful of years. Round-Up has proven toxic to amphibians and pollinators, two integral components of healthy wetlands and prairies.
Then there is just what my logical cognition tells me to be concerned about, which is that the pesticides infused in these GMO products are NOT a good thing to have in our food system. We dont yet understand the full impact of how products such as RR crops can affect the health of all living things and until we understand, it would only make common sense to NOT allow their use. If you even suspected someone was poisoning you, would you just sit there and wait to see what the outcome might be?
I encourage that a decision be made based on the current research data and the potential for harm that products such as this could have. We need to consider what type of an environment we are passing on to future generations, one that is healthy or one that has been modified and

compromises the health of all living things. I stand against RR alfalfa. (Comment Number: APHIS-2007-0044-0382-1)

Response: See the response to comment APHIS-2007-0044-0278-1 for Issue 6.0 regarding the regulatory oversight, decision-making process, and scientific study results related to the human health and safety of GT alfalfa.

The commenter refers generally to studies that they claim show a decline in the nutritional value of GM crops, but no specific studies are cited and thus APHIS cannot validate the accuracy of the comments. The DEIS, however, cites reviews on the nutritional quality of GE foods in general and GT alfalfa in particular and concludes that there is no significant nutritional difference in conventional versus the GE plants for food or animal feed (see DEIS Sections III.D and IV.E).

The reference to the cauliflower mosaic virus is unclear, and the commenter does not cite any specific studies so that APHIS can validate these comments. This comment might be referring to the non-coding 35S promoter from the figwort mosaic virus. If so, as discussed in section 1 of appendix W of the DEIS, the non-coding 35S promoter is from the plant pathogen figwort mosaic virus and serves a purely regulatory function for the EPSPS gene. See the second paragraph of the response to comment APHIS-2007-0044-0278-1 for Issue 6.0 for a discussion of the health and safety of GT alfalfa.

In regard to gene flow, see the response to comment APHIS-2007-0044-12026-7 for Issue 3.0.

Regarding the concern expressed by the commenter that pesticides are infused within GT alfalfa, if the commenter is implying that GT alfalfa contains a pesticide resulting from the action of the genetically modified gene, this is not the mechanism in which this product works. Rather, the genetic modification results in a product that is tolerant to the herbicide glyphosate. If the commenter is referring to residual glyphosate found in GT alfalfa crops because of the use of glyphosate on the alfalfa, the overall health impact of exposure is thoroughly analyzed in Sections III.D.2, IV.E.3, and appendix L of the DEIS. These sections concluded that based on the EPA toxicological, ecotoxicological, and fate data reviews, as well as on the APHIS supplemental reviews, glyphosate is considered to be a low-risk herbicide and exhibits low oral and dermal acute toxicity in humans. The general public is not at a high risk of exposure to substantial levels of glyphosate under typical conditions. Appendix L of the DEIS provided a detailed and conservative risk assessment of glyphosate and its only known metabolite, aminomethylphosphonate (AMPA). Additionally, growers are not allowed to use GT alfalfa for sprouts (DEIS section III.A.1), and thus sprouts should not be an exposure pathway for glyphosate. Similarly, other uses of alfalfa for human consumption (e.g., supplements) are subject to regulations regarding pesticide residues. Thus human exposure to GT alfalfa should be minimal and within acceptable levels. And although glyphosate use will likely increase as a result of GT alfalfa deregulation, there might also be an overall decrease in the amount and number of other more toxic and persistent herbicides, which in turn would result in less overall risk to human health and the environment (see DEIS section IV.E). See the response to comment APHIS-2007-0044-6240-2 for Issue 6.0 for additional discussion of this issue.

Comment Excerpt Text:
As a biochemist by education, I find it appalling that GMOs are being pushed into our fields and foods here in the United States. Evidently, no one checks on the German farmers who have found their lands sterile after using seeds from Monsanto and they are not the only country. If such organism can sterilize soil, what can it also do to the inner workings of the human body. We eat the meat and drink the milk from animals who are feed alfalfa. This must be stopped before it cause a complete breakdown in the safety of our food chain. (Comment Number: APHIS-2007-0044-0385-1)

Response: In regard to the commenter's concern about land sterility, see the response to comment APHIS-2007-0044-0385-1 for Issue 8.1. In regard to the commenter's concern about human health and safety, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for Issue 6.0.

Comment Excerpt Text:
Comment on the Environmental Impact Statement on Genetically Modified Alfalfa on Absence of Glyphosate Human Health Impact
The Environmental Impact statement on genetically modified alfalfa prepared by the United States Department of Agriculture Animal and Plant Health Inspection Service (USDA/APHIS) was very extensive covering 1476 pages. Many issues were considered in the document. Among many conclusions the Imapct statement concluded ' APHIS has reliminarily concluded in this Draft Environmental Impact Statement (DEIS) that granting nonregulated status to glyphosate-tolerant (GT) alfalfa lines J101and J163 will not result in significant impacts to the human Further, the impact statement concludes 'the use of glyphosate herbicide does not appear to result in adverse effects on development, reproduction, or endocrine systems in humans and other mammals. Under present and expected conditions of use, glyphosate herbicide does not pose a health risk to humans'. Those conclusion were arrived at through by studying bureaucratic reports from government agencies and from a a number of older peer reviewed studies, In the past few years a number of peer reviewed article such as those of a research group in Caen University, France , were not mentioned in the assessment but should have been mentioned.
Glyphosate Human Toxicity: Glyphosate based herbicides are toxic and endocrine disrupters These impacts appeared at very low concentrations of the herbicide. The main targets for cell damage included membrane, energy metabolism and programmed cell death involing nuclear DNA fragmentation.(1,2). Glyphosate formulations induce apoptosis and necrosis in human umbilical , embryonic and placental cells the adjutants in herbicide formulations are not inert but contribute to the herbicide toxicity (3,4,5). Glyphosate is implicated in oxidative stress in liver and brain (6).Glyphosate has been proven teratogenic in rats and the implication for humans is clear (7,8).
Roundup (glyphosate formulation) effects human reproduction and fetal development in case of contramination based on studies employing human embryo cells (9) Glyphosate formulations effect cell cycle regulation. Which in turn effects chromosome stability according to studies with sea urchin cells in culture(10). Glyphosate caused alteration in estrogen regulated genee expression in humans as determined by powerful micro array analysis (11). Glyphosate breaks and damages the chromosomes in bone marrow cells of mice (12). Glyphosate damages and

breaks the chromosomes of normal and cancerous human cells in culture (13). The genotoxicity of glyphosate is well supported by the studies listed. That fact should be recognized by APHIS not denied.

The main breakdown product of glyphosate is aminoethylphosphoric acid (AMPA). That product accumulates in a treated hepatocellular carcinoma cell line and is genotoxic is such cells. The genotoxicity was well established (14). APHIS denies that glyphosate and its breakdown product is genotoxic but did not provide any indication that they had studied the scientific literature.

An epidemiologic study o f Swedish people exposed tio glyphosate showed that the herbicide exposure doubled the risk of non-Hodgkin lymphpma with a ten year latency periode (15). Aphis does not acknowledge that study, but they should. Studies of glyphosate induced cancer in mouse skin show that the herbicide is a powerful promoter of cancer (16). A clinical study of an accident describes a 26-year-old teacher who used glyphosate correctly but suffered from severe dysphonia after some hours. Laryngostroboscopy revealed decreased vocal fold mobility suggesting innervation impairment. The symptoms resolved spontaneously 6 weeks later and vocal fold mobility returned to normal. Glyphosate neurotoxicity has been discussed in the literature therefore, the dysphonia observed here may have been due to an intermittent neuropraxia of the laryngeal nerve(17)

Conclusion: Draft Environmental Impact Statement; Determination of Regulated Status of Alfalfa Genetically Engineered for Tolerance to the Herbicide Glyphosate paints a pretty picture of harmlessness of glyphosate. Inexplicably numerous studies showing adverse effects of the herbicide were overlooked in the final report by APHIS. In spite of its gigantic volume the impact overlooked crucial studies that impact on human health. The 1476 pages of the report would have been much larger had APHIS included the numerous peer reviewed publications which contradicted or failed to support the APHIS conclusion that glyphosate exposure following treatment of the glyphosate resistant alfalfa is not harmful to humans. On top pf the information on human injury from glyphosate exposure both domestic and wild animals may be injured by exposure to glyphosate. The draft report must be enhanced by the addition of those studies on the toxicity of glyphosate that do not agree with their conclusions about the safety of the herbicide.

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(Comment Number: APHIS-2007-0044-10525-1)

Response: The commenter refers to numerous papers, some of which are from peer-reviewed scientific journals and some of which are not. Most of the peer-reviewed journal articles are in vitro, meaning they are conducted using cell lines and similar approaches in an artificial environment outside the living organism. Such studies are useful for screening and prioritization purposes (e.g., for designing in vivo studies), but they have the major limitation of requiring extrapolation of the in vitro results to the in vivo situation that humans experience in order to reach the commenter's conclusions, especially in cases such as glyphosate where in vivo tests have already been conducted and have demonstrated relatively low overall toxicity. In vivo studies, the chemical form and dose can change in the intestine during digestion, uptake, metabolism, and excretion, and be mediated by adsorbed proteins, detoxification processes, and various immune and other protective responses, all of which affect the dose and form of the chemical that ultimately comes in contact with the cell. An affected cell in turn is then subject to possible repair and other protective mechanisms before the potential for adverse health effects is realized. Many of the studies cited by this commenter also only used glyphosate formulations, which include surfactants and other ingredients. These raise the question about what chemical is actually being studied and causing the effects. Furthermore, applying these formulations directly to cell lines is a very different situation for the cells in terms of the types and concentrations of chemicals compared to what the cells would be exposed to after oral, inhalation, or dermal uptake, metabolism, etc. For example, the paper by Hokanson et al. (2007) used a retail formulation of glyphosate on an in vitro cell line and analyzed the results via DNA microarray. The concentration of glyphosate product used during the experiment was described only as a

percentage and dilutions of the percentage. The exact formulation was not provided, nor was the concentration of glyphosate or surfactant in the product described. Therefore it is not possible for APHIS to determine if glyphosate alone, or other chemicals in the retail formulation are the causal factors for the results found in the study. The authors did not take into consideration that the surfactant and other inert ingredients can adversely affect membrane permeability and cell line behavior in their study. The studies conducted by George et al. (2010), Marc et al. (2004), and Prasad et al. (2009) had a similar issue in that the surfactant or other ingredients in the particular formulations used could have produced the reported effects. Several of these studies also explicitly refer to the effects as being due to glyphosate, not the formulation, which unfortunately gives an appearance of obfuscation and at best obscures the results. The paper by Gasnier et al. (2009) describes an in vitro study that includes four different formulations containing glyphosate plus surfactant and inert ingredients. The authors did also expose the cells to non-formulated glyphosate, but they note that "[glyphosate] alone had no anti-estrogenic activity but was clearly anti-androgenic at sub-agricultural…dilutions" without clearly defining what is meant by "sub-agricultural," which is problematic given the issues of extrapolation from in vitro to in vivo, including for dose, noted above.

In vivo studies also must be interpreted with care. For example, Prasad et al. (2009) used an intraperitoneal delivery approach, which deviates from actual exposure scenarios. The in vivo studies, such as Astiz et al. (2009) and Dallegrave et al. (2003), actually are similar to the studies cited in the DEIS that used doses that do not correspond to human exposure, but nevertheless were used by EPA for their determinations, including to develop the reference dose (RfD) guidelines.
APHIS also notes that regarding endocrine disruptor potential, in late 2009 EPA issued the first test orders for pesticide and other chemicals, including glyphosate, to be screened for their potential effects on the endocrine system (Federal Register: October 21, 2009, Volume 74, Number 202). EPA notes that because this list of chemicals was selected on the basis of exposure potential only, it should not be construed or characterized as a list of known or likely endocrine disruptors. See the response to comment APHIS-2007-0044-5831-1 for Issue 6.0 for more on this topic.

Regarding studies reporting an association between glyphosate and non-Hodgkin lymphoma (NHL) or other cancers, the DEIS (section 3.1.10 of appendix L) notes that EPA concluded that the studies reviewed to date did not establish a definitive link to cancer and the results were based on unverified recollection of exposure; as a result, the EPA maintained its classification of glyphosate as a Group E carcinogen. A more recent study, by De Roos et al. (De Roos, A.J., Blair, A., Rusiecki, J.A., Hoppin, J.A., Svec, M., Dosemeci, M., Sandler, D.P., Alavanja, M.C. Cancer incidence among glyphosate-exposed pesticide applicators in the Agricultural Health Study (2005) Environmental Health Perspectives, 113 (1), pp. 49-54), concluded that there was no association between glyphosate exposure and "all cancer" incidence or most of the specific cancer subtypes they evaluated, including NHL, whether the exposure metric was "ever used," cumulative exposure days, or intensity-weighted cumulative exposure days. The most consistent finding in their study was a suggested association between multiple myeloma and glyphosate exposure. But as the authors appropriately note, certain limitations of their data—such as the small number of cases (and thus low statistical power), self-reported exposure information (which leads to recall bias), and known association of multiple myeloma with farming

occupation in general—hindered the inferences they could make regarding glyphosate and its association with specific cancer subtypes. These limitations are seen in other epidemiology studies as well, making interpretation difficult. For the recent case-control study by Eriksson et al. (2008) in particular, exposures were assessed by questionnaires with information supplemented over the phone, which raises classic recall bias complicated further by interviewer bias. Unfortunately, these biases were not addressed in the paper. Bolognesi et al. (Bolognesi, C., Carrasquilla, G., Volpi, S., Solomon, K.R., Marshall, E.J.P. Biomonitoring of genotoxic risk in agricultural workers from five Colombian regions: Association to occupational exposure to glyphosate (2009) Journal of Toxicology and Environmental Health - Part A: Current Issues, 72 (15-16), pp. 986-997) used an improved exposure assessment using cytogenetic biomonitoring and concluded that the genotoxic risk potentially associated with exposure to glyphosate in the areas where the herbicide is applied for eradication of coca and poppy is of low biological relevance, but this study only examined short-term exposure.

Appendices L and M of the FEIS provide an updated discussion of glyphosate exposure and health effects. The issues and references noted by comments are analyzed in these sections of the DEIS.

Comment Excerpt Text:
Comments on document ID APHIS-2007-0044-0253 “Glyphosate-Tolerant Alfalfa Events J101 and J163: Request for Nonregulated Status -- Draft Environmental Impact Statement”

…The government policies on regulating GE foods are fundamentally flawed. The FDA guidelines, for instance, say GE foods must be thoroughly tested, but the biotech companies themselves determine whether their products are safe or whether they “warrant analytical or toxicological tests.” Even if companies acknowledge safety questions, “consultations” with the FDA are only voluntary. …

…A European study [International Journal of Biological Sciences] also found health impacts on the liver, kidneys and other organs from three varieties of Monsanto's GE corn. Researchers from Caen and Rouen Universities, and the EU Committee for Independent Research and Information on Genetic Engineering, based their analyses on data supplied by Monsanto to authorities for commercial approval — but they drew different conclusions after a two-year test period, compared to Monsanto's much shorter test period. They found that for all three types of Monsanto's corn, the kidneys and liver — organs that react to poisoning — revealed problems. All three GE corn varieties (Mon810, MON863 and NK603) are approved by the USDA.

These examples raise serious concerns about the current U.S. protocol in reviewing applications for GE permits….

…What the EIS fails to address adequately is the impact of glyphosate’s action on:

1) the physiological functions of plants
2) the soil environment
3) the impact on animals fed RR alfalfa, and

4) human consumption of those animal products, such as milk, butter, yogurt, sour cream, cheeses, ice cream, and meat….

…Accumulates in food and feed products to enter the food chain, raising questions about food safety….

…A group of scientists led by biochemist Prof. Gilles-Eric Seralini from the University of Caen in France found that human cells are very sensitive to Roundup at concentrations lower than those currently used in agricultural applications. As reported by the American Chemical Society last spring [2009], the scientists evaluated the herbicide's effect on human embryonic, umbilical and placental cells and found that all cells exposed were killed within 24 hours. They concluded that residues in food and feed treated with Roundup can be highly toxic.

An epidemiological study of Ontario farming populations showed that exposure to glyphosate nearly doubled the risk of late miscarriages. Seralinii and his team decided to research the effects of the herbicide on human placenta cells. Their study confirmed the toxicity of glyphosate; after 18 hours of exposure at low concentrations, large proportions of human placenta cells began to die. Seralini suggests that this may explain the high levels of premature births and miscarriages observed among female farmers using glyphosate.

Seralini's team further compared the toxic effects of the Roundup formula to the isolated active ingredient, glyphosate. They found that the toxic effect increases in the presence of Roundup "adjuvants." These additives have a facilitating role, rendering Roundup twice as toxic as its isolated active ingredient, glyphosate….

…There has been only one scientific human feeding study done on any genetically engineered food and that involved soy. The results of even that single study raised concerns because the genetically engineered DNA was found to have transferred to bacteria in the stomach, something the biotech industry said would not and could not happen. (The study was done with people who had ileostomies, enabling easy tracking of foodstuffs.) …
(Comment Number: APHIS-2007-0044-11328-1)

Response: In regard to the overall process of health and safety reviews and the potential increase in glyphosate use, see the responses to comment APHIS-2007-0044-0278-1 for issue 6.0.

Regarding the concern about the USDA consideration of the European study in the International Journal of Biological Sciences, APHIS assumes the commenter is referring to the following: de Vendômois JS, Roullier F, Cellier D, Séralini GE. A comparison of the effects of three gm corn varieties on mammalian health. Int J Biol Sci 2009; 5:706-726. Available from http://www.biolsci.org/v05p0706.htm. This study was reviewed extensively by several reputable parties, including the French High Counsel on Biotechnology (HCB) and the Food Standards Australia New Zealand (FSANZ), and have found several significant limitations, concluding that this paper does "not bring any new scientific element to the evaluation of the three GMOs" (HCB) and has "distorted the toxicological significance of [the] results by placing undue

emphasis on the statistical treatment of data, and failing to take other relevant factors into account" (FSANZ).

Regarding concerns about human consumption of glyphosate, see the response to comment APHIS-2007-0044-0352-1 in issue 6.3.

Regarding the concern about accumulation of glyphosate in food and feed products, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0 for a discussion of the health and safety of GT alfalfa.

Regarding the work by Seralini, see the APHIS response above. For a response to the epidemiological database, see the response to comment APHIS-2007-0044-10525-11 for issue 6.0.

Regarding the study reporting gene transfer in humans, see the response to comment APHIS-2007-0044-6620-1 for issue 6.1.

Comment Excerpt Text:
Comments of the Stanislau County Farm Bureau regarding APHIS-2007-0044 - Determination of Regulated Status of Alfalfa Genetically Engineered for Tolerance to the Herbicide Glyphosphate.
…It poses no worker safety issues….

…California farmers and ranchers know the importance of using crop protection products, such as
glyphosate, in a safe and responsible manner….
(Comment Number: APHIS-2007-0044-11621-1)

Response: APHIS acknowledges the comments on health and safety and notes that they are supported by the DEIS, as described in more detail in the response to comment APHIS-2007-0044-0280 for issue 6.0. If used incorrectly, however, glyphosate does pose risks to workers, as described in appendix M of the DEIS.

Comment Excerpt Text:
However, more importantly, I am a human being in a wold where an estimated 14 million children die from lack of dietary protein each year. Roundup Ready alfalfa is just the first in a series of genetic modified alfalfas that can provide promise to end those deaths. Alfalfa produces more protein per unit landmass than any other plant, but it is not digestible to humans, only to ruminant livestock. But alfalfa can be fatal to livestock grazing it due to bloat, therefore use of alfalfa is limited to baled hay, [ILLEGIBLE]
There is under development alfalfa that does not cause bloat. This would allow the use of alfalfa in poor, underdeveloped areas like sub-Saharan Africa which is exactly where protein is most deficient.

Only in a country where obesity runs rampant would we have the audacity to consider shelving technology that could save millions of lives annually from starvation. (Comment Number: APHIS-2007-0044-1851-1)

Response: Although the use of GT alfalfa might benefit global food supplies, as noted in section 4.1 of DEIS appendix K and section 4.3 of DEIS appendix V, the increased returns expected for GT alfalfa farming in the short run may or may not persist in the long run, depending on market considerations (including technological fees), limitations to crop rotation imposed by the adoption of GT alfalfa, and cost impacts of any possible increased weed resistance over time.
Regarding the development of other alfalfa strains that reduce the risk of bloat, note that the levels of saponins and soluble forage proteins in GT alfalfa, both of which are associated with frothy bloat in ruminants, are shown to fall within the ranges that occur in conventional alfalfa varieties (see section 1.6 of DEIS appendix O).

Comment Excerpt Text:
I am VERY concerned that the USDA is allowing any GE Roundup ready product to go to market period! I know that money makes things move but PLEASE you are supposed to be the watchdogs for us. The GE/GM movement is a dangerous road to travel we are fighting more and more cancers every year. The government wants us to be more healthy with climbing medical costs but yet you don't seem to take into account the already completed studies from the Journal of the American Cancer Society and the American Chemical Society that show the links between this chemical and the risks involved. It's time you step up and be the watchdog that you are supposed to be and say NO to any GE or GM crops... Lets put Monsanto any others that want to harm our crops back in their place, out of business. (Comment Number: APHIS-2007-0044-2213-1)

Response: GT alfalfa has been genetically modified to tolerate the herbicide glyphosate, not to contain or generate a pesticide. Assuming this commenter is referring to glyphosate use, however, note that although glyphosate use will likely increase as a result of GT alfalfa, there also might be an overall decrease in the amount and number of other more toxic and persistent herbicides, which in turn would result in less overall risk to human health and the environment (see DEIS section IV.E. See the response to comment APHIS-2007-0044-6240-2 for issue 6.0 for additional discussion of this issue. Furthermore, regarding the studies noted by the commenter, specific sources were not provided, and thus APHIS cannot validate the accuracy of comments regarding risks. Section IV.E of the DEIS, however, provides an extensive analysis of potential adverse health effects – see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0 for more detail.

Comment Excerpt Text:
Dear USDA,
I am an 'organic' consumer and care about the organic industry and the small farmer. I disapprove of growing GE alfalfa and any other GE crop as there are provable links to human cell damage and more specifically non-hodgkins lymphoma, as the Journal of the American

Cancer Society has studied and found. Spraying GE crops threatens the organic farmer with drift from the chemicals, thus damaging sustainable agriculture.
Please know that this organic consumer DOES care about how GE affects the small/organic farmer.
Gretchen McLlarky (Comment Number: APHIS-2007-0044-2243-1)

Response: Regarding the study noted by the commenter, a specific source was not provided. The commenter appears to be referring to a study by Erikkson et al. (2008), however, which is addressed in comment APHIS-2007-0044-10525-1 for issue 6.0. For additional discussion of the health and safety of GT alfalfa, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
Document ID:
APHIS-2007-0044-0253
Document Type: OTHER
Docket ID: APHIS-2007-0044
If I took Roundup, even a drop, and put it in your coffee or any other foodstuff every day and you became ill what would be the legal recourse for my actions? I'd go to jail for poisoning you!! But yet it is allowable for you to not do your job and allow all food stuffs to be not only doused with poison in the field but now to allow the seeds to be genetically altered to contain pesticides. I cannot even fathom how sane people would even consider such actions.
Consider the fact that other countries will not even accept our food imports-and who can blame them? Our farmers are losing income. Why do you not care about these matters? Why do you persist in such irresponsible behavior?
You have lost your perspective-splash some cold water on your face and wake up!
POISON IS NOT BENIGN IN ANY FORM! (Comment Number: APHIS-2007-0044-2244-1)

Response: Regarding the concern that GT alfalfa contains a pesticide, see the responses to comment APHIS-2007-0044-2213-1 for issue 6.0. Regarding the comments about regulatory oversight and the toxicity of GT alfalfa and glyphosate, see the responses to comment APHIS-2007-0044-0278-1 for issue 6.0.
In regard to impacts on international trade, see the response to comment APHIS-2007-0044-3404-1 in issue 5.4.

Comment Excerpt Text:
Dear USDA,
I purchase organic produce and consumables whenever I can and I care about the organic industry and the small farmer. I disapprove of growing GE alfalfa and any other GE crops that will effect Organic crops.The Journal of the American Cancer Society has studied and found there are provable links to human cell damage and more specifically non-hodgkins lymphoma from the cultivation of GE crops. Spraying GE crops threatens the organic farmer with drift from the chemicals, thus damaging sustainable agriculture.

Please know that this organic consumer DOES care about how GE affects the small/organic farmer. (Comment Number: APHIS-2007-0044-2245-1)

Response: See the responses to comment APHIS-2007-0044-2243-1 for issue 6.0.

Comment Excerpt Text:
I am very concerned about the approval of another GE crop in our country. Research has shown that GE crops cross polinate with standard varities and have even contaminated Mexican Land Race crops which are vital to the world food supply security. GE cross polination also allows Monsanto to allege patent infringement on farmers whose standard crops become contaminated unintentionally. In many past cases regarding GE corn, these lawsuits have led to the farmer going out of business in order to settle or pay legal fees. GE crops are also an untested biological phenomenon. Rising numbers of people experience food allergies and sensitivities, and GE crops may be partially to blame.
Finally, GE crops are unnecessary. The number of organic farms is growing nation wide. The world wide demand for organic, non GE crops is huge. Other countries are not interested in importing GE crops and Americans are demanding more and more organic foods. Now is the time to stand with the people and say no to GE alfalfa. Don't let Monsanto further contaminate our earth's food supply. (Comment Number: APHIS-2007-0044-2251-1)

Response: In regard to the comment on food allergies and sensitivities, no correlation has been established between an increase in the numbers of people experiencing food allergies/sensitivities and genetically modified crops. For more information, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

In regard to the commenter's concern about cross-pollination, see response to comment APHIS-2007-0044-0443-1 for issue 3.

Comment Excerpt Text:
Canadian consumers of grassfed beef and pork are health conscious and environmentally conscious. The strong points for pastured meat include its higher proportion of healthy fats and its environmental benefits, such as biodiversity, erosion-prevention, and carbon sequestration resulting from year-round cover – all of which occur when land is grazed rather than cultivated. The infiltration of glyphosate tolerant alfalfa into these lands would compromise the product's health claims, reduce the sector's customer base, and lead to a smaller market and smaller land base for this type of environmentally friendly animal husbandry. (Comment Number: APHIS-2007-0044-2380-4)
Response: Regarding human health with respect to GT alfalfa, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

In regard to impacts on organic farming and downstream markets (e.g., dairy and meat), see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Biotech crops with the Roundup Ready herbicide-tolerance trait, including RR alfalfa, are among the most thoroughly studied agricultural products in history. Countless scientific bodies, including the U.S. National Academy of Sciences, American Medical Association, the UNs Food and Agriculture Organization, and many others have studied biotechnology and concluded that this plant breeding method is at least as safe, and often safer, than most non-biotech breeding methods because the breeder actually knows what gene is being transferred and what gene product the new varieties will produce, and can test them more robustly for safety. (Comment Number: APHIS-2007-0044-2711-4)

Response: APHIS acknowledges the comment. The DEIS supports the comment that the use of GT alfalfa is well studied. Refer to the response to comment APHIS-2007-0044-0278-1 for issue 6.0, which describes the regulatory approach and how the potential risks GT alfalfa and other biologically engineered products have been addressed.

Comment Excerpt Text:
Canadian consumers of grassfed beef and pork are health conscious and environmentally conscious. The strong points for pastured meat include its higher proportion of healthy fats and its environmental benefits, such as biodiversity, erosion-prevention, and carbon sequestration resulting from year-round cover – all of which occur when land is grazed rather than cultivated. The infiltration of glyphosate tolerant alfalfa into these lands would compromise the product's health claims, reduce the sector's customer base, and lead to a smaller market and smaller land base for this type of environmentally friendly animal husbandry. (Comment Number: APHIS-2007-0044-2741-6)

Response: The commenter refers to the benefits of pasture fed meats, which the commenter claims would be lost due to the infiltration of GT alfalfa. The commenter does not include citations, however, and therefore APHIS cannot comment on validity of the information. See the response to comment APHIS-2007-0044-9882-1 for issue 5.0, however, for more information on the impacts on organic farming and markets. .

Comment Excerpt Text:
I am strongly opposed to the use of any GE foods...especially those fed to animals that produce milk and meat for my family and I to consume on a daily basis. Too many products have preservatives or have been modified scientifically. This truly effects our bodies. I was diagnosed with Stage IV pre-cancerous cervical cells one year ago. My doctor informed me to "clean up" my diet. I was never one to indulge in fast food or junk food but many of the products I was purchasing has loads of ingredients i couldn't even pronounce. After only six months of eating truly clean (organic) and cutting out everything with preservatives/GE foods, I am happy to say my body has healed itself. Every one of my cells is perfectly healthy and now I can try to have children. I ask you to please not allow GE alfalfa or any other modified products to be introduced on organic farms. For the overall health and safety of myself, my future children and others...please do not approve ANY GE products for commercial use.

Thank you for your time and consideration of this important matter. (Comment Number: APHIS-2007-0044-2756-1)

Response: APHIS acknowledges the comment. In regard to the health effects of glyphosate and GT alfalfa, APHIS concluded in the DEIS that GT alfalfa has no adverse effects on human health, as discussed in the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
Since 1992 when this food went on the market I have extreme difficulty getting pregnant. I have a very delicate system. I can't even take most medicines. I am afraid for my daughters as I may never have grandchildren because of GM foods.
Read my report. I also personally know several farmers in Louisiana who have been bullied by Monsanto. Stop this monopoly on our food system and let us go back to the way America intended. It is destroying us from the inside out! (Comment Number: APHIS-2007-0044-2840-1)

Response: GT crops have not been shown to cause infertility. Furthermore, the report submitted by the commenter is about genetically modified organisms in general, not GT alfalfa. Specific sources about the health and safety of GT alfalfa are not provided, and thus APHIS cannot validate the claims made by the commenter. See the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0 for more details regarding the health effects of glyphosate and GT alfalfa. APHIS has concluded that GT alfalfa has no adverse effects on human health.
In regard to the monopoly comment, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0.

Comment Excerpt Text:
Please DO NOT approve the commercial use use of Genetically Engineered "Roundup Ready" Alfalfa. In a study released by the International Journal of Biological Sciences, analyzing the effects of genetically modified foods on mammalian health, researchers found that agricultural giant Monsanto's GM corn is linked to organ damage in rats. (Comment Number: APHIS-2007-0044-2844-1)

Response: Sections III.D.1, IV.E. and appendix P of the DEIS provide health risk analysis and information about the CP4 EPSPS protein (unique component) found in GT alfalfa. Appendix P of the DEIS states that the CP4 EPSPS protein is functionally equivalent to native plant EPSPS protein except for its affinity for glyphosate. APHIS considered the results obtained in the commenter's attached citation in the response to comment APHIS-2007-0044-11328-1 for issue 6.0.

Comment Excerpt Text:
First, genetic modification of any living thing wherein foreign DNA from another organism is forcibly implanted into another organism of a completely different species violates the most

fundamental laws of the natural world as we know it. The process of genetic modification as previously described is something that would never happen under natural breeding conditions. The audacity of anyone to claim that genetic modification would have no significant impacts on the environment to say nothing of the effects on the animal, insect or human populations is beyond belief. While many will say that alternative breeding technologies have enabled great trait advancements in animals and humans such as artificial insemination (AI) and embryo transfer (ET), these technologies do not combine DNA from one species with the DNA from another or alien species to form an entirely new organism that has never existed before. These "new" organisms express their genes differently than the animals or plants that have been bred for thousands of years, sustaining our planets population. While there is abundant research illustrating the properties of traditionally bred plants and animals, there is virtually no research showing that genetically modified (GM) alfalfa is as safe as traditionally bred alfalfa. Genetically modified alfalfa has only been around for just a very short time and although the environmental impact statement (EIS) states that there are no significant health or environmental risks, the brevity of the research with no long-term testing on animals, insects, or humans cannot possibly support the conclusion that GM alfalfa should be released on a wide scale. Is it prudent to massively disseminate a product that replicates itself when the long-term effects are still unknown? More especially, what will be the effects on children who are highly sensitive to fundamental changes in their diet?
Second, as mentioned in the previous paragraph, the EIS states there are no significant deleterious effects on livestock when genetically modified alfalfa was fed to dairy cows. How long was this study conducted? Certainly studies over four or five years may only show acute effects on living organisms that consume such a product, but there appears to be a lack of long-term research showing the same null effects on animals, insects, or humans either directly consuming or indirectly consuming the product of genetically modified alfalfa. Also and perhaps most importantly, who funded the research to show that there were no significant effects from feeding GM alfalfa - Monsanto? The more I dig into this issue, the more I find that Monsanto scientists did the research with virtually no government co-testing to ensure that Monsanto's findings were true and unbiased. Certainly if this is the case with GM alfalfa, there is a huge lack of oversight on the part of APHIS and the USDA to allow a corporation to certify their own product as safe without any third party verification of the results. (Comment Number: APHIS-2007-0044-3548-1)

Response: Specific sources about the health and safety risks of GT alfalfa have not been provided by the commenter, and thus APHIS cannot validate the claims being made. Note, however, that the human health and safety of GT alfalfa – including in children – have been studied in depth by APHIS, as described in the response to comment APHIS-2007-0044-0278-1 for issue 6.0. Similarly, APHIS has studied human health and safety via exposure to food from animals – see the response to comment APHIS-2007-0044-11034-2 for issue 6.1. For both areas, APHIS has concluded that GT alfalfa has no adverse effects on human health.

Comment Excerpt Text:
Alfalfa is consumed by humans in supplements, herbal teas, as sprouts, and indirectly in animal milk and meat. Given the potential for human exposure through unintended GT alfalfa transgene escapes - a concern echoed by USDA in the environmental impact statement (EIS) - we

recommend that chronic safety testing of GT alfalfa should be carried out in advance of any additional planting to investigate the toxicity of the
transgenic CP4 EPSPS protein in GT alfalfa. Acute toxicity of GT alfalfa was reported in the EIS, but these data were not publically available for scrutiny by others not involved in the report. The concerns with GT alfalfa in food are analogous to the lack of scientific consensus around the toxicity of Monsanto's transgenic corn, based on two reanalyses of Monsanto corn toxicity data in rats (Séralini et al., 2007; de Vendômois et al., 2009). (Comment Number: APHIS-2007-0044-3576-2)

Response: See responses to comments APHIS-2007-0044-0677-1 for issue 6.1, APHIS-2007-0044-9547-1 for issue 6.0, and APHIS-2007-0044-0382-1 for issue 6.0 for more information about direct and indirect exposure to GT alfalfa transgene. Furthermore, note that growth of GT alfalfa for sprouts is not allowed by Monsanto and are enforced through signed agreements between Monsanto/Forage Genetics International and purchasers of GT alfalfa. Therefore human exposure should be minimal. See response to comment APHIS-2007-0044-0677-1 for issue 6 about direct and indirect exposure to the GT alfalfa transgene. Regarding the erroneous reporting of acute toxicity in the DEIS, see the response to comment APHIS-2007-0044-11034-2 for issue 6.1. In regard to the chronic and acute toxicity of CP4 EPSPS in general, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0 and see the response to comment APHIS-2007-0044-9204-3 for issue 6.0. In regard to citations provided in the comment, see response to comment APHIS-2007-0044-11328-1.

Comment Excerpt Text:
In addition i want to know the long term effects on the health and welfare of the people who eat the cows feeding on this crop. We now know that FDA and USDA have ignored long term effects on our health in order to benefit corporate gain. (Comment Number: APHIS-2007-0044-3781-2)

Response: APHIS has studied human health and safety via exposure to food from animals – see the response to comment APHIS-2007-0044-11034-2 for issue 6.1. APHIS has concluded that GT alfalfa has no adverse effects on human health.

Comment Excerpt Text:
The study I've attached shows evidence that GM corn of the roundup ready and BT variety causes organ damage in mammals. They don't know if it's from chemical residue or genetic material that becomes mutated in the gut, but there is damage to several organs, mostly those involved in filtering. I think it would be prudent to not approve GM alfalfa. (Comment Number: APHIS-2007-0044-4102-2)

Response: APHIS acknowledges the comment. Regarding the commenter's concerns about evidence that GM corn is linked to adverse health effects, see response to comment in APHIS-2007-0044-11328-1.

Comment Excerpt Text:
Your stated mandate is to protect American agriculture and to support the co-existence of all types of agriculture. I, Gisele, of "The People" further mandate you to take all necessary actions to include a future that is irrefutably supportive of a healthy food supply and thriving communities.
In this case, this will take the form of setting regulations that are heavily biased toward protecting organic and alfalfa farmers and conventional exporters from contamination by RR Alfalfa. We are not here to support Monsanto! Monsanto is here to support us, and, in the long run, can only thrive by doing so. (Comment Number: APHIS-2007-0044-4201-2)

Response: APHIS acknowledges the comment and notes that the regulatory process and analysis of health effects related to GT alfalfa are addressed in the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
I have been an organic farmer for over 40 years. I also eat Organic meat. What that means is that I do not want ANY of my food to be genetically engineered. There are fewer vitamins and minerals in GE food. It wouldn't surprise me if some of our current obesity were to be linked with GE food.
There is NO way to contain GE alfalfa pollen; therefore, IT SHOULD NOT BE PLANTED.

We continue to give Monsanto power over ALL of our grown food. They are a "for profit" corporation and they do NOT care about the health of those they affect.
PLEASE look closely at ALL types of GE and decide to STOP this now, before it is too late. (Comment Number: APHIS-2007-0044-4202-2)

Response: In regard to the health effects of glyphosate and GT alfalfa, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0. APHIS has concluded that GT alfalfa has no adverse effects on human health.
In regard to the nutritional quality of GE foods, see the response to comment APHIS-2007-0044-0382-1 for issue 6.0.
In regard to the commenter’s concern about preventing GT alfalfa gene flow due to pollen, see response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
Please do NOT approve genetically altered alfalfa for use. Those of us who care about what we eat and how it is produced will be ingesting this alfalfa even if we stick to organic products. Because alfalfa is so widespread in the feedstocks of many animals, the repurcussions of allowing genetically altered alfalfa will rapidly spread beyond those who don't care about ingesting this product to those of us who really don't want this junk in our diet. Have you done any studies or are you depending on the industry to tell you it is safe? Have the sutdies been REALLY long term and gone beyond a short time to see what happens when this product interacts from a variety of food sources over a long time period. Don't play with my health PLEASE. (Comment Number: APHIS-2007-0044-4203-1)

Response: APHIS has conducted extensive reviews of all of the credible scientific evidence regarding the human health effects of GT alfalfa, including long-term use, and has concluded that GT alfalfa has no adverse effects on human health. See the response to comment APHIS-2007-0044-0278-1 for issue 6.0 for additional information.

Comment Excerpt Text:
I oppose approval of the deregulation of GE Alfalfa. I am highly concerned about possible contamination of organic farms and largely about the potential increase in the use of Roundup on the GE crops. I don't believe food should be artificially engineered to withstand higher doses of chemical application. In addition this appears to unfairly benefit a large multinational corporation which profits from chemical pesticide sales while harming the smaller organic producers at the heart of our country. I do not believe it is the role of the government to condone a commercial application which has the potential to directly harm other producers, especially when such a product has side effects that are detrimental to our environment and food supply. Even as govt rhetoric is pushing "green" environmental choices and "healthy eating" for our obese children, it would be hypocritically acting otherwise. (Comment Number: APHIS-2007-0044-4206-1)

Response: In regard to human health effects of GT alfalfa, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0. Regarding glyphosate use, although it will likely increase as a result of GT alfalfa, there also might be an overall decrease in the amount and number of other more toxic and persistent herbicides, which in turn would result in less overall risk to human health and the environment (see DEIS section IV.E. See the response to comment APHIS-2007-0044-6240-2 for issue 6.0 for additional discussion of this issue.

Comment Excerpt Text:
Cancer is becoming an epidemic and anything that disturbs the balance of the production of organic milk, meats, or any other organic foods should not be permitted. I have the battle going on with this condition now and my oncologist told me to eat everything organic I could, to not eat meat with anitbiotics or hormones and not to drink milk with hormones or antibiotics. Chemicals and food alteration has not caused anything good to happen in the National Health Scene. It is your responsibility to protect the American citizens. (Comment Number: APHIS-2007-0044-4227-1)

Response: In regard to the comment on potential health effects, APHIS has conducted extensive reviews of all of the credible scientific evidence and has concluded that GT alfalfa has no adverse effects on human health. For additional information, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:

Aside from the negative dependency on seed producers and the potential health effects of GM foods themselves, this would render the raising of organic meat almost impossible. (Comment Number: APHIS-2007-0044-4233-2)

Response: In regard to the comment on potential health effects, APHIS has conducted extensive reviews of all of the credible scientific evidence and has concluded that GT alfalfa has no adverse effects on human health. For additional information, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

See response to comment APHIS-2007-0044-4233-2 for issue 5 for a response to the comment about organic meat. In regard to the impact on organic markets in general, see response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
I do not approve of genetically engineered alfalfa. Its long term effects on people and the environment have not been studied. It will contaminate organically grown crops, and will be eaten by livestock which people in turn will eat. A big "NO" to this alfalfa!!! (Comment Number: APHIS-2007-0044-4236-1)

Response: In regard to the comment on potential health effects, APHIS has conducted extensive reviews of all of the credible scientific evidence and has concluded that GT alfalfa has no adverse effects on human health. For additional information, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
This EIS does not adequately assess the potential impacts to humans and the human environment (flora and fauna) based upon insufficient information as to how this GE organism behaves in varied environments. For this reason, this EIS does not adhere to CEQ guidelines in implementing NEPA. (Comment Number: APHIS-2007-0044-4258-1)

Response: In regard to the comment on potential health effects, APHIS has conducted extensive reviews of all of the credible scientific evidence and has concluded that GT alfalfa has no adverse effects on human health. For additional information, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

The DEIS discusses the environmental consequences to animals and plants in section IV.C. In addition, regarding potential risks from increased use of glyphosate to threatened and endangered species, see the response to comment APHIS-2007-0044-9936-27 for issue 4.1. Regarding the comment on CEQ guidelines, see the response to comment APHIS-2007-0044-9936-35 for issue 2.0.

It is not possible to test an organism's response to every environmental condition; however, for a response to the genetic engineering process and unintended plant traits, see the response to comment APHIS-2007-0044-7620-38 for Issue 13.

Comment Excerpt Text:
Also, the safety of these crops has not been proven. They may seem safe for a while, but as in the recent case with Toyota, a product that has seemed basically safe for years may turn out to have problems. While Toyota is now issuing massive recalls, I think the USDA should consider the impossibility of recalling food animals and people have already eaten and the potential toll on exports of food as well as the health care system.
Lastly, I would like to remind the USDA of the importance of genetic diversity as opposed to GE super-crops. Feeding a nation on just a few varieties of any crop is dangerous. Just ask descendants of Irish immigrants who had to flee to escape starvation during the Potato Famine, when the nation's potato crops succumbed to the same blight because there wasn't any diversity. Even supposing GE crops are resistant to disease, there is evidence that disinfectants that kill 99.9% of bacteria allow the 0.01% of resistant bacteria to take over the niche. I think there is a definite parallel between disinfectants and GE crops: nature eventually finds a way to overcome the best obstacles of human imagination. I encourage the USDA to oppose the acceptance of GE alfalfa, and similar crops, and to instead embrace nature and biodiversity as the best solution. (Comment Number: APHIS-2007-0044-4426-3)

Response: Regarding the comment on potential health effects, APHIS has conducted extensive reviews of all of the credible scientific evidence and has concluded that GT alfalfa has no adverse effects on human health. For additional information, in regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for issue 5.2.
In regard to movement of the RR trait into other alfalfa (gene flow), see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.
GT alfalfa *is not a monoculture crop. The transgene events can be crossed into the existing alfalfa cultuvars. APHIS has added a discussion of the possible effects of GT alfalfa on the availability of regionally adapted varieties to appendix V.3.4.1 the FEIS.*

Comment Excerpt Text:
With this huge quantity of Roundup dousing our soil and crops each year, it does seem only responsible to ask - is this chemical safe? Roundup is one of the less dangerous pesticides in the agricultural industry, but studies have shown toxicity effects on fish and amphibians, genetic changes in mammals, and a recent oncological study out of Sweden implicated Roundup in the development of non-Hodgkin's lymphoma. Other studies have linked Roundup to various cognitive disorders in children.
In addition to killing weeds, Roundup acts as a fairly broad spectrum biocide, affecting a large number of soil microbial species (Johal & Rahe 1988, Molec. Plant Pathol. 32:267-281). There are some fungal species though that resist the Roundup, and finding much reduced competition after application, they become dominant. Research from the University of Manitoba/Ag Canada ("Crop Production Factors Associated with Fusarium Head Blight in Spring Wheat in Eastern Saskatchewan", Fernandez, Sellesa, Gehlb, DePauwa and Zentner, Crop Science, 2005) and more recent work by USDA-ARS scientists (Glyphosate and glyphosate-resistant crop interactions with rhizosphere microorganisms, Kremer and Means, J Agronomy 2009) has shown

that Fusarium in particular benefits and increases in the soil with Roundup use. Fusarium is a serious fungal plant pathogen that affects many crop species.

Recently, work in Missouri ("Glyphosate Effects on Diseases of Plants", Johal and Huber, European J Agronomy, 2009) showed how plants, when treated with Roundup, actually experience a chemical change that reduces their own immune defenses, making them much less able to resist fungal and insect attack. Soil applications of Roundup appear to first create a rhizosphere microbial community enriched with virulent athogenic species, and then weakens the crop plants to make them more susceptible to those pathogens.

In small grains, Fusarium causes headblight and scab. While these diseases do reduce yield and grain quality, they also often form tasteless, colorless mycotoxins (fungal toxins) that can be very poisonous to humans and to animals. At high concentrations, mycotoxin poisoning can cause hemorrhaging, abortion, kidney dysfunction, blindness and death in animals, but commonly, mycotoxin poisoning can be subclinical, with generalized symptoms such as immune suppression, reproductive abnormalities, increased susceptibility to other diseases, decreased milk production, poor feed intake and weight loss, and abnormal juvenile growth and development.

Indeed, some Fusarium toxins act as estrogens, feminizing males and causing female reproductive problems. The Manitoba research showed that wheat, grown after a crop of Roundup Ready soybeans, is much more likely to develop scab. This research should come as no surprise to many conventional wheat growers who have been spraying increasingly large doses of fungicides over the past few years to keep wheat scab from destroying their crops! Mycotoxins are not just a problem in grains. Indeed, in Northeast, many farmers have learned that mycotoxins can equally be a problem in hay and baleage, infected in the field under cool wet growing conditions and then spread throughout the feed in storage. Increased incidence of mastitis, breeding difficulties, foot and other problems are often not quickly attributed the presence of mycotoxins in forage.
Recent reseach (J. Fox et, , 2007, National Academy of Science) has shown that soybeans, sprayed with Roundup to control weeds, produce beans with reduced nutrient content, especially lower protein. This appears NOT to be the result of genetic changes from the recombinant DNA. Instead, it appears that the Roundup suppresses the activity of Rhizobium bacteria on and in the soybean roots, impairing the plant's ability to fix nitrogen, an essential factor in protein synthesis. (Comment Number: APHIS-2007-0044-4924-2)

Response: In regard to the comments on cognitive disorders in children, specific sources were not provided by the commenter and thus APHIS cannot validate the accuracy of comments. APHIS has conducted extensive reviews of all of the credible scientific evidence and has concluded that overall risk of glyphosate use to human health does not change with the adoption of GT alfalfa. For additional information, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

In regard to the carcinogenicity of glyphosate, specific sources were not provided by the commenter and thus APHIS cannot validate the accuracy of comments. **EPA has concluded that the data provided** evidence of non-carcinogenicity for humans (glyphosate is a Group E

carcinogen) See DEIS section 3.1.10 of appendix L and response to comment APHIS-2007-0044-2243-1 for more information. Also, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0 regarding the regulatory oversight, decision-making process, and scientific study results related to the human health and safety of GT alfalfa.

Regarding the nutritional content of GT alfalfa, see the response to comment APHIS-2007-0044-0382-1 for issue 6.0.

See the response to comment APHIS-2007-0044-4924-2 for issue 4.3 for additional responses on glyphosate effects on soil microbes and diseases of plants.

Comment Excerpt Text:
Members of the Nevada Organic Advisory Council, an advisory group to the Nevada State Department of Agriculture, have serious concerns about the release of genetically modified organisms (GMOs) into Nevada's agricultural environment without proper federal or state oversight. Genetically modified crops have not been subjected to adequate health and safety testing, nor to long term environmental impact studies, nor to any other sufficiently extensive studies, addressing effects on people or animals generally. (Comment Number: APHIS-2007-0044-5057-3)

Response: APHIS has conducted extensive reviews of all of the credible scientific evidence and has concluded that GT alfalfa has no adverse effects on human health. Please see the response to comment APHIS-2007-0044-0278-1 for issue 6.0 for information on the regulatory oversight, decision-making process, and scientific study results related to the human health and safety of GT alfalfa.

Comment Excerpt Text:
Your pending decision to allow GM products grown in the US poses a health hazard to consumers such as myself who are very careful with the source of their food. Please allow us the freedom to choose to ingest products of a safe variety. the US's cavalier attitude toward dietary products just astounds me. The government is to protect the people not destroy them. (Comment Number: APHIS-2007-0044-5201-1)

Response: APHIS has conducted extensive reviews of all of the credible scientific evidence and has concluded that GT alfalfa has no adverse effects on human health. Please see the responses to comment APHIS-2007-0044-0278-1 for issue 6.0 for information on the regulatory oversight, decision-making process, and scientific study results related to the human health and safety of GT alfalfa.

In regard to the "freedom to choose" comment, see the response to comment APHIS-2007-0044-0416-1 for issue 2.0.

Comment Excerpt Text:

I am a big supporter of the organic food industry.....we cannot let GE alfalfa into the food supply! There are reasons no other country wants to by our produce, and there are many facts on the illnesses that GE food will eventually cause! No other country allows these crops to be sold with out representation, and the continuation of these crops in our food supply need to stop! Organic food is our only safe haven from these "science projects" we call food, and that introduction of GE alfalfa will ruin this!!!!!!!! (Comment Number: APHIS-2007-0044-5228-1)
Response: APHIS has conducted extensive reviews of all of the credible scientific evidence and has concluded that GT alfalfa has no adverse effects on human health. Please see the response to comment APHIS-2007-0044-0278-1 for issue 6.0 for information on the regulatory oversight, decision-making process, and scientific study results related to the human health and safety of GT alfalfa.

In regard to impacts on international trade, see the response to comment APHIS-2007-0044-3404-1 in issue 5.4.

Comment Excerpt Text:
Not enough research has been done on genetically engineered alfalfa to deregulate it. There is no reason to think that these modifications would not spread to surrounding fields. The US needs to stop trying to answer every problem with a new technological fix. Genetic engineering is not a long-term solution to our problems.
I will do everything I can, as a consumer, to avoid GMOs and to provide my family with food that is natural. (Comment Number: APHIS-2007-0044-5239-1)

Response: In regard to the spread of Roundup resistance genes to surrounding fields (gene flow), see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. Regarding research on health and safety, APHIS has conducted extensive reviews of all of the credible scientific evidence and has concluded that GT alfalfa has no adverse effects on human health. Please see the response to comment APHIS-2007-0044-0278-1 for issue 6.0 for information on the regulatory oversight, decision-making process, and scientific study results related to the human health and safety of GT alfalfa.

Comment Excerpt Text:
Given the lack of unbiased research and high risk of introducing another genetically modified crop into our food source, I hope the USDA will continue to fight Monsantos plea for deregulation of their GE alfalfa. Not only is it a fiscal monopoly to allow another 'owned' crop into our food source, the small amount of research that has been done on other genetically modified crops has show that the yield increase is negligible, if at all, and the potential environmental impact is great, due to the increase use of pesticides and the monoculture of genetically altered crops. GE alfalfa needs to stay out of our food source and off our dinner plates. (Comment Number: APHIS-2007-0044-5251-1)

Response: APHIS has conducted extensive reviews of all of the credible scientific evidence and has concluded that GT alfalfa has no adverse effects on human health. Please see the responses to comment APHIS-2007-0044-0278-1 for issue 6.0 for information on the regulatory oversight,

decision-making process, and scientific study results related to the human health and safety of GT alfalfa.

In regard to GT alfalfa yield, see the response to comment APHIS-2007-0044-0933-14 for issue 3.7. In regard to the monopoly comment, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0.

Comment Excerpt Text:
I am a consumer of organic products and you bet I am against GE alfalfa and the use of Glyphosate. In fact I'm against GE alfalfa, GE corn and GE soybeans and all the herbicides and pesticides that are used with them. These genetically engineered "plants" of questionable nutritive value should be treated as invasive pollutants and be eliminated. They may be serving to make profits and market dominance for their creators but they are contaminating natural, organic food supplies for the rest of us. The use of herbicides and pesticides (1) are increasing with GE plantings, and, (2) have known serious health consequences. Put the health and food safety of people over the profits of corporations. Do not approve GE alfalfa. And then ban GE corn, GE soy, GE sugar beets and the use of Roundup (glyphosate). (Comment Number: APHIS-2007-0044-5260-1)

Response: For information on the regulatory oversight, decision-making process, and scientific study results related to the human health and safety of GT alfalfa, please see the response to comment APHIS-2007-0044-0278-1 for issue 6.0. Regarding the nutritional quality of GT alfalfa, see the response to comment APHIS-2007-0044-0382-1 for issue 6.0. Regarding concern about GT alfalfa entering organic food supplies, see the response to comment APHIS-2007-0044-0677-1 for issue 6.1.

See the response to comment APHIS-2007-0044-5239-1 for issue 5.0 for a response to the rest of the issues raised in this comment.

Comment Excerpt Text:
With all that we know about the potential health and horticultural effects of pesticide use, it's unnecessary to be genetically re-designing crops in order to allow an herbicide manufacturer to increase usage of their own product. Glyphosate is not as non-toxic and degradable as is promoted by its manufacturers many studies have found this. With the awareness of the benefits to the environment and health of both humans and animals of organic and more sustainable agricultural methods, let's go forward, not backward. If we're going to pad someone's pockets, lets help an industry headed in a healthier direction, and not threaten their livelihood (crop interbreeding/unfair competition). I'm a concerned consumer and an organic gardener. It's possible to exist and grow without glyphosate. Invest in the promotion of knowledge, not already wealthy corporations. (Comment Number: APHIS-2007-0044-5261-1)

Response: Please see the response to comment APHIS-2007-0044-0278-1 for issue 6.0 for information on the regulatory oversight, decision-making process, and scientific study results related to the human health and safety of GT alfalfa and potential increases in glyphosate.

In regard to the comment about the need for re-designing crops, GT alfalfa was genetically was made to simplify the process of weed control and make management of weeds more effective. See response to comment APHIS-2007-0044-5261-1 for issue 4 and issue 5 for additional responses to this comment.

Comment Excerpt Text:
Dear USDA,
Please do not allow genetically engineered (GE) alfalfa, or any other GE products, to be fed to cattle. GE seeds are "Roundup Ready" and carry contaminates into the foods we eat. Roundup has glyphosate which is linked to non-Hodgkins lymphnoma (Journal of the American Cancer Society). The American Chemical Society reports that glyphosate damages and kills human cells. In light of such research, I hope you will ban the use of GE seeds and Roundup herbicide in all food products, including foods being fed to cattle and other animals that are used for food production.
Kindest regards,
Patty Finnegan (Comment Number: APHIS-2007-0044-5280-1)

Response: In regard to concerns over glyphosate and lymphoma, see the response to comment APHIS-2007-0044-2243-1 for issue 6.0. Regarding human health effects of GT alfalfa more generally, refer to the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
I do care about organic farmers and organic food. My health depends on it. People like myself with allergies cannot safely eat genetically modified food. I know of alot of consumers like myself who care about organic food, and understand it's value in our health and well being. Organic farmers and organic consumers do care about GE contamination. GE contamination undermines the very basis of foods being organic. How could we not care? It seems that profit and greed are the motives of the willingness of GE people to make such a blatantly false statement: saying organic consumers don't care about GE contamination.
The fact that Roundup Ready alfalfa will be sprayed with the herbicide: Roundup (glyphosate): and that studies show a clear link between glyphosate and non-Hodgkins lymphoma (Journal of the National Cancer Society) and have found that glyphosate damages and kills human cells even at diluted levels far below recommendations (Journal of the National Cancer Society) makes me wonder how GE alfalfa could even be considered for approval.
We do care about the quality of organic foods, such as the milk, cheese, yogurt, and beef products from the cows. We do not want organic cows to eat GE contaminated alfalfa. Please support the health of our people. The health of our people is more important than the profits of the GE companies.
Thank you (Comment Number: APHIS-2007-0044-5284-1)

Response: In regard to concerns over glyphosate carcinogenicity, see the response to comment APHIS-2007-0044-2243-1 for issue 6.0. In regard to concerns about human health and safety more generally, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0. The issue

of allergenicity to CP4 EPSPS protein unique to GT alfalfa is discussed in sections III.D.1, IV.E.1, and appendix P of DEIS. The CP4 EPSPS protein is not reported to be a significant allergenic risk and is functionally equivalent to native plant EPSP protein and except for its affinity for glyphosate. Furthermore, the CP4 EPSPS protein sequence lacks structural similarities sequences in several allergen databases. See the response to comment APHIS-2007-0044-9547-1 for issue 6.0 for more information on allergenicity.

Comment Excerpt Text:
Dear Friends at USDA,
I strongly oppose approval of the use of Roundup Ready GE) alfalfa (or any other GE crops). Roundup (glyphosate) is dangerous to the food supply; studies have shown a clear link between glyphosate and non-Hodgkiins lymphoma (Journal of the American Cancer Society), and have found that glyphosate damages and kills huan cells even at diluted levels far below recommendations (American Chemical Society). (Alfalfa feeds cows which feed people. . . .)
I believe strongly that it is important to protect the food industry, especially the organic food industry, from non-natural genetic material.
Let's support organic farmers, encourage their sustainable practices, and refuse to allow Roundup crops into the food chain.
Thank you for your consideration,
Sarah McElroy (Comment Number: APHIS-2007-0044-5295-1)

Response: In regard to concerns over glyphosate and lymphoma, see the response to comment APHIS-2007-0044-2243-1 for issue 6.0. Regarding human health effects of GT alfalfa more generally, refer to the response to comment APHIS-2007-0044-0278-1 for issue 6.0.
In regard to impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
re: Dept of Ag environmental impact statement for genetically engineered alfalfa. How do you know "there is no evidence organic consumers care about GE contamination"? Have you asked? Did you do a survey? Of course we care! Genetically engineered alfalfa or any crop is dangerous, especially the ones that are Roundup Ready. Glyphosphate is clearly linked to non-Hodgkins lymphoma, and causes damage and death in human cells at levels far below recommendations. (Comment Number: APHIS-2007-0044-5299-1)

Response: In regard to concerns over glyphosate carcinogenicity, see the response to comment APHIS-2007-0044-4924-2 for issue 6.0. Regarding human health effects of GT alfalfa more generally, refer to the response to comment APHIS-2007-0044-0278-1 for issue 6.0. Regarding the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:

Genetically Engineered, Glyphosate-Tolerant Alfalfa (GEGT Alfalfa) should not be approved for the following reasons:
Environmental Impact: Alfalfa relies on open pollination by bees. Evidence strongly suggests that GEGT Alfalfa will cross pollinate with other alfalfa crops despite intended protections. (note actual cases reported of cross contamination). While it has been argued that GE traits themselves will not show up in beef and dairy end-products, a survey of milk products sold in stores in Italy (screening of 60 samples of 12 different milk brands) demonstrated the presence of GM maize sequences in 15 (25%) and of GM soybean sequences in 7 samples (11.7%). Also, research shows that glyphosate-tolerant forage (which therefore contains residues of glyphosate) fed to mammals has negative/toxic effects on animal blood, kydney and liver function after feeding for only five to fourteen weeks (de Vendmois JS, Roullier F, Cellier D, Sralini GE. A Comparison of the Effects of Three GM Corn Varieties on Mammalian Health. Int J Biol Sci 2009; 5:706-726. Available from http://www.biolsci.org/v05p0706.htm) These effects would be introduced into the human food chain as well as impacting the food chain and health of cervids and other wild foraging animals.
I believe GE is crossing the line. even if just a grain! Serious business (Comment Number: APHIS-2007-0044-5313-1)

Response: In regard to the concern about human health and safety, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0. For response to de Vendmois et al. (2009) citation, see response to comment APHIS-2007-0044-11328-1 for issue 6.0.

See response to comment APHIS-2007-0044-5313-1 for issue 4.4 for a response to the additional issues raised in this comment.

Comment Excerpt Text:
I am very concerned that genetically modified crops are endangering our food supply, our health and the survival of our pollinators. Studies have shown a clear link between glyphosate and non-hodgkins lymphoma. Other studies suggest GM crops may be killing pollinators. I AM VERY CONCERNED. (Comment Number: APHIS-2007-0044-5332-1)

Response: In regard to concerns over glyphosate and lymphoma, see the response to comment APHIS-2007-0044-2243-1 for issue 6.0. In regard to concerns about human health and safety more generally, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
USDA, in an environmental impact statement on genetically engineered (GE) alfalfa, declares there is no evidence that organic consumers care about GE contamination.
As an organic consumer, I am hereby providing evidence by this statement that I do INDEED care about GE contamination,and in this particular case, the possiblity of Roundup Ready Alfalfa being approved.
Studies have shown a clear link between glyphosate (Roundup) and non-Hodgkins lymphoma (Journal of the American Cancer Society), and have found that glyphosate damages and kills human cells even at diluted levels far below recommendations (American Chemical Society).

Glyphosate/Roundup also is used on GE soybeans and GE corn, so the USDA's remark that it has no evidence organic consumers care about GE contamination involves more than just Roundup Ready alfalfa. (Good grief --- how could there possibly be any doubt that GE contamination is not a primary concern for organic consumers?)
USDA admitts that an economic analysis shows GE alfalfa will hurt the organic industry and small farmers but it fails to analyze or suggest any possible protections for organic.
Alfalfa isn't a crop that people eat directly, but if you eat yogurt, cheese, milk, ice cream or beef and if you believe that "we are what they (cows) eat" then it's critically important. (Comment Number: APHIS-2007-0044-5346-1)

Response: In regard to concerns over glyphosate and lymphoma/carcinogenicity, see the response to comment APHIS-2007-0044-2243-1 for issue 6.0. Regarding concern about human health and safety more generally, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0. Regarding the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
I disagree with the environmental impact study draft because round up ready crops will contaminate conventional crops and put me out of business! For those of us that are organic farmers it will contaminate our certified organic crops. Genetically modified organisms cannot coexist with those that are organic and we don't want them produced in the first place! The consuming public wants food that is safe. According to Jeffrey Smith "GMO's are causally linked to immune system problems, organ damage, accelerated aging, insulin disregulation, gastrointestinal problems and higher death rates." Companies who choose to genetically alter our foods should learn an example from rBGH which the public has chosen to remove from their food, and the big companies have heard them loud and clear. Anybody listening? Sincerely, Jerry Snyder (Comment Number: APHIS-2007-0044-5359-1)

Response: APHIS has conducted extensive reviews of all of the credible scientific evidence and has concluded that GT alfalfa has no adverse effects on human health. Seethe response to comment APHIS-2007-0044-0278-1 for issue 6.0 for information on the regulatory oversight, decision-making process, and scientific study results related to the human health and safety of GT alfalfa.

In regard to impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.
In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I object to the use of GE alfalfa and other GE contamination of our farmlands. The environmental and economic consequences of GE crops will effect more than organic farming. Use of GE alfalfa will eventually increase pesticide use and allow the enhancement of invasive weeds and the associated adverse impacts on biodiversity and endangered species.

Wake up people! This is a bad idea. Monsanto's Roundup Ready GE alfalfa is loaded with glyphosate, which damages and kills human cells.
The public has the right to choose to NOT eat GE food.
Farmers have the right to choose what crops they want to grow without risk of cross contamination.
Sincerely,
Bill Falk
(Comment Number: APHIS-2007-0044-5393-1)

Response: Regarding concern about increased pesticide use, see DEIS (section IV.C.3. and the response to comment APHIS-2007-0044-0278-1 for issue 6.0 and see the response to comment APHIS-2007-0044-6240-2 for issue 6.0.
In regard to impacts on threatened and endangered species, see the response to comment APHIS-2007-0044-9936-27 for issue 4.1.
In regard to impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
I DO NOT support non-regulated status. I am concerned about GE contamination. Studies have shown a clear link between glyphosate and non-Hodgkins lymphoma (Journal of the American Cancer Society), and have found that glyphosate damages and kills human cells even at diluted levels far below recommendations (American Chemical Society) (Comment Number: APHIS-2007-0044-5420-1)

Response: In regard to concerns over glyphosate and lymphoma/carcinogenicity, see the response to comment APHIS-2007-0044-2243-1 for issue 6.0. Regarding overall concern about human health and safety, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
No on GE!
As a Chemist and concerned citizen I affirm that it is vitally important that pesticide use be more tightly regulated over deregulating genetically engineered crops that are tolerant of pesticides. There are a myriad of reasons for not approving genetically engineered alfalfa and below I will enumerate three of the most pressing reasons.
First: pesticides are dangerous to people. Pesticides including phosphate containing ones like glyphosate (Round Up) will accumulate in peoples fat deposits. Glyphosate is classified as Class III toxin by the EPA yet incredibly it is still in wide use. Pesticides cannot be removed or flushed from these deposits and will cause cellular damage including possibly cancer. These phosphates are also passed from mother to fetus and nursing children via blood and breast milk (EPA 2005).
Second: Genetically engineered crops are a complete unknown, the long term repercussions of GE plant use are largely untested. The tests that are being done are very short-term. We need a paradigm shift: instead of the "use-now-and-see-what-happens" approach of the past (i.e. DDT, thalidomide, leaded paint/ gasoline, Agent Orange etc) we need a more proactive approach. Such

crops like this new alfalfa are already banned in much of Europe because they believe that GE crops should be considered dangerous until proven otherwise. Let's follow suit.
Third: As we saw with the "round up ready" soy and canola there is a danger that a small handful of companies (namely Monsanto) who create these "super crops" could monopolize the food production by forcing all competitors and farmers who don't use their seed out of business, Percy Schmeiser and more than 90 other farmers had been prosecuted by Monsanto in and before 2005. In short GE crops such as this new alfalfa are (directly or indirectly) dangerous not only to human health but also the capitalist system in which we live.
Thank you for your time,
Jeffrey A Carman
(Comment Number: APHIS-2007-0044-5429-1)

Response: In regard to concerns over glyphosate carcinogenicity, see the response to comment APHIS-2007-0044-4924-2 for issue 6.0. Furthermore, EPA regulates exposure, and thus any accumulation in the body and any adverse effects, by limiting the concentrations of herbicides that can be applied, as appropriate. Also, please note that Toxicity Category III indicates the substance is only slightly toxic (IV indicates practically non-toxic). For more on human health and safety more broadly, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0. Regarding what is known about genetically engineered crops, please note that they have been in use for more than 13 years. These crops have been subjected to rigorous scientific analysis with no documented significant adverse consequences.

In regard to the monopoly comment, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0.

Comment Excerpt Text:
Hello,
I'm strongly opposed to the use of Genetically Enginered Food practices, and GMO,for many reasons,and for the safety of my chidren. Aslo, Studies have shown a clear link between glyphosate and non-Hodgkins lymphoma (Journal of the American Cancer Society), and have found that glyphosate damages and kills human cells even at diluted levels far below recommendations (American Chemical Society).
As a result of my beliefs, I only buy non GMO non-GE foods, from my grocery stores Health Food Stores, and will not support the use of GE GMO practices!
I believe that healthy disease resistant foods can be obtained through the use of Organic Biodynamic Gardening, which is far less harmful to the Earth And it's inhabitants!
I urge you to stop using GE GMO methods, before it kills us all!
Thanks you,
Stephen Triplett
(Comment Number: APHIS-2007-0044-5540-1)

Response: In regard to concerns over glyphosate and lymphoma, see the response to comment APHIS-2007-0044-2243-1 for issue 6.0. Regarding concern about overall human health and safety, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
I am urging the Department of Agriculture not to allow genetically modified (glyphosate tolerant) alfalfa. There are three major reasons this should not be done.
1) It is futile, in that insects will inevitably evolve resistance to glyphosate, and then the attempt to chemically control insects will become more toxic.
2) Once planted, this genetically modified alfalfa cannot be prevented from fertilizing non-genetically modified alfalfa. Organic alfalfa will be affected.
3) The main reason Monsanto wants to sell genetically modified crops, including alfalfa is to allow farmers to use Round Up with abandon, as he plants will be tolerant. But Round Up has endocrine disruptors wihich adversely affect human fetal development. It is socially irresponsible to allow the use of Round Up at all, much less an increased amount of it.
So, it is socially irresponsible to allow Monsanto to engage in an evolutionarily futile exercise with adverse public health consequences, and which denies the growth of organic alfalfa.
I must, therefore, strongly urge that permission not be granted. (Comment Number: APHIS-2007-0044-5831-1)

Response: The comment about insects evolving resistance to glyphosate is a confusion of the herbicide use that will accompany this herbicide tolerant alfalfa line with some bt-expressing lines. Nevertheless, see issue 3 for responses concerning the potential resistance of weeds to glyphosate. Regarding comments about endocrine- and other reproduction-related effects, DEIS appendix L, section 3.1.8 notes that of the specific tests conducted to determine potential effects of glyphosate on the endocrine system, none have reported any potential estrogen, androgen, and/or thyroid mediated toxicity resulting from exposure to glyphosate. Regarding concerns about the human health and safety of glyphosate, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.
In regard to gene flow, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

See response to comment APHIS-2007-0044-5831-1 for issue 4 for additional responses to this comment.

Comment Excerpt Text:
The concept of having glyphosate in our food chain is totally shocking and abhorrent to me. (especially corn and soy, but alfalfa is fed to our animals too, yes?)
I have Non-Hodgekins lymphoma and am sensitive to chemicals. I do try to buy organic, but this deliberate poisoning as a way to save costs seems like a "slippery slope".
Has any consideration been given to workers who will be exposed to this as well? (Comment Number: APHIS-2007-0044-5893-1)

Response: In regard to concerns over glyphosate and carcinogenicity, see the response to comment APHIS-2007-0044-2243-1 for issue 6.0. Regarding concerns about the overall human health and safety of glyphosate, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0. Farm and other workers are discussed in section IV.E and appendix M of the DEIS.

Comment Excerpt Text:
As an orgainic consumer, I care about GE contamination and am against government approval of the GE alfalfa that the USDA wants to approve which is Roundup Ready. Please take another look at what this means for the health of our nation and the cost of medical care for diseases caused by these GE plants. (Comment Number: APHIS-2007-0044-6205-1)

Response: In regard to concern about human health and safety, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
do not genetically engineer our food. do not poison us and create any further diseases! (Comment Number: APHIS-2007-0044-6213-1)

Response: In regard to concern about human health and safety, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
Please do not remove the nonregulated status for glyphosate-tolerant alfalfa. The contamination from the genetically engineered alfalfa is a serious health concern for our country. (Comment Number: APHIS-2007-0044-6215-1)

Response: In regard to concern about human health and safety, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
On page xv the statements are made “GT alfalfa is not toxic to animals...”. I find this reasoning unsatisfactory, because, as APHIS itself notes in the EIS, the herbicides intended to be used with these GT strains of alfalfa contain undisclosed surfactants. On page 64 the statement is made, “While surfactants are typically classified as “inert” components in herbicides, they are not toxicologically inert and in many cases they are found to be more toxic than the herbicide itself. USDA-FS, 2003)”. And on page 29, in regards to the water flea, “...glyphosate formulations are several orders of magnitude more toxic than technical glyphosate.” That this greater toxicity applies to more than just that particular species is borne out by comments on page 28 as follows: “...amphibians exhibited greater sensitivity to Roundup® formulations than to glyphosate tested as an acid or IPA salt.” and “In general, the glyphosate formulations (herbicide plus other chemicals) were more toxic to fish than technical glyphosate (herbicide only). The increased toxicity is due to the presence of a surfactant in glyphosate formulations...” This variability of toxicity seems to have been left out of APHIS's line of reasoning when it makes the statement on page xv that “Due to the use of glyphosate on GT alfalfa, overall glyphosate use may increase in alfalfa production, but such an increase should be not be a significant impact on the environment...” and on page xiii that “granting nonregulated status to glyphosate-tolerant (GT) alfalfa lines J101 and J163 will not result in significant impacts to the human environment.”

According to USDA-APHIS Regulations and Assessments Title 40, the definition of human environment (USDA-APHIS Regulations and Assessments Title 40 http://www.aphis.usda.gov/regulations/compliance/environmental_quality_1508.shtml) includes the definition of effect, which states "Effects and impacts as used in these regulations are synonymous. Effects includes ecological...aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative."

It is reasonable to assume that commercial products containing surfactants of unknown, but reasonably considerably toxic, surfactants shall be used in conjunction with GT alfalfa (as opposed to glyphosate in isolation) based on the comment, "While additional glyphosate products may be used, five products are recommended for use on GT alfalfa. The five herbicides are Monsanto products and include: Honcho®, Honcho Plus®, Roundup Original MAX®, Roundup WeatherMAX®, and Roundup Ultra MAX II®." found on page 63.

This is significant, because the EIS also acknowledges on page xvi that "the net effect on alfalfa production with the increased adoption and planting of GT alfalfa should be some increased use of the less toxic glyphosate with a decreased use of more toxic herbicides." as well as pages 61 that there is reason to expect that use of such products will increase in response to the deregulation of GT alfalfa ("A few studies have claimed that the volume of herbicide use is greater due to GT crops...") and 62 ("Gianessi and Reigner (2006) noted that an increase in glyphosate usage coincided with a decrease in total amount of herbicide usage by 61 million pounds (of active ingredient) between 1997 and 2002. Much of this reduction occurred in cotton and soybeans, where several herbicides were replaced by glyphosate.") and the afore-quoted statement from page xv to similar effect.

In light of the forgoing, it is very difficult to accept the statement made on page xiii that "The APHIS Biotechnology Regulatory Service's (BRS) mission is to protect America's agriculture and environment using a dynamic and science-based regulatory framework...", especially when considering the aforementioned definition of the term "human environment". Despite the USDA-APHIS's indemnifying disclaimer delineating its particular area of responsibility as well as its compliance with CEQ requirements, APHIS's declaration that GT alfalfa presents "no significant impact on the human environment" (page xv) is clearly incompatible with the statements acknowledging that the use of unknown and very probably considerably toxic substances in the production of food destined for human consumption, may, as a direct result of deregulation, increase. It is unreasonable that such an increase could not have an impact of considerable significance on the human environment, and that therefore either the alternative of deregulation must in good conscience be postponed until the composition of the herbicides in question are fully disclosed and have been demonstrated to pose no significant risk to the human environment or else rejected altogether in favor of continued regulation. To do otherwise clearly violates USDA-APHIS's own mission statement. (Comment Number: APHIS-2007-0044-6240-2)

Response: Regarding the DEIS statement about GT alfalfa being non-toxic to animals, this is true at the intended or expected levels of ingestion. Regarding surfactants, the DEIS included a risk assessment of POEA and other added ingredients that are present in glyphosate formulations in appendix L, section 3.1.14. These surfactants have been carefully evaluated for their effects on human health, and application rates of the end-use product (glyphosate plus surfactant and other added ingredients) are determined using specific product labels for each end use product recommended for use on GT alfalfa.

Regarding potential changes in glyphosate and other herbicide use profiles, glyphosate use will very likely increase due to the availability of GT alfalfa, there also might be change in the amount of other herbicides used. Whether this goes up or down will depend on the management practices used in conjunction with the adoption of GT alfalfa and the adoption rate of GT alfalfa. . This is modeled in Appendix J. APHIS notes that the USDA National Agricultural Statistics Service (NASS) data are used throughout the DEIS, for example in section III.C, III.D, III.E, IV.B, IV.D, IV.I, and several appendices. Other data also are used to supplement the NASS data because of the unique needs at times for more specific data. The FEIS (appendix V) provides an expanded analysis of herbicide use in this regard. See additional responses to this comment in issue 4.4.

Comment Excerpt Text:
GM crops are implicated in declining fertility rates and suspected in bee colony collapse. I am not interested in Monsanto's spin on what it perceives the public interest is. Monsanto is not improving God's alfalfa, it is improving its own profits. (Comment Number: APHIS-2007-0044-7025-1)

Response: In regard to declining fertility rates, see the response to comment APHIS-2007-0044-2840-1 for issue 6.0.

See response to comment APHIS-2007-0044-7025-1 in issue 4.4 for additional responses.

Comment Excerpt Text:
Please do not allow glyphosate-tolerant alfalfa to be introduced into the food chain. Evidence shows that it is linked to non-Hokgkins lymphoma. (Comment Number: APHIS-2007-0044-7191-1)

Response: In regard to concerns over glyphosate and lymphoma, see the response to comment APHIS-2007-0044-2243-1 for issue 6.0.

Comment Excerpt Text:
1) Farmer safety is always our highest priority. By reducing the number of traditional chemicals used to kill numerous broadleaf and grasses, our farmers are handling fewer chemicals and reducing their exposure to them in preparing a tank mix. (Comment Number: APHIS-2007-0044-7953-3)

Response: APHIS acknowledges the comment and notes that these findings are supported by the DEIS discussion in section IV.E and appendix L.

Comment Excerpt Text:
The draft environmental impact statement “Glyphosate-Tolerant Alfalfa Events J101 and J163: Request

for Nonregulated Status” states on page 148 that the food tolerance established for glyphosate on alfalfa
considers “whether the pesticide produces an effect in humans similar to an effect produced by a naturally-occurring estrogen or produces other endocrine-disruption effects.” In fact, this is not true.
Glyphosate is currently being tested as part of the U.S. Environmental Protection Agency’s Endocrine
Disruptor Screenign Program, but the test results are not due to be completed until January 2012, and
then must be evaluated. See attached document: “Status of EDSP Orders/DCIs as of Thursday, January
28, 2010.” (Comment Number: APHIS-2007-0044-9066-2)

Response: APHIS acknowledges the comment. See response to comment APHIS-2007-0044-5831-1 for issue 6.0 for a description of how endocrine-related effects are addressed. The testing referred to by the commenter is additional testing. EPA notes that because the list of chemicals selected for (additional) testing was done so on the basis of exposure potential only and should not be construed or characterized as a list of known or likely endocrine disruptors.

Comment Excerpt Text
The draft environmental impact statement also states (on pages 27-28) that glyphosate “was not found to cause reproductive or developmental effects in mammals.” In fact, the National Institute for
Occupational Safety and Health in the RTECS database identifies glyphosate as a reproductive effector
and lists three studies (in mammals) demonstrating such effects. (Comment Number: APHIS-2007-0044-9066-3)

Response: APHIS acknowledges the comment. The DEIS does include information describing the reproductive and developmental toxicity of glyphosate in appendix L, section 3.1.9.d.

Comment Excerpt Text:
GMO-contamination of organic alfalfa is inevitable if the Obama
Administration successfully commercializes Monsanto's GM alfalfa.
Consumers who ingest Roundup Ready alfalfa genes are risking their health;
according to the environmental impact statement, "acute toxicity in mice
was observed."
According to the EIS, consumers who ingest Roundup may experience "general
and non-specific signs of toxicity from subchronic and chronic exposure to
glyphosate includ[ing] changes in liver weight, blood chemistry (may
suggest mild liver toxicity), liver pathology, and weight of the pituitary
gland."
The EIS warns that, "Based on upper estimates of exposure ... infants
consuming fruit and all age groups consuming vegetables may be at risk of

adverse effects associated with acute exposure to glyphosate residues."
Consuming milk and meat from animals fed crops that are genetically engineered is also risky. In a survey of milk products sold in stores in Italy, results from the screening of 60 samples of 12 different milk brands demonstrated the presence of GM maize sequences in 15 (25%) and of GM soybean sequences in 7 samples (11.7%). (Comment Number: APHIS-2007-0044-9204-3)

Response: Regarding acute toxicity of CP4 EPSPS protein, the DEIS erred in stating that acute toxicity was observed in mice. Appendices P and Q of DEIS state that there were no treatment related adverse effects observed in an acute toxicity tests in which mice were gavaged with doses up to 572 mg of CP4 EPSPS per kilogram of body weight. Furthermore, the CP4 EPSPS protein is only a small portion of total protein (ca. 0.50%) in alfalfa and susceptible to rapid proteolytic digestion in simulated gastric fluid. No deleterious effects of CP4 EPSPS protein consumption have been reported in dairy cattle, livestock and poultry parameters.

Regarding the concern about the toxicity from sub-chronic and chronic exposure to glyphosate, the cited quote, which is from DEIS section III.D.2.a and in several places in appendix L of the DEIS, does not state that consumers who ingest Roundup will experience these signs of toxicity, but only that these are signs of toxicity in animals or humans with exposure that exceeds safe levels (not expected when used according to the product label). Similarly, the risks for infants, which is also discussed in several places in Appendices L and M of the DEIS, should be clarified in that these risks are based on a conservative assessment and although plausible are not likely because exposures would need to be significantly higher exposures than those occurring when used according to the product label. In regard to overall concerns about the human health and safety of GT alfalfa and glyphosate, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
Consumers who ingest Roundup Ready alfalfa genes are risking their health; according to the EIS, "acute toxicity in mice was observed."
According to the EIS, consumers who ingest Roundup may experience "general and non-specific signs of toxicity from subchronic and chronic exposure to glyphosate includ[ing] changes in liver weight, blood chemistry (may suggest mild liver toxicity), liver pathology, and weight of the pituitary gland."
The EIS warns that, "Based on upper estimates of exposure ... infants consuming fruit and all age groups consuming vegetables may be at risk of adverse effects associated with acute exposure to glyphosate residues."
Consuming milk and meat from animals fed crops that are genetically engineered is also risky. In a survey of milk products sold in stores in Italy, results from the screening of 60 samples of 12 different milk brands demonstrated the presence of GM maize sequences in 15 (25%) and of GM soybean sequences in 7 samples (11.7%). (Comment Number: APHIS-2007-0044-9240-2)

Response: See the response to comment APHIS-2007-0044-9204-3 for issue 6.0.

Comment Excerpt Text:
The USDA's Environmental Impact Statement on genetically engineered alfalfa paves the way for the unregulated commercialization of Monsanto's Roundup Ready alfalfa. As a consumer of organic food, I strongly oppose this action because it will result in the genetic contamination of organic food.
GMO-contamination of organic alfalfa is inevitable if the Obama Administration successfully commercializes Monsanto's GM alfalfa.
Consumers who ingest Roundup Ready alfalfa genes are risking their health; according to the environmental impact statement, "acute toxicity in mice was observed."
According to the EIS, consumers who ingest Roundup may experience "general and non-specific signs of toxicity from subchronic and chronic exposure to glyphosate includ[ing] changes in liver weight, blood chemistry (may suggest mild liver toxicity), liver pathology, and weight of the pituitary gland." (Comment Number: APHIS-2007-0044-9267-1)

Response: See the response to comment APHIS-2007-0044-9204-3 for issue 6.0.

Comment Excerpt Text:
According to the EIS, consumers who ingest Roundup may experience "general and non-specific signs of toxicity from subchronic and chronic exposure to glyphosate includ[ing] changes in liver weight, blood chemistry (may suggest mild liver toxicity), liver pathology, and weight of the pituitary gland."
The EIS warns that, "Based on upper estimates of exposure ... infants consuming fruit and all age groups consuming vegetables may be at risk of adverse effects associated with acute exposure to glyphosate residues."
Consumers are going to want to avoid Roundup Ready alfalfa, but according to the EIS, we don't have that right because, "At the present time, there is no policy regarding the unintended presence of GE material in organic products or food, consistent with the fact that the NOP is a process-based program for certifying a farm or production system as organic, and not a product-based program that tests or certifies individual products as organic." (Comment Number: APHIS-2007-0044-9305-2)

Response: In regard to human health impacts, see the response to comment APHIS-2007-0044-9204-3 for issue 6.0.
In regard to consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Biotech Alfalfa Crops Are Safe: Biotech crops with the Roundup Ready herbicide-tolerance trait, including RR alfalfa, are among the most thoroughly studied agricultural products in history. - the U.S. National Academy of Sciences
- American Medical Association
- the UN's Food and Agriculture Organization
Many other scientific and regulatory agencies s have studied biotechnology and concluded that this plant breeding method is at least as safe, and often safer, than non-biotech breeding methods

because the breeder actually knows what gene and protein the new varieties will produce, and can test them more robustly for safety. (Comment Number: APHIS-2007-0044-9316-6)

Response: See the response to comment APHIS-2007-0044-2711-4 for issue 6.0.

Comment Excerpt Text:
The USDA's Environmental Impact Statement on genetically engineered alfalfa paves the way for the unregulated commercialization of Monsanto's Roundup Ready alfalfa. As a consumer of organic food, I strongly oppose this action because it will result in the genetic contamination of organic food.
Consumers are going to want to avoid Roundup Ready alfalfa, but according to the EIS, we don't have that right because, "At the present time, there is no policy regarding the unintended presence of GE material in organic products or food, consistent with the fact that the NOP is a process-based program for certifying a farm or production system as organic, and not a product-based program that tests or certifies individual products as organic."
According to the EIS, consumers who ingest Roundup may experience "general and non-specific signs of toxicity from subchronic and chronic exposure to glyphosate includ[ing] changes in liver weight, blood chemistry (may suggest mild liver toxicity), liver pathology, and weight of the pituitary gland."
GMO-contamination of organic alfalfa is inevitable if the Obama Administration successfully commercializes Monsanto's GM alfalfa.
The USDA's EIS needs to take the contamination of organic crops more seriously. As long as there is a risk of contamination, Roundup Ready alfalfa shouldn't be allowed. (Comment Number: APHIS-2007-0044-9327-1)

Response: See the response to comment APHIS-2007-0044-9204-3 for issue 6.0.

Comment Excerpt Text:
The real concern I see for GMO alfalfa is that the nation's milk supply will be produced with GMO alfalfa and all of the tons of forage consumed will have received glyphosate or Round Up. It will be virtually impossible to guarantee a mother that her baby is not receiving milk produced from GMO forage -- nearly all of which was sprayed directly with Round Up before harvest. As with the case of GMO soybeans and corn, only the plants are sprayed with Round Up (prior to seed development) so the actual grain-- the corn and soybean seeds are not physically sprayed but are then utilized as feedstuffs. However, with alfalfa the whole plant is utilized for feedstuffs with the potential contaminants both genetically in the plant and also the potential residual effects of the glyphosate chemistry on the plant itself.
If GMO alfalfa is approved for widespread use, it will be impossible for a mother to provide GMO and Round UP-free milk for her baby. (Comment Number: APHIS-2007-0044-9346-2)

Response: APHIS acknowledges the comment. In regard to concern about human health and safety, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0. Appendices P and Q of DEIS provide a detailed and conservative health analysis of CP4 EPSPS protein (unique component) found in GT alfalfa.

Comment Excerpt Text:
In the early 1990s, Dr. Pusztai linked GMO foods to potentially pre-cancerous cell growth, smaller brains, livers, and testicles, partially atrophied livers, and damaged immune systems in tested animals.
In 2005, Irina Ermakova, discovered that more than half of the baby rats in an experiment died within three weeks. She had fed the mothers GM soy flour.
Dr. Andrs Carrasco said his studies of amphibians suggest that the herbicide used in GMO crops could cause defects in the brain, intestines, and hearts of fetuses. The original reason for his initial research was inspired by the indigenous communities who were suffering from exposure to toxic herbicides used on the GM soy fields throughout Argentina.
I could list case after case after case. Most of which have been swept under the rug, because heaven forbid we don't get that kickback from Monsanto. Our caring government cares more about the almighty, genetically modified dollar more than the health of its citizens. (Comment Number: APHIS-2007-0044-9516-1)

Response: Because specific sources were not provided by the commenter, APHIS cannot validate the accuracy of the commenter's claims regarding carcinogenicity or other health effects from GM food crops. Nevertheless, one of the studies apparently indicated by the commenter is Pusztai et al. (Ewen, S.W.B., Pusztai, A. (1999). Effect of diets containing genetically modified potatoes expressing Galanthus nivalis lectin on rat small intestine. Lancet, 354 (9187), pp. 1353-1354). This study was subsequently criticized sharply by The Royal Society (Royal Society (1999). Review of data on possible toxicity of GM potatoes. http://royalsociety.org/Review-of-data-on-possible-toxicity-of-GM-potatoes/) and Burke (Burke, D. (2004). GM food and crops: what went wrong in the UK? EMBO Reports 5 432-435). An unpublished (in a scientific journal) study by Ermakova was discussed and criticized in Marshall (Marshall, A. (2007). GM soybeans and health safety—a controversy reexamined Nature Biotechnology 25, 981-987); see citations below). In regard to overall concern about the human health and safety of GT alfalfa, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
If anything should go wrong with the GMO alfalfa, the lawsuits will bankrupt the farming industry. (Comment Number: APHIS-2007-0044-9528-1)

Response: In regard to impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to potential lawsuits from Monsanto, see the response to comment APHIS-2007-0044-11753-1 for issue 2.0.

Comment Excerpt Text:
The use of RR alfalfa will cause an increase in the amount of glyphosate in the human diet.

GT alfalfa will increase the amount of glyphosate in the human diet. Glyphosate, when sprayed on a plant, translocates to all parts of the plant and does not degrade or dissipate. It remains in the plant tissue.

Glyphosate can be sprayed on RR up to seven days prior to harvest. The entire above ground plant is harvested when alfalfa is cut for forage. Forage is fed to milking cows, beef, goats, and etc...The glyphosate residue in the forage will be consumed by the animals. (Page …..) EIS stated that 70% will be excreted in urine and feces. What happens to the other 30%? It builds up in the cow and some is in the milk.

There are several recent studies that indicate glyphosate has serious effects on reproductive organs and tissue. Feeding children milk with trace amounts of glyphosate in it raises very serious health concerns. See Céline Gasnier (a), Coralie Dumont (b), Nora Benachoura, Emilie Clair (a), Marie-Christine Chagnon (b), Gilles-Eric Séralini (a)) University of Caen, Institute of Biology, Lab. Biochemistry EA2608,Esplanade de la Paix, 14032 Caen cedex, France Herbicides Roundup Disrupt Sexual Hormones Glyphosate-based herbicides are toxic and endocrine disruptors in human cell lines Published in the journal Toxicology June 13, 2009

AHIS claims that the EPA is responsible for determining the safety of herbicides and other chemicals in food products. In light of these new studies RR alfalfa should not be deregulated until the FDA has reviewed the safety of these new and added uses of glyphosate. (Comment Number: APHIS-2007-0044-9537-2)

Response: APHIS acknowledges the comment. See response to comment APHIS-2007-0044-5831-1 for issue 6.0 for a description of how reproduction-related effects are addressed. Regarding the study by Gasnier et al. (2009), see the response to comment APHIS-2007-0044-10525-11 for issue 6.0. Regarding review of glyphosate safety, EPA reviews new uses of glyphosate, and any action by USDA will be coordinated with the determination by EPA for product use. Regarding these reviews and overall concern about the human health and safety of GT alfalfa and glyphosate, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
This section is where human health risk should have been addressed but there are no scientific facts. There is only suppositions and assertion (in other words they assume). At one point, the section even states “the CP4 EPSPS protein is only a small portion of alfalfa; and while acute toxicity in mice was observed, allergenic responses associated with Roundup Ready® crops have not been reported by farm workers or members of the general population since the commercialization of these crops in 1996. FDA (2004b) did not review studies on dermal or inhalation toxicity of the CP4 EPSPS gene or protein, nor were any available at the time of this analysis.” How can this be an assurance that the gene product is not a human health risks? Where is the scientific fact? If it is so safe, then why not prove it and lay to rest the fears of consumers?
Page 61 Increased Use of Pesticides?
There is no analysis of herbicide use on conventional alfalfa, because if herbicide use before the release of RR alfalfa is considered, it would be found alfalfa is one of the crops where very little herbicide is necessary. With the introduction of RR alfalfas, every field will have to be sprayed

in the seedling stage just to eliminate the non RR seedlings, which will significantly increase the use of glyphosate. It would also be found that to take out an old RR alfalfa stand farmers will have to use a more toxic herbicide. Again the section relies on suppositions and assertions based on other crops and at no point considers the uniqueness of alfalfa and its cropping situation.
Page 64 Glyphosate toxicity
"With regard to subchronic and chronic toxicity, one of the more consistent effects of exposure to glyphosate is loss of body weight. Other general and non-specific signs of toxicity from subchronic and chronic exposure to glyphosate include changes in liver weight, blood chemistry (may suggest mild liver toxicity)" How can this be considered safe? How come once again there are no long term feeding studies? If you put this on a label and attached it to every hay bale, would the dairy farmer want to feed it to his cows? Also "Levels up to 9 lb a.e./acre over 3 years did not cause a reduction in yield or nutrition of the alfalfa in any of the forage quality measurementstaken (e.g., protein, starch, sugar)." Was there a study of micro nutrient content and the effect this would have on the food supply?
Page 65 Risk to Public Health and Safety
This section never addresses the risk to farm workers. Farm worker have to go into the fields on a daily basis to change water and other jobs. The use of glyphosate on alfalfa will increase farm worker's exposure and increase their health risks. This exposure is not limited to the exposure in the field but also exposure every time the forage is handled up to the point it is fed to livestock.
Page 67 and 68 1. Alfalfa Production Practices a. Seed
This section fails to consider the production of "catch crop" seed in South Dakota, Kansas, and Oklahoma. The DEIS even references that production on page 79. What will happen to these farmers if the neighbor has RR alfalfa and because of field conditions allows it to bloom and contaminate the catch crop seed? Why wasn't this scenario addressed? It will have a substantial impact on seed prices, and management practices in areas where catch crop seed is grown.
(Comment Number: APHIS-2007-0044-9547-1)

Response: Regarding the concern about acute toxicity of the CP4 EPSPS protein, see the response to comment APHIS-2007-0044-9204-3 for issue 6.0, which describes how the DEIS erred in stating this protein showed acute toxicity. Regarding the DEIS excerpt about the lack of dermal and inhalation toxicity studies on the GT alfalfa protein, appendix P of the DEIS describes the FDA information provided on the gene product's toxicity and allergencity, including: (1) Agrobacterium species are not known for human or animal pathogenicity; (2) the protein has a history of use as a genetic donor in numerous glyphosate-tolerant crops, which humans and animals have consumed since 1996; (3) the CP4 EPSPS protein is functionally equivalent to native plant EPSPS protein except for its affinity for glyphosate; (4) based on an amino acid homology search of several toxin databases, the CP4 EPSPS protein does not have biologically relevant structural similarities to protein toxins known to cause adverse health effects in humans or animals; and (5) no treatment-related adverse effects were observed in an acute toxicity test in which mice were gavaged with doses of up to 572 milligrams of CP4 EPSPS1 per kilogram of body weight. Furthermore, no reports have been presented demonstrating an association between this gene product and adverse health effects, including allergenicity. The response to comment APHIS-2007-0044-9204-3 for issue 6.0 also addresses the commenter's concern about subchronic and chronic toxicity.

Regarding herbicide use on conventional alfalfa, see the response to comment APHIS-2007-0044-6240-2 for issue 6.0.

Regarding health risks of glyphosate exposure to field workers, see section III.D and appendix M of the DEIS. For information on farm worker risks in particular, see DEIS section D.2.a.1 and appendix M.

Regarding gene flow from GT alfalfa to catch crops, farmers growing GT alfalfa must sign a mandatory Technical Use Agreement with Monsanto to reduce the possibility of gene flow as well as also follow the mandatory National Alfalfa and Forage Alliance (NAFA) Best Management Practices. For more information on these and other stewardship programs see section IV.B.4 and appendix V, 3.4.2 of the FEIS and appendix V 5.8 for data on compliance with these programs. Even with these programs, APHIS acknowledges that low level presence of GT alfalfa can occur in common or catch crop seeds and has an expanded discussion of the issue in appendix V, 5.2.2.1 of FEIS.

Comment Excerpt Text:
I am a consumer who is concerned about deregulating of round- up and the commercialization of GM-Alfalfa. please DO NOT support the commercialization of GM-alfalfa or any product that will contaminate the organic crops of Alfala, corn, wheat, or any grain product. My son had asthma as a child. the regular meds did not work on him. we found that the only product that work then and to this day makes a hugh impact on his life being free of asthma is ORGANIC ALFALFA. contaminated alfalfa did not work, we tried it. it made him worse. we have LIVING proof that the ORGANIC ALFALFA is working for him. please I ask protect organic and conventional agriculture. Please protect farmers' and consumers' right to choose organic and non-GE crops and foods by rejecting the deregulation of
Monsanto's GE alfalfa.
DO NOT SUPPORT: commercialization of GM-alfalfa
(Comment Number: APHIS-2007-0044-9711-1)

Response: APHIS acknowledges the comment. Regarding concern about human health and safety related to the presence of GT alfalfa, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0. Appendix P of the DEIS in particular analyzes the allergenicty of the CP4 EPSPS protein in GT alfalfa. No allergenic risk could be found. Furthermore, the CP4 EPSPS protein is functionally equivalent to native plant EPSPS protein, except for its affinity for glyphosate. Its protein sequence is not similar to sequences in any allergy database. See response to comment APHIS-2007-0044-9547-1 for issue 6.0 for additional discussion on this topic.

In regard to the adventitious presence of GE alfalfa with non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

6.1 Issue 6.1 – Introduction of Gene Product into Foods

Comment Excerpt Text:

I oppose any change that would result in the degregulation and or approval of GMO alfalfa. Alfalfa is one of the highest-protein green hay foods for ruminant animals (cows, goats, and sheep) and is also an ingredient in rabbit pet food and can be included in poultry feed as well. If deregulated, GMO alfalfa would quickly work its way into the American diet through meat and dairy. Such deregulation would also devastate the organic dairy industry, and damage organic meat producers. American consumers would be left in the dark, essentially unable to know whether they're consuming producs that were raised on GMO alfalfa.
In the broader sense, Round-Up Ready crops are incredibly damaging to water supplies. Ample evidence shows that agricultural runoff has resulted in tremendous damage to our waterways. The very premise of a crop that permits farmers to inundate it with pesticide with no apparent effect on the crop itself simply invites farmers to overuse the pesticide, leading to increased agricultural runoff and groundwater pollution beyond that which we already suffer from. (Comment Number: APHIS-2007-0044-0677-1)

Response: Regarding commenter's concerns about GT alfalfa entering the American diet, Sections IV.E.1 and .2 of the DEIS analyze and list reasons why the natural flow of genes or traits between alfalfa populations in the United States would likely not have a significant impact on the human environment.

Regarding commenter's concerns about GT alfalfa and damage to water supplies, see the response to this comment in 2007-0044-0375-1 for issue 8.1, APHIS-2007-0044-6238-1 for issue 8.2, and APHIS-2007-0044-6298-2 for issue 8.3.

In regard to the impact on organic farming, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
I travel abroad and publish in foreign journals. I interview foreign scientists, and farmers about their concerns with unethical research practices. The Lancet, I have already letters to, though not published. I have studied in foreign universities including the University of Caen, which has published on the deadly side effects of glyphosphate. I have been asked by American editors to submit such articles. For example a recently published letter in Iowa, described that rgbh is illegal in Canada, and all European nations because it is linked to high rates of cancer. And yet school children in the US are drinking this dangerous milk. Local farmers here, who grow bt-corn love me, because I'm exposing the corruption of Monsanto. (Comment Number: APHIS-2007-0044-0702-2)

Response: APHIS acknowledges this comment. The commenter refers generally to studies on the health effects of glyphosate, but does not provide a complete citation. The DEIS, however, describes numerous detailed analyses on the toxicity of glyphosate. See the response to comment APHIS-2007-0044-0352-1 in issue 6.3 for additional detail regarding these analyses. Also, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0 regarding the regulatory oversight, decision-making process, and human health and safety assessments for GT alfalfa.

Comment Excerpt Text:
USDA's job is to ensure food and drugs are safe for people to eat. By allowing Monsanto to continue genetically engineering food, in this case alfalfa, the Agency would be going against their goal. The health risksof genetically engineered foods is still unknown. But, lack of knowledge of a danger does not assure safety. I would like every member of this panel to consider if they would drink an unknown substance - simply because they didn't know if it was necessarily harmful. I could not, ethically, allow my family to eat GMO products because we are only now learning of its implications. A recent study showed strong evidence of organ failure in rats that consumed GMO products. USDA cannot consent to poison American families with more GMO products. The Agency has an obligation to protect human health and assure the safety of foods. By allowing Monsanto to grow GMO alfalfa, USDA is not assuring safety of Americans, but is taking a risk that it will be safe. That's not a risk I'm willing to take with my family. (Comment Number: APHIS-2007-0044-0781-1)

Response: APHIS acknowledges this comment; however, our analysis of relevant information supports a different conclusion. As discussed in section I.B of the DEIS, the mission of the APHIS Biotechnology Regulatory Services (BRS) is protect America's agriculture and environment using a dynamic-based regulatory framework that allows for safe development and use of genetically engineered organisms (GMOs). Regarding the commenter's concerns about the effects of GT alfalfa on human health, see the second paragraph of the response to comment APHI-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
Dear USDA Staff,
All of us understand your job is not easy. We want to feed many people in the world. We already can; yet many are still malnourished. Not because they simply ate very little but because it was so processed and unlike what it really was to begin with.
My father farmed almost every year of his life, I witnessed and heard often how companies like Monsanto dominated the source of seeds, I hear how they are monopolizing the seed sourcing almost like a Microsoft and the Windows system. This parallel cannot be ignored purely on a business model much less on a science model of cross contamination to organic foods.
WE CANNOT let the capitalistic model of decision making over rule the values of organic farming. Example, I recently read valid information on A1 and A2 bovine dairy farming in New Zealand and Austrailia. If a gene mutation like A1 can cause so much chronic human illness, then why are we entertaining accepting GM products without restrictions? I am not sure if it is possible to mandate enough distance for pollen to not co-mingle with organic crops. Even if you could agree on a distance between crops it doesn't matter. Organic farmers find that if the balance of insects are present the crops can succeed. Specific farming practices reduce weed pressure.
Man's ability to create highly sophisticated products and interventions does not always pay off in the end when it comes to nature. I personally have gone to eating a much higher content of raw food in my diet and am feeling better than I have in a long time. I have chronic illnesses related to Hashimoto Thyroiditis like asthma and reflux. The less we humans process and monkey around with the original genetic make up of plants and animals the better.

I have studied science and sustainability at Rochester Institute of Technology in the last four years and appreciate science immensely so the above statement is not made lightly. If you allow GE alfalfa, there is no turning back. (Comment Number: APHIS-2007-0044-0837-1)

Response: APHIS acknowledges this comment. Regarding the relevance of the A1 and A2 genes example, the commenter refers generally to a study but does not provide a citation, and thus APHIS is not able to validate the claim. Also, the A1 and A2 genes issue is related to a natural gene mutation in animals and is not relevant to GT alfalfa. Regarding the regulatory oversight, decision-making process, and human health and safety assessments for GT alfalfa more broadly, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
Consumers who ingest Roundup Ready alfalfa genes are risking their health; according to the environmental impact statement, "acute toxicity in mice was observed." (Comment Number: APHIS-2007-0044-11034-2)

Response: Regarding the commenter's concern about acute toxicity, section III.D of the DEIS states that the FDA concluded the CP4 EPSPS produced by GT alfalfa lines J101 and J163 was biochemically and functionally equivalent to CP4 EPSPSs produced by other Roundup Ready® crops and to the family of EPSPS proteins that naturally occur in crops and microbiologically-based processing agents that have a long history of by humans and animals. For additional information, including regarding an error in the DEIS about acute toxicity, see the response to comment APHIS-2007-0044-9204-3 for issue 6.0.

Comment Excerpt Text:
The DEIS also fails to address the human use market for year-round greens and sprouts. While the analysis cursorily addresses the current niche market for alfalfa seed for sprouting, it fails to consider
powerful trends in market development favoring local produce and demand for year round fresh greens
and sprouts. This market has the potential to expand dramatically as the cost of moving traditional
lettuces and micro greens across thousands of miles increases. There is great potential for a premium
niche market to develop both in conventional and organic alfalfa seed production for this sprouting
market. As noted in the DEIS, this market, because it is destined for human consumption, will have a
lower consumer tolerance for the presence of GE. In fact, it is highly likely that this market would offer
a price premium to seed that is certified GE-free, independent of an organic certification premium. This
market trend is evidenced in the growing popularity of a wide variety of foods marketed as "GE-free."

The Non-GMO Report [Footnote 24: The Organic and Non-GMO Report, http://www.non-gmoreport.com/ (last visited Feb 10, 2010).] documents this trend and the growing consumer demand for GE-free niche
products.[Footnote 25: Other crop industries with deregulated GE versions have shown this type of niche development. For example,
increasing consumer demand for GE-free soybeans coincides with a dramatic decrease in the availability of
certified GE-free soy seed. There, demand for non-GE is outstripping supply. The potential for this market trend
to affect future human-consumption alfalfa markets is not adequately addressed in the DEIS.] (Comment Number: APHIS-2007-0044-11741-8)

Response: Regarding the commenter's concerns about trends in market development favoring local produce for year round fresh greens and sprouts, section IV.D.5 of the DEIS analyzes the impact of socioeconomic impact on trade. In regard to consumer demand for GE-free products, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Comments of Consumers Union on the US Department of Agriculture/Animal, Plant Health Inspection Service (USDA/APHIS) on Docket No. APHIS-2007-0044, Glyphosate-tolerant Alfalfa Events J101 and J163: Request for Non-regulated StatusDraft Environmental Impact Statement (November 2009)

…The EIS also states that the Food and Drug Administration (FDA) has "concluded" that there is no risk to human health from GE alfalfa. However, the FDA has not made any conclusions on the human health risks of GE alfalfa because FDA does not have a premarket safety approval process. The conclusion that the GE alfalfa is safe is Monsanto's. …

...Besides use of GE alfalfa in dairy production, there is also a market for alfalfa sprouts, which USDA estimates at 15 to 18 million pounds in 1998. Thus, consumers could be directly exposed to GE alfalfa sprouts. USDA argues that "FDA concluded that CP4 EPSPS protein produced by GT [glyphosate tolerant] alfalfa lines J101 and J163 was biochemically and functionally equivalent to CP4 EPSPS produced by other Roundup Ready crops, and to the family of EPSPS proteins that naturally occur in crops and microbiologically-based processing agents that have a long history of safe consumption by humans and animals." However, FDA did not come to any such conclusion; Monsanto did. The FDA's Biotechnology Consultation note to Monsanto on GE alfalfa, referenced by USDA, states "The CP4 EPSPS protein used in this study was produced in E. coli. Monsanto and Forage Genetics note that the CP4 EPSPS protein produced in E. coli is biologically, chemically, and functionally equivalent to the CP4 EPSPS protein produced in plants" (italics added). More importantly, FDA has not come to any conclusions about the relative safety of GE alfalfa or of the CP4 EPSPS; it simply states that the company does not think there are any safety issues. As FDA noted in their letter to Monsanto on December 10, 2004, "Based on the safety and nutritional assessment Monsanto and Forage Genetics have conducted, it is our understanding that Monsanto and Forage Genetics have concluded that food and feed derived from the new alfalfa varieties are not materially different in

composition, safety, and other relevant parameters from food and feed derived from alfalfa varieties currently on the market, and that the genetically engineered alfalfa varieties do not raise issues that would require premarket review or approval by the FDA." USDA also notes that "while acute toxicity in mice was observed, allergenic responses associated with Roundup Ready crops have not been reported by farm workers or members of the general population since the commercialization of these crops in 1996." In other words, there was no follow-up to this finding in mice.

Since FDA has not conducted a proper safety assessment of the GE alfalfa lines J101 and J163, we urge USDA to require more safety data on these crops. In fact, we urge USDA to require a food safety assessment that should be at least as stringent as the range of tests laid out in the Codex Alimentarius "Guidelines for the Conduct of Food Safety Assessment of Foods Derived from Recombinant-DNA Plants" (CAG/GL 45-2008)…. (Comment Number: APHIS-2007-0044-11865-1)

Response: Regarding concern for GT alfalfa in sprouts, see the response to comment APHIS-2007-0044-0382-1 for issue 6.0.

Regarding the comment on the FDA conclusion, APHIS notes that FDA considers, based on agency scientists' evaluation of the available information, whether any unresolved issues exist regarding the food derived from the new plant variety that would necessitate legal action by the agency if the product were introduced into commerce. Examples of unresolved issues may include, but are not limited to, significantly increased levels of plant toxicants or anti-nutrients, reduction of important nutrients, new allergens, or the presence in the food of an unapproved food additive. For more on the FDA role, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0 and Consultation Procedures Under the FDA 1992 Statement of Policy - Foods Derived from New Plant Varieties (June 1996; Revised October 1997). The wording in the FEIS has been corrected accordingly.

Regarding the reference to the erroneous statement in the DEIS about acute toxicity in mice, see the response to comment APHIS-2007-0044-9204-3 for issue 6.0.

Regarding compliance with Codex Alimentarius Commission guidelines, the FDA review process is similar to the Codex guidelines (e.g., for allergenicity, conducting a review of immunologically relevant sequences, as determined by comparison of the amino acid sequence of the CP4 EPSPS protein to sequences in several allergen databases).

Comment Excerpt Text:
Oppose approval of genetically engineered alfalfa.
Organic consumers strongly care about genetically engineered alfalfa (and soybeans, corn, etc):
- Contaminating natural crops, and entering into the human food chain,
- Devaluing or destroying the marketability of food crops,
- Adding increased glyphosate pesticide toxicity to the environment and food chain,
- Causing serious disease to humans (link between glyphosate and non-Hodgkins lymphoma: Journal of the American Cancer Society).

Only Monsanto profits from genetically altered seeds/plants; we the people suffer the consequences. (Comment Number: APHIS-2007-0044-2207-1)

Response: APHIS acknowledges the comment. Regarding the commenter's concerns about genetically engineered alfalfa contaminating natural crops and entering the food chain, see the first paragraph of the response to comment APHIS-2007-0044-0677-1 for issue 6.1.

Regarding the commenter's concerns about glyphosate pesticide toxicity to the environment and food chains, see the second paragraph of the response to comment APHIS-2007-0044-0677-1 for issue 6.1.

In response to concerns over glyphosate carcinogenicity, see the second paragraph of the responses to comment APHIS-2007-0044-2243-1 for issue 6.0.

Comment Excerpt Text:
I raise grass finished beef to health conserned customers, and most of them don't want GMO's involved with their food. (Comment Number: APHIS-2007-0044-2209-2)

Response: APHIS acknowledges this comment. Regarding the commenter's concerns about the effects of GT alfalfa on human health, see the second paragraph of response to comment APHI-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
I very much do NOT want to consume food that is genetically engineered (GE) or has ingredients that have GE's in them. Further, I do not want to eat dairy or meat products where the cow or other animal has eaten GE's. GE's have not been sufficiently studied and what studies there are indicates that GE's are harmful. Short of banning them (my first choice) at least the public should know what products have GE's or were raised with GE's.
Please do NOT approve GE alfalfa as being Roundup Ready. Please do not approved ANY food items for people or animals that have GE's. (Comment Number: APHIS-2007-0044-2218-1)

Response: Regarding the commenter's concerns about the effects of GT alfalfa on human health and the adequacy of the research, see the second paragraph of response to comment APHIS-2007-0044-0278-1 for issue 6.0. Regarding notifications regarding genetically modified products, see the response to comment APHIS-2007-0044-0416-1 for issue 2.0.

Comment Excerpt Text:
I am against the approval of Glyphosate Tolerant Alfalfa and am concerned about its effects on the food I eat. Please do not approve this GE product to enter our food chain. (Comment Number: APHIS-2007-0044-2220-1)

Response: APHIS acknowledges the comment. Regarding the commenter's concerns about the effects of GT alfalfa on human health, see the second paragraph of response to comment APHIS-2007-0044-0278-1 for issue 6.0

Comment Excerpt Text:
I am concerned about genetic engineering (GE) of foods and other products and about GE contamination.
I will not buy or consume GE foods or any that have been directly or indirectly contaminated by GE plants, goods and processes, e. g. alfalfa.
Thank you
(Comment Number: APHIS-2007-0044-2236-1)

Response: APHIS acknowledges the comment. Regarding the commenter's concerns about the effects of GT alfalfa on human health, see the second paragraph of response to comment APHIS-2007-0044-0278-1 for issue 6.0

Comment Excerpt Text:
I am totally against GE contamination of our food source!!! We have many illnesses and I strongly believe much is because of how we have contaminated the food source. (Comment Number: APHIS-2007-0044-2238-1)

Response: APHIS acknowledges the comment. Regarding the commenter's concerns about GT alfalfa contaminating the food source, see the first paragraph of the response to comment APHIS-2007-0044-0677-1 for issue 6.1. Regarding concerns about the effects of GT alfalfa on human health, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
I am writing to express my concerns about genetically engineered food. This is a bing issue or concern for my family. We choose organic when offered an option but are beginning to find that we have little or no option when it comes to produce because the food is being mixed in the fields.
Please enforce restriction to the distribution of genetically engineered foods.
Thanks, Marv Kvamme
(Comment Number: APHIS-2007-0044-2239-2)

Response: Regarding the commenter's concerns that GT alfalfa may be present at low levels in the food source, see the first paragraph of the response to comment APHIS-2007-0044-0677-1 for issue 6.1.

Comment Excerpt Text:

I do NOT want toxic chemicals allowed in my organic foods. That is the reason I eat organic foods...because they lack the roundup and DEI that is in all non-organic foods. Please do not poison my son and I:((Comment Number: APHIS-2007-0044-2241-1)

Response: APHIS acknowledges the comment. Regarding the commenter's concerns that GT alfalfa may have a low level presence with other conventional foods see the first paragraph of the response to comment APHIS-2007-0044-0677-1 for issue 6.1. Regarding concerns about the effects of GT alfalfa on human health, see the second paragraph of the response to comment APHIS-2007-0044-0278-1for issue 6.0.

Comment Excerpt Text:
I would just like to state that I do care wether or not the products I buy contain Genetically Modified components. I would also like to state that there is a large population that would agree with me but are uninformed of the decisions made in the food system. Allowing Monsanto to control our alfalfa supply may lead to them thinking that they too own the cattle who eat the alfalfa. All of which is impossible.
Please please please believe that people do not know much of what is happening to their food, and if they did they might not like what they found out. I personally do not want to eat or support the industry of Genetically Modified food. I would rather starve.
Thank you for you time
(Comment Number: APHIS-2007-0044-2262-1)

Response: APHIS acknowledges the comment. Regarding the commenter's concerns that GT alfalfa may have a low level of presence in the food source, see the first paragraph of the response for APHIS-2007-0044-0677-1 for issue 6.1. Regarding concerns about the effects of GT alfalfa on human health, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
You can not allow the GMO alfalfa!!!! We do not know if it is safe! No one has REALLY spent any time to see what the long term effects of this mutant really are! It is all a scheme to poison the very food we eat! I am a horse owner and I do not want my horse eating this either!
(Comment Number: APHIS-2007-0044-3257-1)

Response: Regarding the commenter's concerns about the long term effects of GT alfalfa, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
A smaller concern is the efficacy of their testing on the safety in the food chain. The livestock are safe, but what about the person who eats lots of read meat or the pregnant woman? Has testing in this type of scenario been done? (Comment Number: APHIS-2007-0044-6304-1)

Response: APHIS acknowledges the comment. Regarding the commenter's concerns about the health and safety of GT alfalfa, see the response to comment APHIS-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
Although consumers might not eat alfalfa directly, alfalfa is a major feed for cows and other livestock. There have been no studies showing that GE alfalfa is safe for feeding to livestock or what effect feeding GE-alfalfa has on the meat or milk from such animals. Because of the risk of contamination of non-GE crops, approval of GE alfalfa could ultimately make it impossible for farmers to find GE-free sources for their livestock. I urge you to withhold approval for genetically engineered alfalfa. Thank you. (Comment Number: APHIS-2007-0044-6331-2)

Response: APHIS acknowledges the comment. Section IV and Appendix Q of the DEIS address the safety of GT alfalfa in human food and animal feed. No deleterious effect of the CP4 EPSPS protein (the unique component of GT alfalfa) have been seen. Regarding the commenter's concerns about the effect of GT alfalfa on the meat or milk from animals, as well as about glyphosate and other health and safety concerns, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0. The commenter's concerns about the presence of non-GT alfalfa with GT alfalfa are addressed in the first paragraph of the response to comment APHIS-2007-0044-0677-1 for issue 6.1.

Comment Excerpt Text:
I am a consumer and I do not want genetically altered alfalfa to be permitted into our food chain. There is no long term studies that show one way or another how this affects health issues. Thank you Mrs. Grubbs. (Comment Number: APHIS-2007-0044-6339-1)

Response: APHIS acknowledges the comment. Regarding the commenter's concerns about the long term effects of GT alfalfa, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0 and APHIS-2007-0044-0677-1 for issue 6.1.

Comment Excerpt Text:
There are identified 65 potential health risks of eating GMO foods. When given a choice cows, pigs, elk, deer, raccoons, geese, squirrels and mice, have shown a preference for non-GMO or complete avoidance of GMO food. The GMO process uses promoter, terminator and an antibiotic-resistant marker gene to identify GM protein cells. The blasting of this gene process creates mutations. The GMO process allows genes to cross the species barrier. There is too much risk and not enough testing to allow this GMO alfalfa to enter the human food chain. (Comment Number: APHIS-2007-0044-6597-1)

Response: APHIS acknowledges the comment. Regarding the commenter's concerns about the health risk and testing of GT alfalfa, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0. Section IV and Appendices P and Q of DEIS provides a comparison analysis of GT and conventional alfalfa, and conclude that the food/feed derived from GT alfalfa are as safe and nutritious as current commercial varieties. Since the commenter did not provide a citation for

statement regarding the preference of livestock for non-GT foods, APHIS cannot validate the accuracy of claim.

Comment Excerpt Text:
I do not want gmo's in my food! I have done the research. GMO's are not safe. And cause damage to the human body! If you do not belive me, research these names, BiologistArpad Pusztai, Scientist Irina Ermakova, Embryologist Andres Carrasco, Virologist Terje Traavik. Goggle these names you will be deeply saddened, and disguisted to what is happening to America food supply. We are being slowly posioned. And nobody seems to care within our federal government! Go read, Seeds of Deception by Jeffrey M. Smith. And Genetic Roulette: The Documented Health Risks of Genetically Engineered Foods. This book identifies 65 risks of GMO's and demonstrates how superficial government approvals are not competent to find most of them! All you have to do is read the proof!!!! (Comment Number: APHIS-2007-0044-6599-1)

Response: APHIS acknowledges the comment and researched all credible scientific studies. Regarding the commenter's concern about the overall safety of GT alfalfa to human health, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0. For additional discussion about the cited authors, see response to comment APHIS-2007-0044-9516-1 for issue 6.0.

Comment Excerpt Text:
You need to know for one example among so many other studies. the following study: "shows that when humans digest genetically modified foods, the artificially created genes transfer into and alter the character of the beneficial bacteria in the intestine. (Heritage 2004: Netherwood, et al, 2004). (Comment Number: APHIS-2007-0044-6620-1)

Response: The paper by Netherwood et al. (2004) and the discussion by Heritage (2004) address the finding by Netherwood et al. of evidence of low-frequency EPSPS gene transfer from genetically modified soya to the microflora of the small bowel. Note, however, that in this study and as discussed in more detail in DEIS appendix Q, section 2.1.1.4 regarding earlier studies, no recombinant DNA sequences were found in any organ or tissue sample from animals fed GE plants. Furthermore, only the microflora contained EPSPS, and only in fragments; the full-length gene was not detected, and the bacteria themselves could not be conclusively determined to have contained the fragments. Also, sample presence cannot be ruled out. The authors also note that the potential gene transfer events from transgenic plants to gut microflora are highly unlikely to alter gastrointestinal function or endanger human health. As Heritage (2004) notes, replication of this study would be useful, as would determining whether transgenic DNA present in cultured digesta, and presumably found in the bacterium, was being expressed.

Regarding the commenter's overall concern about the overall safety of GT alfalfa to human health, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:

The studies that I have read, amongst those suppressed by agrobusiness, show that the modification in the plant gene carries forth into the intestines of the consumer, thereby modifying the consumers genetic makeup and allowing their own body to produce pesticides or herbicides. The problem is that these pesticides and herbicides are dangerous to our organism and thus create a harmful cascade of events. Through consuming GMO we are initiating a process of self destruction. (Comment Number: APHIS-2007-0044-6635-2)

Response: APHIS acknowledges the comment. Regarding the commenter's concern about the transfer of GT alfalfa genes to humans, see the response to comment APHIS-2007-0044-6620-1 for issue 6.1. Also, note that the CP4 EPSPS gene in alfalfa only expresses homologues of endogenous proteins for normal metabolism, not pesticides or other substances.

Comment Excerpt Text:
I am writing as a consumer to say that I oppose the release of genetically modified alfalfa into the environment. To date I understand that adequate testing has not been done to ensure safety. Meanwhile, a recent study showed that GMO corn caused organ failure in rats. Hints are emerging that GMO crops may be dangerous, and I see no reason to rush a big decision that could lead to health hazard. (Comment Number: APHIS-2007-0044-6940-1)
Response: APHIS acknowledges the comment and researched the provided names. The commenter refers generally to a study on the health effects of GMO corn, but does not provide a complete citation. Regarding the commenter's concern about the overall safety of GT alfalfa to human health, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
Genetically engineered Alfalfa must not be allowed. I have seen the negative impact of genetically engineered foods in numerous patients already. There is an explosion of sensitivities and allergies to the foods that have been genetically modified. People are suffering. Let's not add Alfalfa to the list as it will affect our dairy and meat sources. With genetically modified foods there is no going back and getting rid of them - we are permanently affecting our crops. We need to value the health of humans first and foremost above the financial health of corporations. (Comment Number: APHIS-2007-0044-7101-1)

Response: APHIS acknowledges the comment. Regarding the commenter's concerns for allergies and other health effects from GT alfalfa, see the second paragraph of the response to comment APHIS-2007-0044-9547-1 for issue 6.0.

Comment Excerpt Text:
Abundant information is appearing to show that we have been misled regarding the toxic effects of GE food crops. These crops present a significant health risk that cannot be ignored or avoided if they are introduced. In addition there are misrepresentations as to the increased crop yields which it turns out have not been resulting. This skirting of judicial findings is a dangerous one and should not be adopted. The FDA's own scientists warned of the dangers of GE crops but

were ignored by superiors who were former employees of Monsanto. (Comment Number: APHIS-2007-0044-7139-1)

Response: APHIS acknowledges the comment. Regarding the commenter's concerns about the toxic effect of GT alfalfa, see the second paragraph of response to comment APHIS-2007-0044-0278-1 for issue 6.0. Regarding FDA, appendix P of the DEIS, documents FDA's review of the data indicating that food/feed derived from GT alfalfa are not materially different in safety, composition, or any other relevant parameter from alfalfa now grown, marketed, and consumed.

Comment Excerpt Text:

I do not want any of my food supply contaminated with genetically modified plant material. Please do not allow GMO alfalfa as this would devistate the organically grown alfalfa and spread contaminated GMO alfalfa into the food supply. (Comment Number: APHIS-2007-0044-7205-1)

Response: APHIS acknowledges the comment. Regarding the commenter's concerns about the movement of GT alfalfa into the food supply, see the first paragraph of the response to comment APHIS-2007-0044-0677-1 for issue 6.1.

Comment Excerpt Text:

Consumers who ingest Roundup Ready alfalfa genes are risking their health; according to the environmental impact statement, "acute toxicity in mice was observed."
Also the EIS warns that, "...infants consuming fruit and all age groups consuming vegetables may be at risk of adverse effects associated with acute exposure to glyphosate residues." (Comment Number: APHIS-2007-0044-7239-2)

Response: APHIS acknowledges the comment. Regarding the commenter's concerns about acute toxicity and exposure to infants, see the response to comment APHIS-2007-0044-9204-3 for issue 6.0. The adverse health risk to infants from glyphosate exposure (Section III.D and appendix L of the DEIS) is based on highly conservative fruit and vegetable intake rates and high concentrations of glyphosate.

Comment Excerpt Text:

I absolutely do not want the ban on Monsanto's GMO alfalfa lifted. So much talk of democracy and freedom, but Monsanto is opposed to both. I believe that GMOs are dangerous to life. Their sole purpose is to give a few corporations a monopoly on the world's food supply. Increasing the use of pesticides is dangerous to our health and I believe that this kind of tinkering with DNA is turning our food into poison. (Comment Number: APHIS-2007-0044-7246-1)

Response: APHIS acknowledges the comment. Regarding the commenter's concerns about the increase use of glyphosate and its health effects, and about the use of GT alfalfa in general, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:

I have a right to eat organic, non-GM foods and your approving GM seed is taking this right from me. You might wonder why I want organic food, food grown from seed that has evolved naturally over thousands and millions of years. The reason: that type of food is in harmony with my body that evolved along with that food. GM food, in contrast, has been produced without any real concern for consumer health. A recent study links GM food with organ damage. (See "A Comparison of the Effects of Three GM Corn Verities on Mammalian Health" by Joel Spiroux de Vendômois, et. al. in Int J Biol Sci 2009; 5:706-726.) Another study based on Monsanto's own data by Dr Gilles-Eric Seralini, from the University of Caen, showed that GM food could cause liver and kidney damage. (http://www.dailymail.co.uk/news/article-1244824/Fears-grow-study-shows-genetically-modified-crops-cause-liver-kidney-damage.html#ixzz0fIIM4AfD)
In fact, far too little research has been done on consumer health effects to justify releasing GM crops, including the contemplated alfalfa. (Comment Number: APHIS-2007-0044-7453-2)

Response: APHIS acknowledges the comment. Regarding the commenter's concerns about the toxic effect of GT alfalfa, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0. For analysis of the citations provided by the commenter, see response to comments APHIS-2007-0044-11328-1 for issue 6.0.

Comment Excerpt Text:
GMO and GM is excellent for a Silence Genocide explain a bit more why, GM Pollen in the wind they blow together with thermic find this Toxic Pollen no borders and go from Country to another Country yes to other Contigents and why must all Citizens around the whole World breath Toxic Chemical Pollen the whole year around, it make them soon or later sick.
This is a complete forgotten item by Cross Pollination know Beekeepers that all old plants, bush and trees change their DNA this is also the case by Human People and their animals, birds and fish. Inclosed a Power-Point-Presentation DBIB Profesional Germany Beekeepers let excellent see why GM plants is complete CHEMICAL DUST you can read this also in the study Spiroux Prof. Seralini did send me 17 February 2010 a email with 'The important thing after NK603 consumption is : heart increase by 11%, spleen increase after MON810 by 18% in females this is all a reason to forbidden GM Alfalfa but also GMO Beet- and Cane Sugar also Beet- and Cane Sugar with Roundup et al with Glyphosate the same for Maize et al. (Comment Number: APHIS-2007-0044-8804-2)

Response: APHIS acknowledges the comment. Regarding the commenter's concerns about the containment of GT alfalfa from organically grown alfalfa and food supply, see the first paragraph of the response to comment APHIS-2007-0044-0677-1 for issue 6.1. In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. For analysis of the citations listed in the comment, see the response to comment APHIS-2007-0044-11328-1 for issue 6.0.

Comment Excerpt Text:
Eating genetically modified (GM) foods may cause disease

GMOs may be the greatest health disaster in the American diet. Within 9 years of their introduction in 1996, multiple chronic illnesses jumped from 7 percent to 13 percent of the population,[1] food allergies doubled in less time, and many other ailments have been on the rise. Millions may already be suffering health problems caused by genetically modified organisms (GMOs) in their diet. The American Academy of Environmental Medicine has urged doctors to prescribe non-GMO diets for all patients, and cites animal studies that show how GMOs cause disorders such as vital organ damage, gastrointestinal and immune system problems, accelerated aging, infertility, and dysfunctional regulation of insulin and cholesterol.
Baby rats from moms that ate GM soy were smaller than those fed natural soy. More than half the GM soy group died within three weeks. Irina Ermakova, 2005-2007. (Comment Number: APHIS-2007-0044-9298-6)

Response: APHIS acknowledges the comment. Regarding the commenter's concerns about GT alfalfa causing chronic illness and food allergies, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0. For analysis of discredited work by Ermakova, see the response to comment

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Comment Excerpt Text:
The real concern I see for GMO alfalfa is that the nation's milk supply will be produced with GMO alfalfa and all of the tons of forage consumed will have received glyphosate or Round Up. It will be virtually impossible to guarantee a mother that her baby is not receiving milk produced from GMO forage -- nearly all of which was sprayed directly with Round Up before harvest. As with the case of GMO soybeans and corn, only the plants are sprayed with Round Up (prior to seed development) so the actual grain-- the corn and soybean seeds are not physically sprayed but are then utilized as feedstuffs. However, with alfalfa the whole plant is utilized for feedstuffs with the potential contaminants both genetically in the plant and also the potential residual effects of the glyphosate chemistry on the plant itself.
If GMO alfalfa is approved for widespread use, it will be impossible for a mother to provide GMO and Round UP-free milk for her baby.
This puts our nation's milk supply at extreme risk for contamination!
I also consume organic foods and alfalfa tablets for my health and well being (they are especially good for alkalizing the body which helps prevent cancer) and I do not want any GMO food going into my body!! (Comment Number: APHIS-2007-0044-9319-1)

Response: APHIS acknowledges the comment. Regarding the commenter's concerns about the long term effects of GT alfalfa, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0. Regarding the commenter's concerns about GT alfalfa contaminating the food supply, see the first paragraph of the response to comment APHIS-2007-0044-0677-1 for issue 6.1. Also see Appendices L and Q of the DEIS, which analyze the health effects of glyphosate residue on consumed forage and conclude that it does not appear to result in adverse effects in development, reproduction, endocrine systems in human and other mammals.

Comment Excerpt Text:

It is well accepted that genetic engineering has a greater likelihood of producing unintended effects than traditional breeding, some of them hazardous or detrimental. [Footnote 72 NAS (2004). Safety of Genetically Engineered Foods: Approaches to Assessing Unintended Health Effects, Committee on Identifying and Assessing Unintended Effects of Genetically Engineered Foods on Human Health, Institute of Medicine & National Research Council, National Academy of Sciences.] Unintended effects are rarely well-understood, but can result from extensive mutations to the organism's genes caused by the genetic engineering process, [Footnote 73 Wilson, AK, Latham, JR and RA Steinbrecher (2006). "Transformation-induced mutations in transgenic plants: Analysis and biosafety implications," Biotechnology and Genetic Engineering Reviews, Vol 23, Dec. 2006, 209-234.] or unexpected metabolic alterations. Such disruptions are sometimes evident in the form of non-viable or debilitated organisms. Others may have subtler effects that go undetected in the development process. Potential adverse effects include the unintended amplification of naturally occurring toxins that are normally present at low, unobjectionable, levels; the unintended creation of novel toxins; or reduced levels of nutrients. (Comment Number: APHIS-2007-0044-9936-24)

Response: APHIS acknowledges the comment. Note that a full comparison of possible changes to nutritional properties and to the known toxins of the crop plant are made before deregulated status is awarded. The developer removes all "events" (organisms) that are "debilitated" in any way before submitting one or a few events to the government for product approval. No novel toxins have ever been found in any GE plant, or unexpected increases in natural crop toxins, other than those reported by the developer before approvals. Regarding the commenter's overall concerns about safety and human health, see the complete response to comments APHIS-2007-0044-0278-1 in issue 6.0.

6.2 Issue 6.2 – Impact of Introduction of Gene Product into Animal Feed

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Comment Excerpt Text:
I AM NOT AGAINST RRA IF THE ISSUE OF CROSS CONTAMINATION HAS BEEN ADDRESSED. I WOULD BE INTERESTED IN LONG TERM STUDIES OF GMO MODIFIED ALFALFA ON LIVESTOCK PHYSIOLOGY. (Comment Number: APHIS-2007-0044-2246-1)

Response: APHIS acknowledges the comment. Regarding the issue of mixtures of GT and non-GT crops-, section IV.B of the DEIS analyses the issue of the mixing, see response to comment APHIS-2007-0044-12026-7 in issue 3.1. Regarding the issue of long term studies of GT alfalfa on livestock and physiology, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
If the USDA lets Monsanto sell its new alfalfa, it will inevitably overtake organic alfalfa crops through the natural pollination process. As a result organic farmers may be feeding their cows genetically modified food which goes against it's regulation of organic certification requirements. (Comment Number: APHIS-2007-0044-6207-1)

Response: APHIS acknowledges the comment. See the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. In regard to the National Organic Program, see the response to comment APHIS-2007-0044-10866-5 for issue 3.3.

Comment Excerpt Text:
I am writing to voice my adamant objection to the release or use of genetically modified Alfalfa, this will adversely effect all of us that want to stay as for away from GMO food as possible. It could be fed to animals that are sold as Organic, including dairy products. (Comment Number: APHIS-2007-0044-6316-1)

Response: APHIS acknowledges the comment. Regarding the commenter's concerns about food-related adverse health effects, see the second issue of the response to comment APHIS-2007-0044-0278-1 for issue 6.0.Also see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
I'm a veterinarian that's involved in forage quality and health and nutrition of primarily dairy cattle. I support glyphosate technology in alfalfa since in my job capacity I have seen no difficulty in feeding hay or silages from glyphosate tolerant alfalfa across North America even though it has been in production since 2005. The feed quality advantage of glyphosate tolerant alfalfa forages, will be fewer of the noxious weeds that can sicken or even kill animals that eat the hay and silages. Given better control of noxious and poisonous weeds, glyphosatate tolerant alfalfa will improve the wellbeing of cattle. (Comment Number: APHIS-2007-0044-6358-2)

Response: APHIS acknowledges the comment. The analysis in the DEIS supports the comment, as discussed in DEIS section III.E.3.

Comment Excerpt Text:
please do not approve genetically modified alfalfa, as it has not been proved to be harmless to livestock as a feed. (Comment Number: APHIS-2007-0044-6507-1)

Response: APHIS acknowledges the comment; however, our analysis of relevant information supports a different conclusion. As discussed in issue III.B.4 of the DEIS, APHIS concluded that there were no differences between GT alfalfa and the control.

Comment Excerpt Text:
While it has been argued that GE traits themselves will not show up in beef and dairy end-products, a survey of milk products sold in stores in Italy (screening of 60 samples of 12 different milk brands) demonstrated the presence of GM maize sequences in 15 (25%) and of GM soybean sequences in 7 samples (11.7%). Also, research shows that glyphosate-tolerant forage (which therefore contains residues of glyphosate) fed to mammals has negative/toxic

effects on animal blood, kydney and liver function after feeding for only five to fourteen weeks (de Vendmois JS, Roullier F, Cellier D, Sralini GE. A Comparison of the Effects of Three GM Corn Varieties on Mammalian Health. Int J Biol Sci 2009; 5:706-726. Available from http://www.biolsci.org/v05p0706.htm) These effects would be introduced into the human food chain as well as impacting the food chain and health of cervids and other wild foraging animals. (Comment Number: APHIS-2007-0044-6914-1)

Response: Regarding the commenter's concerns about food-related adverse health effects, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0. In regard to past accidental mixtures of GT and non-GT crops, see the response to comment APHIS-2007-0044-9936-10 for issue 11.15. Regarding the first study noted, a specific citation was not provided and therefore APHIS cannot evaluate the study; however, the response to comment APHIS-2007-0044-6620-1 for issue 6.1 is applicable. For analysis of the second citation, see response to comment APHIS-2007-0044-11328-1 for issue 6.0.

Comment Excerpt Text:
Genetically engineered Alfalfa must not be allowed. I have seen the negative impact of genetically engineered foods in numerous patients already. There is an explosion of sensitivities and allergies to the foods that have been genetically modified. People are suffering. Let's not add Alfalfa to the list as it will affect our dairy and meat sources. With genetically modified foods there is no going back and getting rid of them - we are permanently affecting our crops. We need to value the health of humans first and foremost above the financial health of corporations. (Comment Number: APHIS-2007-0044-7101-1)

Response: APHIS acknowledges the comment. Regarding the commenter's concerns about sensitivities and allergies to GT alfalfa, see the response to comment APHIS-2007-0044-7101-1for issue 6.1. Appendix P of the DEIS analyzed the allergic potential of CP4 EPSPS protein produced in GT alfalfa (lines J101 and J163) and concluded that it does not impose a significant allergenic risk. Furthermore the immunologically relevant sequences in C4 EPSPS protein do not resemble the sequences in any allergen database. Appendices P and Q of the DEIS analyzed the health risk CP4 EPSPS protein found in GT alfalfa and other GT crops and concluded that the food/feeds derived from them are as safe and nutritious as conventional varieties. There has been no identified medical cause and effect from GT alfalfa consumption.

Comment Excerpt Text:
Environmental Impact: Alfalfa relies on open pollination by bees. Evidence strongly suggests that GEGT Alfalfa will cross pollinate with other alfalfa crops despite intended protections. (note actual cases reported of cross contamination). While it has been argued that GE traits themselves will not show up in beef and dairy end-products, a survey of milk products sold in stores in Italy (screening of 60 samples of 12 different milk brands) demonstrated the presence of GM maize sequences in 15 (25%) and of GM soybean sequences in 7 samples (11.7%). Also, research shows that glyphosate-tolerant forage (which therefore contains residues of glyphosate) fed to mammals has negative/toxic effects on animal blood, kydney and liver function after feeding for only five to fourteen weeks (de Vendmois JS, Roullier F, Cellier D, Sralini GE. A Comparison of

the Effects of Three GM Corn Varieties on Mammalian Health. Int J Biol Sci 2009; 5:706-726. Available from http://www.biolsci.org/v05p0706.htm) These effects would be introduced into the human food chain as well as impacting the food chain and health of cervids and other wild foraging animals. (Comment Number: APHIS-2007-0044-7249-1)

Response: See the response to comment APHIS-2007-0044-6914-1 for issue 6.2. In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for issue 3.1. In regard to past low level presence, see the response to comment APHIS-2007-0044-9936-10 for issue 11.15.

Comment Excerpt Text:
I do not want to buy any GE alfalfa derived meat and dairy products. This will lead to contamination of organic farmers crops and will jeopardize family farms. There is already GE contamination of canola, soy and corn by Monsanto's seeds and Alfalfa will be more of the same. There have been no studies of the effects of feeding GE alfalfa to livestock. The USDA should NOT approve GE alfalfa. (Comment Number: APHIS-2007-0044-7255-1)

Response: APHIS acknowledges this comment; however, our analysis of relevant information supports a different conclusion about the effects of feeding GT alfalfa to livestock. As discussed in section III.B.4 of the DEIS, APHIS concluded that there were no differences between GT-fed and control cows. See the second paragraph of the response to comment APHIS-2007-0044-0278-1for issue 6.0 for further discussion. In regard to the adventitious presence of GE alfalfa with non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to past low level of mixing (GT alfalfa/alfalfa) episodes, see the response to comment APHIS-2007-0044-9936-10 for issue 11.15. In regard to the impact on small farms, see the response to comment APHIS-2007-0044-4913-7 for issue 5.1.

Comment Excerpt Text:
feel strongly that animals should not be feed genetically modified foods, especially if I am later going to eat animals products from that animal. I do not feel that adverse effects of genetically modified foods on animals and individuals have been studied effectively. I also feel that once GM alfalfa is planted there will be little means to protect against contamination of organic alfalfa with the GM version. This puts an undue burden on organic ranchers and farmers who do not want GM alfalfa in their fields or their animals. (Comment Number: APHIS-2007-0044-7258-1)

Response: APHIS acknowledges the comment. Regarding the commenter's concern of food-related adverse health effects, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0. In regard to the mixing of non-GE or organic alfalfa with GT alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:

Alfalfa is a major food source for livestock and GE alfalfa would destroy the integrity of organic dairy products. (Comment Number: APHIS-2007-0044-7266-3)

Response: APHIS acknowledges the comment. See the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
The USDA's Environmental Impact Statement on genetically engineered alfalfa paves the way for the unregulated commercialization of Monsanto's Roundup Ready alfalfa. As a consumer of organic food, I strongly oppose this action because it will result in the genetic contamination of organic food.
Genetically engineered alfalfa would be the first perennial GM crop, and would result in a huge increase of toxic RoundUp in the environment. It would expose livestock widely to both genetically engineered genes and pesticide residues. It would especially affect cows and horses--their health, their reproduction, and their byproducts, particularly milk.
Alfalfa pollen is carried far and wide by the wind and bees, so the presence of GM alfalfa in the environment would contaminate organic alfalfa, rendering organic dairy impossible. Consumers who eat alfalfa sprouts would be exposed directly, as well as those who eat meat. (Comment Number: APHIS-2007-0044-7272-1)

Response: Regarding the commenter's concern that the use of GT alfalfa would result in adverse health effects and a large increase of glyphosate, see response to comment APHIS-2007-0044-0278-1 for issue 6.0. In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. In regard to the impact on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Section IV.E.1 of the DEIS stated that Monsanto, the developer of GT alfalfa, pursuant to its mandatory agreement for growing its GT alfalfa lines, does not allow GT alfalfa to be planted for sprouts. Furthermore, see responses to comments APHIS-2007-0044-0677-1 for issue 6.1, APHIS-2007-0044-9547-1 for issue 6.0, and APHIS-2007-0044-0382-1 for issue 6.0 for more information about direct and indirect exposure to GT alfalfa.

Comment Excerpt Text:
Alfalfa pollen is carried far and wide by the wind and bees, so the presence of GM alfalfa in the environment would contaminate organic alfalfa, rendering organic dairy impossible. Consumers who eat alfalfa sprouts would be exposed directly, as well as those who eat meat. You have no right to contaminate our environment. (Comment Number: APHIS-2007-0044-7287-3)

Response: See responses to comments APHIS-2007-0044-0677-1 for issue 6.1, APHIS-2007-0044-9547-1 for issue 6.0, and APHIS-2007-0044-0382-1 for issue 6.0 for more information about direct and indirect exposure to GT alfalfa. See the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0. Section IV.E of the DEIS stated that the developer of GT alfalfa, pursuant to the mandatory agreement it requires from those who want to grow the GT alfalfa lines, does not allow GT alfalfa to be planted for sprouts. In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. In

regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for issue 3.1. In regard to the impact on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

6.3 Issue 6.3 – Glyphosate Exposure and Other Herbicide Use

Comment Excerpt Text:
The issues of gene flow between conventional and glyphosate tolerant alfalfa have been addressed. There are no other safety or environmental concerns (at least among educated people) that justify delaying the general release of this product. If anything, there are environmental benefits from the release of glyphosate tolerant alfalfa seed, since the use of more persistent and volatile herbicides will be reduced.
Farmers want and need an economic, safe, and dependable tool for weed control. This fills the bill. (Comment Number: APHIS-2007-0044-0263-2)

Response: APHIS acknowledges the comment. See the response to comment APHIS-2007-0044-6240-2 for issue 6.0 for additional discussion of this issue.

Comment Excerpt Text:
Most glyphosate-containing products are either made or used with a surfactant, chemicals that help glyphosate to penetrate plant cells.
Glyphosate-containing products are acutely toxic to animals, including humans. Symptoms include eye and skin irritation, headache, nausea, numbness, elevated blood pressure, and heart palpitations. The surfactant used in a common glyphosate product (Roundup) is more acutely toxic than glyphosate itself the combination of the two is yet more toxic.
Given the marketing of glyphosate herbicides as benign, it is striking that laboratory studies have found adverse effects in all standard categories of laboratory toxicology testing. These include medium-term toxicity (salivary gland lesions), long-term toxicity (inflamed stomach linings), genetic damage (in human blood cells), effects on reproduction (reduced sperm counts in rats; increased frequency of abnormal sperm in rabbits), and carcinogenicity (increased frequency of liver tumors in male rats and thyroid cancer in female rats).
In studies of people (mostly farmers) exposed to glyphosate herbicides, exposure is associated with an increased risk of miscarriages, premature birth, and the cancer non-Hodgkin's lymphoma.
Glyphosate has been called "extremely persistent" by the U.S. Environmental Protection Agency, and half lives of over 100 days have been measured in field tests in Iowa and New York.
Glyphosate has been found in streams following agricultural, urban, and forestry applications.
Glyphosate treatment has reduced populations of beneficial insects, birds, and small mammals by destroying vegetation on which they depend for food and shelter.
In laboratory tests, glyphosate increased plants' susceptibility to disease and reduced the growth of nitrogen-fixing bacteria. (Comment Number: APHIS-2007-0044-0352-1)

Response: In terms of human toxicity, EPA considers glyphosate to be a toxicologically low-risk herbicide (see DEIS Sections III.D and IV.E and appendix L). The EPA Reregistration Eligibility Decision (RED) document concludes that glyphosate is of relatively low oral and

dermal acute toxicity to humans. For this reason, glyphosate has been assigned to Toxicity Categories III and IV for these effects (i.e., Toxicity Category I indicates the highest degree of acute toxicity, and Category IV the lowest). With regard to subchronic and chronic toxicity, currently registered pesticide products containing glyphosate – including products containing surfactants – when used in accordance with the labeling will not pose unreasonable risks or adverse effects to humans or the environment. In addition, glyphosate is not considered a carcinogen, but rather has been classified by EPA as a Group E carcinogen (evidence of non-carcinogenicity for humans). For additional analysis about carcinogenicity from glyphosate exposure, see response to comment APHIS-2007-0044-2243-1 for issue 6.0. The health effects noted by the commenter are not substantiated with scientific references, and thus APHIS cannot validate them; nevertheless, some appear to reflect the health effects associated with high doses of glyphosate products, which are not expected when these products are used in accordance with the product labels. Where pesticides may be used on food or feed crops, EPA sets tolerances (maximum pesticide residue levels) for the amount of the pesticide that can legally remain in or on foods. EPA undertakes this analysis under the authority of the Federal Food, Drug, and Cosmetic Act (FFDCA). EPA must find that such tolerances will be safe, meaning that there is a reasonable certainty that no harm will result from aggregate exposure to the pesticide chemical residue. This finding must be made and the appropriate tolerance established before a pesticide can be registered for use on the particular food or feed crop in question. Regarding surfactants, the DEIS included a risk assessment of these substances in appendix L, section 3.1.14. These surfactants have been carefully evaluated for their effects on human health, and application rates of the end use product (glyphosate plus were surfactant and other added ingredients) are determined using specific product labels for each end use product recommended for use on GT alfalfa. Regarding workers, section IV.E.3.c and appendix M of the DEIS describe analyses showing how workers are not at risk from glyphosate due to the deregulation of GT alfalfa. Indeed, for both the public and workers, there might be an overall decrease in the use of other more toxic and persistent herbicides and a net decrease in risks to human health and the environment. See the response to comment APHIS-2007-0044-6240-2 for issue 6.0 for additional discussion of this issue.

Comment Excerpt Text:
RoundUp is extremely DANGEROUS!!
In studies of people (mostly farmers) exposed to glyphosate herbicides, exposure is associated with an increased risk of miscarriages, premature birth, and the cancer non-Hodgkin's lymphoma.
Glyphosate has been called "extremely persistent" by the U.S. Environmental Protection Agency, and half lives of over 100 days have been measured in field tests in Iowa and New York.
Glyphosate has been found in streams following agricultural, urban, and forestry applications.
Glyphosate treatment has reduced populations of beneficial insects, birds, and small mammals by destroying vegetation on which they depend for food and shelter.
In laboratory tests, glyphosate increased plants' susceptibility to disease and reduced the growth of nitrogen-fixing bacteria. (Comment Number: APHIS-2007-0044-0353-2)

Response: In regard to the commenter's concerns about the safety of glyphosate, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3.

Comment Excerpt Text:
I am in favor of the deregulation of RR alfalfa because it will cut down on the amount of other chemicals that would have to be used to control noxious weeds. This would help reduce the amount of exposure that farm works would be exposed to while using these other chemicals. I grew up on a farm in the midwest and know first hand how this would be benificial to everyone involved. (Comment Number: APHIS-2007-0044-0402-1)

Response: APHIS acknowledges the comment and notes that although glyphosate use will likely increase as a result of GT alfalfa use, there also might be an overall decrease in the use of other more toxic and persistent herbicides, which in turn would result in less risk to human health and the environment. A more detailed discussion of this issue is contained in section IV.E of the DEIS. See the response to comment APHIS-2007-0044-6240-2 for issue 6.0 for additional discussion of this issue.

Comment Excerpt Text:
Title: Acute poisoning with a glyphosate-surfactant herbicide ('Roundup'): a review of 93 cases.
Authors: Talbot AR; Shiaw MH; Huang JS; Yang SF; Goo TS; Wang SH; Chen CL; Sanford TR
Address: Department of Critical Care Medicine, Changhua Christian Hospital, Taiwan, Republic of China.
Source Hum Exp Toxicol
Abstract:
Between 1 January 1980, and 30 September 1989, 93 cases of exposure to herbicides containing glyphosphate and surfactant ('Roundup') were treated at Changhua Christian Hospital. The average amount of the 41% solution of glyphosate herbicide ingested by non-survivors was 184 +/- 70 ml (range 85-200 ml), but much larger amounts (500 ml) were reported to have been ingested by some patients and only resulted in mild to moderate symptomatology. Accidental exposure was asymptomatic after dermal contact with spray (six cases), while mild oral discomfort occurred after accidental ingestion (13 cases). Intentional ingestion (80 cases) resulted in erosion of the gastrointestinal tract (66%), seen as sore throat (43%), dysphagia (31%), and gastrointestinal haemorrhage (8%). Other organs were affected less often (non-specific leucocytosis 65%, lung 23%, liver 19%, cardiovascular 18%, kidney 14%, and CNS 12%). There were seven deaths, all of which occurred within hours of ingestion, two before the patient arrived at the hospital. Deaths following ingestion of 'Roundup' alone were due to a syndrome that involved hypotension, unresponsive to intravenous fluids or vasopressor drugs, and sometimes pulmonary oedema, in the presence of normal central venous pressure.
MESH Headings Adolescence*; Adult*; Age Factors*; Aged*; Aged, 80 and over*; Cardiovascular Diseases*; Case Report; Central Nervous System Diseases*; Child*; Child, Preschool*; Female; Glycine*; Herbicides*; Human; Infant*; Kidney Diseases*; Leukocytosis*; Liver Diseases*; Lung Diseases*; Male; Middle Age*
NORML SPECIAL REPORT, November 12, 1996
DEA Herbicide Under Fire From Hawaii Residents
Locals Complain Of Nausea, Other Ailments Due To Aerial Spraying

Residents of the island of Hawaii are complaining of flu-like symptoms such as nausea, headaches, and fatigue and many are pointing fingers at the federal government and state law enforcement.

For nearly a decade, Drug Enforcement Agency-coordinated marijuana eradication efforts have targeted the island of Hawaii, often spraying a glyphosate-based herbicide from low-flying helicopters over suspected marijuana patches. Recently, however, some residents are claiming that the pesticide, a chemical weed-killer similar to "Round Up," is killing wildlife and making some citizens sick.

"You can actually taste it in your mouth," said Roger Christie of the Hawaii Hemp Council, who alleges that the pesticide is occasionally mixed with additives. Christie reports that gusts of wind disperse the pesticide to outlying communities, where it collects in rainwater catchments. Rooftop catchments are a common source of residents' drinking water. Christie is convinced that the spraying is directly linked to recently reported environmental and health problems.

"In the last two weeks, hundreds of people have come to me with their complaints and said that's why I'm feeling this way too," said Ka'u resident Susan Smith in an interview with KGMB-TV earlier this month. "[Law enforcement] are flying over my house every other day. ... It's like a war zone out here."

According to local area physician, Patricia Bailey, MD, Christie and Smith's claims are not without substance. Bailey has collected incident reports from some 40 persons, aged 9 months to 84 years, who claim that they have been affected by the spray. She cites generalized symptoms of eye and respiratory tract irritation. She further notes that about 75 percent of respondents suffered from diarrhea.

Affidavits attained by NORML report frequent complaints from residents of flu-like symptoms such as nausea and headaches, sometimes lasting for more than a week after the spraying. Others complain of experiencing fatigue, irritability, soar joints and throats, and frequent itchiness and burning of the eyes. In one of the most severe reported cases, an Ocean View resident complained of experiencing prolonged numbness in her arms. "The numbness was the most prominent and frightening [symptom,]" she explained. "[It] felt uncomfortable to wear my watch [so] I took it off and carried it. I kept rubbing my arms, trying to warm them and get blood back circulating." The resident described the experience as "unnerving."

"There is a statistical significance to the complaints," said Dr. Bailey. "I think [this] is serious now."

Studies on the potential dangers of glyphosate to both humans and the environment are mixed. According the 1986 federal Environmental Impact Statement (EIS), laboratory and greenhouse studies performed mostly by the manufacturer (The Monsanto Company) indicated that glyphosate was only a moderately toxic herbicide that posed little danger to the environment. However, Noah Berry, vice president of EcoLaw Institute Inc., an Oklahoma organization that works to strengthen environmental laws, has examined the safety of glyphosate and concludes that the chemical "can do a lot of damage to our bio-diversity."3 In addition, a 1991 report by the Radian Corporation concludes that human exposure to glyphosate can cause "irritation of the skin, gastrointestinal tract and respiratory tract, convulsions and coma."

Lenny Terlip of the state Department of Land and Natural Resources (DLNR) told NORML that claims of glyphosate harming the environment and endangering the health of residents were "erroneous." He denied reports that the herbicide was mixed with any additives and said that the sprayings were not being conducted near houses or residential areas. He further added that the

helicopter-mounted spray-guns have "pin-point accuracy," a claim rebuked by a review of some of the available scientific literature.

According to the Journal of Pesticide Reform, "In general, movement of a pesticide through unwanted drift is unavoidable; drift of glyphosate is no exception." The article emphasized, however, that glyphosate drift is a "particularly significant problem ... [because] damage is likely to be much more extensive and more persistent than with many other herbicides."7 Two studies conducted in Canada measured glyphosate residues more than 650 feet away from target areas following helicopter applications to forest sites and a third study from California found glyphosate over 2,600 feet away following aerial application.9 By her own estimations, Smith judges that high wind gusts on the island of Hawaii can carry glyphosate residue even farther. "Why do we have to wait [until] five years from now [for an answer?]" asked Smith. "Why do we have to wait ... till they tell us, okay, it's toxic and now it's outlawed?"

Recently, Smith gathered angry residents to an informal town meeting where they voiced their grievances with elected officials and state agency representatives, signed health impact affidavits, and met with news media. She and other area residents agreed to file a formal complaint with the DLNR.

Photographs on display at the meeting documented orange-sprayed foliage in forests and yards as well as dead bird carcasses. Many residents elaborated on the symptoms of their illnesses. Glenn Sahara, a spokesman for the Hawaii Department of Agriculture who attended the meeting, attempted to deny that the spraying played any role. Instead, he stated that the animal deaths might be due to heart failure caused by the noise of low-flying helicopters. Many residents remained unconvinced. "We are being poisoned," claimed one elderly gentleman. "It's the children I am thinking of. Stop the aerial spraying!"

This is an example of "law enforcement run amuck," claimed environmental activist and resident Jerry Rothstein. Rothstein has studied the original EIS and tells NORML that residents may file a lawsuit against both state and federal agencies for failure to comply with regulations mandated by the 1986 report. EIS rules require that law enforcement, "Take all reasonable steps to notify everyone, including residents, before spraying."

For the time being, Rothstein is encouraging residents to participate in the updating of the scheduled 1996 EIS supplement. Public comments on this notice were requested in the August 13, 1996 issue of the Federal Register and public hearings will be held before a final version is drafted.

"From the response of the Ka'u community, th[ese] latest aerial herbicide attack[s] appear to be among the worst yet," noted Rothstein. He said that in the past, law enforcement has attempted to dismiss complaints by alleging that they were only from marijuana growers attempting to protect their crops. These latest rounds of complaints, however, are too widespread to ignore, he said. Currently, only one other state, South Dakota, engages in aerial herbicide spraying.1 Swindell, Bill. "State Will Dump Pesticide on Pot." Tulsa World News: June 11, 1996.

REFERENCES

2. Cox, Caroline. "Glyphosate, Part 2: Human Exposure and Ecological Effects." J. of Pest. Rfm.: Vol. 15, Winter 1995.

3. Bishop, Hunter. "Herbicide causing illness?" Hilo Tribune-Herald: October 24, 1996.

4. NTP Chemical Repository. Radian Corporation: August 29, 1991.

5. Nivia, Elsa and Gips, Judith. "Drug Control and Herbicide Spraying in Columbia." Global Pesticide Campaigner, February 1993.

6. Cox, Caroline. "Glyphosate, Part 2: Human Exposure and Ecological Effects." J. of Pest. Rfm: Vol. 15, Winter 1995.
7. Freedman, B. "Controversy over the use of herbicides in forestry, with particular reference to glyphosate usage." J. Envir. Sci. Hlth.: Vol: C8(2), 1990-1991.
8. Cox, Caroline. "Glyphosate, Part 2: Human Exposure and Ecological Effects." J. of Pest. Rfm: Vol. 15, Winter 1995.
9. Ibid.
10. Personal conversation with Jerry Rothstein
OnSite: 13 NOV 96 =A9 copyright 1996, 1997 NORML
(Comment Number: APHIS-2007-0044-0620-1)

Response: As noted in the paper by Talbot et al. cited by the commenter, accidental exposure was asymptomatic after dermal contact with spray (six cases), while mild oral discomfort occurred after accidental ingestion (13 cases). The remaining cases were all intentional, large doses. These observations are consistent with the EPA conclusion that glyphosate is a toxicologically low-risk herbicide (see DEIS sections III.D and IV.E and appendix L). Specifically, the EPA Reregistration Eligibility Decision (RED) document concludes that glyphosate is of relatively low oral and dermal acute toxicity to humans. For this reason, glyphosate has been assigned to Toxicity Categories III and IV for these effects (i.e., Toxicity Category I indicates the highest degree of acute toxicity, and Category IV the lowest). In regard to the commenter's overall concern about human health and safety, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0. And although glyphosate use will likely increase as a result of GT alfalfa deregulation, there might also be an overall decrease in the amount and number of other more toxic and persistent herbicides, which in turn would result in less overall risk to human health and the environment (see DEIS section IV.E). See the response to comment APHIS-2007-0044-6240-2 for issue 6.0 for additional discussion of this issue.

Comment Excerpt Text:
According to the EIS, consumers who ingest Roundup may experience "general and non-specific signs of toxicity from subchronic and chronic exposure to glyphosate includ[ing] changes in liver weight, blood chemistry (may suggest mild liver toxicity), liver pathology, and weight of the pituitary gland."
The EIS warns that, "Based on upper estimates of exposure ... infants consuming fruit and all age groups consuming vegetables may be at risk of adverse effects associated with acute exposure to glyphosate residues." (Comment Number: APHIS-2007-0044-11034-3)

Response: In regard to the cited quotes about subchronic and chronic toxicity and infant exposure, see the response to comment APHIS-2007-0044-9204-3 for issue 6.0.

Comment Excerpt Text:
For some reason, APHIS consistently ignores pesticide usage data collected by its sister agency, USDA's National Agricultural Statistics Service (NASS). This is quite surprising and unacceptable, given the fact that NASS is universally acknowledged to provide the most accurate

and reliable pesticide information available in the U.S. As we will see, APHIS couples its neglect of NASS data with unfortunate reliance on data one to two decades old, on dubious "simulation studies" conducted by organizations funded by the biotechnology industry, and by use of a variety of illegitimate methods of its own.

CFS relies on NASS data for several reasons. First, NASS utilizes transparent, rigorous procedures and statistically valid sampling methods to deliver highly accurate pesticide data. Second, NASS has regularly collected pesticide usage data on the major crops for which glyphosate-tolerant (GT) versions are predominant (soybeans, corn and cotton) over the entire period of GT crop adoption, offering a consistent set of data that facilitates accurate, year-to-year comparisons. Finally, NASS data and methodologies are freely and publicly available, which allows for open review and criticism of any analysis utilizing them.

NASS's Advisory Committee on Agricultural Statistics, comprised of experts from academia and industry, had this to say in 2006:

"NASS employs rigorous methods to ensure that statistically representative samples are achieved…." thus ensuring "a high level of data reliability and accuracy, which are the greatest advantage of NASS data." [Footnote 1: USDA NASS (2006). "Meeting of the Advisory Committee on Agriculture Statistics (ACAS): Summary and Recommendations," February 14-15, 2006, USDA NASS, Appendix III, at: http://www.nass.usda.gov/About_NASS/Advisory_Committee_on_Agriculture_Statistics/advisory-es021406.pdf.]

NASS data are also extensively used by the U.S. Environmental Protection Agency, state pesticide officials, pesticide firms and independent analysts.

The same NASS Advisory Committee quoted above found fault with alternative, private sector pesticide data, finding it non-transparent and potentially based on faulty sampling techniques (e.g. overly small sample sizes). With reference to Doane, the major private-sector provider of pesticide usage information, the Advisory Committee found that:

"The proprietary agreements entered into by Doane subscribers extend well beyond prohibitions on data disclosure, to embargo revelation of the sampling and analytical procedures used to generate their data. Thus, it may be that a large number of the area wide estimates included in the Doane system are based on individual or statistically unrepresentative observations." [Footnote 2: USDA NASS (2006), op. cit., Appendix III.]

In other words, NASS is regarded by experts in the field as the authoritative source for pesticide usage information in American agriculture, while private sector companies may at times supply faulty pesticide data because of illegitimate (and secretive) techniques whose validity cannot be confirmed. (Comment Number: APHIS-2007-0044-11037-1)

Response: See response to comment APHIS-2007-0044-6240-2 for issue 6.0. As appropriate, the FEIS reflects the edits provided by the commenter, including clarifications in the DEIS, additional data, etc. There are comments that did not result in changes to the FEIS either

because they would not have provided a substantive change or because the agency does not agree with the comment.

Comment Excerpt Text:
One obvious consequence of introducing the RR alfalfa system would be a substantial increase in the use of glyphosate, over already extremely high and growing levels. Glyphosate is (by far) the most heavily used chemical pesticide in the history of agriculture, due primarily to the widespread adoption of other RR crop systems. EPA's latest estimate for overall agricultural use of glyphosate in the U.S. is 135 million lbs. acid equivalents, [Footnote 6: EPA (2009). "Glyphosate Summary Document Registration Review: Initial Docket," Environmental Protection Agency, June 2009, p. 12. See also EPA (2008), both in supporting materials.] which translates to 182 million lbs. of the most commonly used isopropylamine salt of glyphosate, as found in many of Monsanto's glyphosate products, including Honcho brand herbicide (Figure 1).

The adverse consequences of unrestrained use of glyphosate with RR crop systems argues for great caution before any more RR crop systems, including RR alfalfa, are deregulated. These adverse consequences include a rapidly growing epidemic of glyphosate-resistant weeds; increased disease susceptibility and reduced nutritional content of major crops, stemming mainly from adverse impacts of glyphosate on soil microbiota; increased rates of cancer and possibly other diseases in farmers and farmworkers who use Roundup; and a possible role in the worldwide decline of amphibian populations. These important issues are discussed in detail in several documents included in the supporting materials. A documented overview can be found in the file entitled Glyphosate Registration Review – FINAL 9-21-09, which CFS submitted to the EPA in September of last year for the initial phases of its registration review of glyphosate, and which is included in the supporting materials submitted to this docket. We would add that the EPA last reviewed glyphosate in 1993, and that there has been an enormous increase in its use since that time, as well as a substantial amount of new research on the various adverse impacts of glyphosate and glyphosate-based herbicide formulations on the environment and the interests of agriculture. CFS believes it would be only prudent of APHIS to refrain from taking any action, such as deregulation of RR alfalfa, that promises to substantially increase the use of this herbicide, before EPA has the opportunity to review glyphosate's registration and impose any needed restrictions on its use. (Comment Number: APHIS-2007-0044-11037-18)

Response: Regarding comments about the differences between conventional and GT alfalfa in terms of nutritional content and health and safety, section IV.E of the DEIS concludes that no such differences exist. Newer toxicity data than from the 1993 EPA review also have been examined . Furthermore, section IV.E of the DEIS states that there is no evidence thus far to indicate that the recombinant DNA would be digested and metabolized in a manner any different from genetic material of conventional feed products. Additionally, no negative effects of CP4 EPSPS protein or gene consumption on nutritional characteristics of dairy cattle, livestock, or poultry have been reported. Concerns for an increased use of glyphosate and other more toxic and persistent herbicides are addressed in the response to comment APHIS-2007-0044-6240-2 for issue 6.0. Also, see the response to comment APHIS-2007-0044-11037-1 for issue 6.3 for additional discussion of this comment.

Comment Excerpt Text:
While APHIS has generally failed to provide an adequate quantitative analysis of the likely impacts of the RR alfalfa system on herbicide use in general, or glyphosate in particular, there is one attempt at estimating glyphosate use. Assuming 90% adoption of the RR alfalfa system (that is, on 90% of the 2007 alfalfa acreage of 21.67 million acres), and assuming application of the highest allowable annual rate of glyphosate on GT crops of 7.32 lbs./acre/year, APHIS provides a high-end estimate of the "potential amount of glyphosate due to adoption of GT alfalfa" of 142,761,960 lbs. per year. [Footnote 7: EIS at N-17 to N-18.]

Figures for agricultural; industrial, comm'l, gov't; and home & garden uses of glyphosate from EPA. For the years 1987 to 1995: "Pesticides Industry Sales and Usage: 1994 and 1995 Market Estimates," EPA, August 1997, Tables 8 & 9. For the years 1997, 1999 & 2001, see: "Pesticides Industry Sales and Usage: 2000 and 2001 Market Estimates," EPA, May 2004, Tables 3.6 to 3.8. Both available at: http://www.epa.gov/oppbead1/pestsales/. Each data point is the midpoint of the range (e.g. 27.5 for 25-30 million) given in the documents cited above. EPA figure for 2006 derived from EPA (2009). "Glyphosate Summary Document Registration Review: Initial Docket," June 2009, p. 12. See: http://www.regulations.gov/search/Regs/home.html#documentDetail?D=EPA-HQ-OPP-2009-0361-0003, which states that 135 million lbs. glyphosate acid equivalents are applied annually to agricultural crops in the U.S., based on data from Screening Level Estimates of Agricultural Uses of the Case Glyphosate, 11/26/08. Acid equivalents converted to the most common salt of glyphosate (isopropylamine) using 0.74 conversion factor to arrive at the equivalent figure for the isopropylamine salt of glyphosate (182 million lbs.) to facilitate comparison to prior years. EPA leaves unclear in which year this estimated 135 a.e./182 a.i. million lbs. of glyphosate were applied. Comparison of EPA's figures for soybeans, corn and cotton in the Screening Level Estimates with the latest available from USDA NASS for soybeans (2006), corn (2005) and cotton (2007) suggests that EPA relied primarily on these USDA NASS data. We choose 2006 as the midpoint of this three year (2005-2007) range, and because soybeans, surveyed in 2006, receive the most glyphosate. See text for explanation as to why this figure likely underestimates actual glyphosate use, which CFS estimates at 210-220 million lbs. a.i. (iso.). Glyphosate use figures for soybeans, corn and cotton derived from USDA NASS Agricultural Chemical Usage reports for respective years, adjusted to reflect usage on 100% of crop acreage. See: http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1560.

Reference to Figure 1 (based on EPA's latest estimate of total glyphosate use in American agriculture) reveals that this amount of glyphosate applied to Roundup Ready alfalfa would exceed the amount of glyphosate applied to all agricultural crops combined (using EPA's acid equivalents estimate of 135 million lbs., and assuming APHIS's estimate is also in acid equivalent units). Frankly, we find this estimate excessive. Our own assessment (see Appendix 2) is based on a somewhat lower RR alfalfa adoption rate, and usage at less than the maximal allowable rates. According to this estimate, glyphosate use on Roundup Ready alfalfa would be more on the order of 30 – 70 million lbs, though with the important caveat that it will increase as time goes by, with the inexorable emergence of glyphosate-resistant weeds.

What is remarkable about APHIS's estimate above is that APHIS does nothing with it. It is a meaningless number-crunching exercize without consequence for its later analysis. (Comment Number: APHIS-2007-0044-11037-19)

Response: In regard to the commenter's concern about unalterable emergence of glyphosate-resistant weeds, Appendices G and H of DEIS analyzes the effects of glyphosate-resistant weeds in agricultural and non- agricultural systems. In regard to the commenter's concerns about the increase in use and risk of glyphosate, see the response to comment APHIS-2007-0044-6240-2 for issue 6.0. Also, see the response to comment APHIS-2007-0044-11037-1 for issue 6.3 for additional discussion of this comment.

Comment Excerpt Text:
Our other major source of pesticide usage data – the US Environmental Protection Agency – is also ignored by APHIS. EPA recently began its "registration review" of glyphosate – the first since 1993, and in this context has developed the latest estimates for agricultural use of glyphosate by crop, including alfalfa. EPA's figures are contained in the EPA document "Screening Level Estimates of Agricultural Uses of the Case Glyphosate," November 26, 2008. The USDA and the EPA data referred to in these comments are included in the supporting materials.

APHIS offers no serious quantitative assessment of the likely impact of introducing GT alfalfa on pesticide use. "No calculations or speculation on GT alfalfa's specific impact on herbicide usage have been published…."[Footnote 3: EIS at 170. repeated almost verbatim at N-17.] This is a startling deficiency, given the fact that GT alfalfa is engineered explicitly to alter herbicide usage practices; and that pesticide use is generally acknowledged to have adverse impacts on human health, the environment and farmer welfare; and that there is a real need to promote integrated pest (including weed) management to reduce the use of pesticides and the negative impacts to which they give rise. Instead, APHIS continually repeats the mantra that Roundup Ready alfalfa will or may reduce the use of non-glyphosate herbicides, but gives no quantitative analysis to back up these assertions. (Comment Number: APHIS-2007-0044-11037-2)

Response: In regard to the commenter's concern about the amounts of glyphosate and other herbicides that are used, see response to comment APHIS-2007-0044-6240-2 for issue 6.0. Also, see the response to comment APHIS-2007-0044-11037-1 for issue 6.3 for additional discussion of this comment.

Comment Excerpt Text:
3) "Likely carcinogenic" corn herbicide poised for use in soybeans and cotton to combat GR weeds caused by RR crop systems
Monsanto recently registered a new formulation of the corn herbicide, acetochlor, for use in soybeans and cotton, explicitly to combat glyphosate-resistant weeds (e.g. GR Palmer amaranth and GR tall waterhemp) in those crops. [Footnote 12: Monsanto (2010). "Monsanto Company receives approval for new acetochlor herbicide formulation," Monsanto, Feb. 2, 2010. http://www.greenbook.net/viewStory.aspx?StoryID=1085, last visited 2/28/10.] Although

acetochlor was the second most heavily used herbicide on corn in 2005 (over 32 million lbs. applied nationally), USDA NASS data show that essentially no acetochlor was used in cotton or soybeans in that year. [Footnote 13: USDA NASS (2006). "Agricultural Chemical Usage: 2005 Field Crops Summary," USDA NASS, May 2006, pp. 2, 19. Pesticide usage surveyed on 93% of corn acres (p. 2), to which 29.802 million lbs. were applied (p. 19). National use = 29.802/0.93 = 32.045 million lbs.] EPA has classified acetochlor as "likely to be carcinogenic to humans" based on increased incidence of lung tumors and histiocytic sacrcoma in mice, and increased incidence of nasal epithelial tumors and thyroid follicular cell adenomas in rats. [Footnote 14: EPA (2006). "Report of the Food Quality Protection Act (FQPA) Tolerance Reassessment Progress and Risk Management Decision (TRED) for Acetochlor," US EPA, March 2006, p. 4. http://www.epa.gov/oppsrrd1/reregistration/REDs/acetochlor_tred.pdf.] Chronic exposure to acetochlor has produced testicular atrophy, renal injury and neurologic movement abnormalities in laboratory animals. [Footnote 15: CDC (undated). "Acetochlor: Chemical Information," National Report on Human Exposure to Environmental Chemicals, Centers for Disease Control, http://www.cdc.gov/exposurereport/data_tables/Acetochlor_ChemicalInformation.html.] EPA believes exposure to acetochlor in drinking water and other sources is below levels of concern. Yet additional, and perhaps substantial additional use of acetochlor to combat GR weeds in two major crops (soybeans and cotton) where it had not been used before will likely increase human exposure to the chemical. Here too, GR weeds are the occasion for increased use of a carcinogenic herbicide that otherwise would not be deployed. (Comment Number: APHIS-2007-0044-11037-24)

Response: This comment, which addresses the broader concerns for an increased use of glyphosate and other more toxic and persistent herbicides, as well as for the alleged use of flawed analyses and data, are addressed in the response to comment APHIS-2007-0044-6240-2 for issue 6.0. Also, see the response to comment APHIS-2007-0044-11037-1 for issue 6.3 for additional discussion of this comment.

Comment Excerpt Text:
4) Use of 2,4-D – component of Vietnam War defoliant Agent Orange – increases substantially in soybeans to combat GR weeds
When weeds evolve resistance to glyphosate, 2,4-D is one of the most commonly recommended supplements. As early as 2001, Ohio State University agricultural advisers recommended using a combination of 2,4-D, metribuzin and paraquat as pre-emergence chemicals to prevent the evolution of glyphosate-resistant marestail (horseweed) in Roundup Ready soybeans in Ohio. [Footnote 16: Loux, M. and J. Stachler (2001). "Is There a Marestail Problem in Your Future?" Crop Observation and Recommendation Network, Ohio State University Extension, April 2001. http://corn.osu.edu/archive/2001/apr/01-07.html#linkg.] In 2005, weed scientists in Tennessee noted that Palmer amaranth in the state survived applications of up to 44 ounces per acre of Roundup, and so recommended that farmers use additional herbicides such as 2,4-D, Clarity (dicamba), Gramoxone Max (paraquat) or Ignite (glufosinate). [Footnote 17: "Glyphosate-resistant Palmer Pigweed Found in West Tennessee," Farm Progress, Staff Report, September 23, 2005.
http://nebraskafarmer.com/story.aspx/glyphosateresistant/palmer/pigweed/found/in/west/tennessee/8/394] In 2006, it was reported that farmers would rely increasingly on older herbicides such

as 2,4-D, dicamba and paraquat to control glyphosate-resistant giant ragweed and other GR weeds. [Footnote 18: Roberson, R. (2006). "Pigweed not only threat to glyphosate resistance," Southeast Farm Press, Oct. 19, 2006. http://southeastfarmpress.com/news/101906-herbicide-resistance/.]

USDA NASS figures confirm that farmers are in fact using substantially more 2,4-D to combat GR weeds. From just 2002 to 2006, use of the chemical on soybeans increased from 1.39 to 3.67 million lbs., a more than 160% increase. 2,4-dichlorophenoxyacetic acid (2,4-D) is one of the oldest herbicides, and formed part of the Vietnam War defoliant Agent Orange. Ingestion or inhalation of 2,4-D has adverse effects on the nervous system – loss of coordination, limb stiffness, stupor, coma. A growing body of evidence points to 2,4-D as a carcinogen. Studies in the U.S., Italy, Canada, Denmark and Sweden link 2,4-D exposure to non-Hodgkin's lymphoma, a cancer of the immune system. Studies of farmworkers who handled 2,4-D in northern states reveal higher than normal rates of birth defects in their children. 2,4-D is also a mutagen and an endocrine disruptor, and is sometimes found contaminated with the highly toxic compound dioxin, which is highly carcinogenic, weakens the immune system, decreases fertility, and causes birth defects. 2,4-D is banned in Norway. [Footnote 19: Based on: Beyond Pesticides (2004). "2,4-D: chemicalWATCH Factsheet," Beyond Pesticides, 2004. http://www.beyondpesticides.org/pesticides/factsheets/24D_Jul04.pdf.]
(Comment Number: APHIS-2007-0044-11037-25)

Response: APHIS acknowledges the response. This comment, which addresses the broader concerns for an increased use of glyphosate and other more toxic and persistent herbicides, as well as for the alleged use of flawed analyses and data, are addressed in the response to comment APHIS-2007-0044-6240-2 for issue 6.0. Also, see the response to comment APHIS-2007-0044-11037-1 for issue 6.3 for additional discussion of this comment.

Comment Excerpt Text:
5) Supplemental herbicide recommended for use with glyphosate for "improved weed control" in Roundup Ready sugar beets

Just as APHIS wrongly assumes that glyphosate will displace all other herbicides in the RR alfalfa system, so one often encounters the same "Roundup only" claim with respect to the RR sugar beet system. Yet even though RR sugar beets have only been grown commercially for two years (introduced in 2008), already one major pesticide manufacturer is recommending supplemental use of an herbicide, known as "Upbeet" (triflusulfuron methyl), "for improved weed control in Roundup Ready sugar beets" – and in particular, to "provide improved control of wild buckwheat, common lambsquarter, common mallow, redroot pigweed, and velvetleaf." [Footnote 20: DuPont (2007). "DUPONT UPBEET HERBICIDE: UpBeet plus glyphosate for improved weed control in Roundup Ready Sugar Beets," 2(ee) Recommendation under FIFRA, 2007, expires 12/31/11.] Two of these weeds are naturally glyphosate-tolerant, meaning they become more prevalent members of the local weed community due to "weed shifts" in RR crop fields continually subjected to glyphosate applications over time. [Footnote 21: APHIS misunderstands a fundamental tenet of weed science in the EIS, the difference between species tolerance and evolved resistance. APHIS also wrongly excludes velvetleaf from the list of

glyphosate-tolerant weeds that are problematic in alfalfa (see EIS at G-25, velvetleaf listing; and Hower et al (1999), op. cit., Table 29, p. 60, where velvetleaf is the 4th most problematic summer annual weed of spring-seeded alfalfa; and Tables 30 & 31 (pp. 63, 66), where velvetleaf is also listed as a weed in fall-seeded alfalfa and established alfalfa stands.]r (Comment Number: APHIS-2007-0044-11037-26)

Response: This comment, which addresses the broader concerns for an increased use of glyphosate and other more toxic and persistent herbicides, as well as for the alleged use of flawed analyses and data, are addressed in the response to comment APHIS-2007-0044-6240-2 for issue 6.0. Regarding concerns about weed control, see the response to comment APHIS-2007-0044-11037-26 for issue 4.2. Also, see the response to comment APHIS-2007-0044-11037-1 for issue 6.3 for additional discussion of this comment.

Comment Excerpt Text:
6) GR weeds driving increased use of premix herbicides and tank mixtures with multiple herbicides, to be used with multiple herbicide-resistant crops

Glyphosate-resistant weeds are such a serious problem that much of the research of agricultural biotechnology companies is geared toward development of crops with "enhanced" resistance to glyphosate; to non-glyphosate herbicides such as 2,4-D and dicamba (chlorophenoxy herbicides that are probable human carcinogens); and to multiple herbicides. These developments are described in Benbrook (2009) in the supporting materials. One example of a crop resistant to multiple herbicides is DuPont-Pioneer's Optimum GAT corn and soybeans, which resist applications of both glyphosate and certain classes of the large herbicide family known as ALS inhibitors. These new dual-HT crops are being sold together with premix herbicide products containing two and usually three herbicidal active ingredients, and marketed as a partial solution to weeds that have evolved resistance to glyphosate or to ALS inhibitors. For instance, Instigate herbicide contains rimulfuron and chlorimuron-ethyl, ALS inhibiting herbicides to handle glyphosate-resistant weeds, and the HPPD herbicide mestrione to control ALS inhibitor-resistant weeds. Of course, an increasing number of weed populations have developed dual-resistance to both glyphosate and ALS inhibitors, meaning that even this 3-in-one product will not be sufficient, and making it necessary for Dupont to offer the following recommendation:

"Tank-Mix Partners
Instigate™ demonstrated additional control of emerged weeds when tank mixed with herbicides such as 2,4-D, atrazine, glyphosate and glufosinate.
Instigate™ demonstrated additional residual weed control when tank mixed with herbicides such as atrazine, metolachlor and acetochlor." [Footnote 22: DuPont Instigate Herbicide (2008). Instigate is one of several "premix" herbicides being marketed for use with dual herbicide-tolerant, Optimum GAT corn and soybeans. Each comes with similar "Tank-Mix Partner" recommendations. EPA recently approved the registration petition for Instigate herbicide.]

Thus, farmers could easily use a total of 4-7 different herbicidal active ingredients (3 in one product, plus one to four tank-mix partners) in an effort to kill increasingly herbicide-resistant weeds. This is one of several pre-mix herbicide products sold specifically for use together with

dual-herbicide-resistant Optimum GAT corn and/or soybeans. In each case, DuPont gives similar "Tank-Mix Partners" recommendations. (Comment Number: APHIS-2007-0044-11037-27)

Response: APHIS acknowledges the comment. Regarding the commenter's concern that glyphosate-resistant weeds would require the use of other more environmentally harmful herbicides, appendix G of DEIS the analyses the effects of glyphosate-resistant weeds in agricultural systems and states that the herbicides used for glyphosate-resistant weeds would be similar to the herbicides used in conventional alfalfa farming practices. Regarding the commenter's concerns about increased use of glyphosate over more toxic and carcinogenic herbicides, see the response to comment APHIS-2007-0044-6240-2 for issue 6.0 for additional discussion of this issue.. Also, see the response to comment APHIS-2007-0044-11037-1 for issue 6.3 for additional discussion of this comment.

Comment Excerpt Text:
Roundup Ready alfalfa system will increase use of toxic herbicides for removal of RR alfalfa stands

As even APHIS is forced to concede, introduction of Roundup Ready alfalfa will eliminate glyphosate as an option for alfalfa stand removal, and therefore increase the use of more toxic herbicides for this purpose. [Footnote 23: EIS at 121 (emphasis added): "In conventional alfalfa fields, glyphosate is often used to remove alfalfa after 3 to 8 years when it has become vulnerable to weeds and thinning. For stand removal, adoption of GT [alfalfa] would likely result in a shift from glyphosate to other herbicides due to the inability of glyphosate to remove stands of GT alfalfa."] Though APHIS makes this concession, it fails to give even a rough estimate of the increase in use of more toxic herbicides for stand removal. Below, we supply such a rough estimate.

As noted above, EPA estimates that 200,000 lbs. a.e. glyphosate are applied to alfalfa each year, on less than 2.5% of national alfalfa acreage. If one assumes 2% of 22.25 million acres receive glyphosate, that equals 0.45 million acres, or 450,000 acres. Since so little glyphosate or any other herbicide is needed for weed control in alfalfa, and as APHIS and its sources agree, glyphosate is "often used" for alfalfa stand removal, the majority of the glyphosate-treated alfalfa acreage is likely used for stand removal purposes. If one assumes 400,000 acres treated with glyphosate are for stand removal purposes, then replacement herbicides would be needed for this much acreage. Sources cited by APHIS (Mayerle 2002, Manitoba 2002) and one other (U of Wy 2006) give several possible herbicide regimes for stand removal without glyphosate:

Herbicide(s) (chemical name(s)) Rate (combined) Source
Curtail (clopyralid + 2,4-D) 0.8 liter/acre Mayerle (2002)
Curtail (clopyralid + 2,4-D) 1 liter/acre Manitoba (2002)
Curtail (clopyralid + 2,4-D) 40 oz/acre U of Wy (2006)
Banvel + 2,4-D (dicamba + 2,4-D) 0.9 liter/acre Manitoba (2002)
Tordon + 2,4-D (picloram + 2,4-D) 8 oz/acre U of Wy (2006)
2,4-D ester alone 1-2 qts/acre Endres (1999)
Banvel (dicamba) alone 0.5 liter/acre Manitoba (2002)

Below, we estimate how much additional other herbicides would be used if each regime were to completely replace glyphosate. This would approximate a scenario in which all alfalfa is RR alfalfa, and so should be regarded as upper-bound estimates. Obviously, growers will make different choices, so the overall increase will be an aggregrate of some portion of each of these totals (and others not listed).

If glyphosate were to be completely replaced by Curtail for alfalfa stand removal, this would result in roughly 1 liter per acre or an additional 400,000 liters of Curtail (a mixture of clopyralid and 2,4-D); replacement with dicamba + 2,4-D at 0.9 liter/acre = an additional 360,000 liters of dicamba + 2,4-D; an additional 100,000 quarts of picloram + 2,4-D; an additional 400,000 to 800,000 quarts of 2,4-D alone; or an additional 200,000 liters of dicamba. The latter two regimes are not as likely, as neither chemical alone gives very good weed control on its own. Mayerle (2002) explains that another chemical "kick" (treatment) is often required later on to achieve adequate control of alfalfa prior to next season's rotation crop, so these calculations likely underestimate the true impact of "losing" glyphosate for stand removal purposes.

One serious problem with increased use of several of these herbicides for stand removal is long-lasting residual effects that, in the case of picloram, can last for more than a year. Even very low levels of picloram residues on hay or straw can be hazardous. (Comment Number: APHIS-2007-0044-11037-28)

Response: APHIS acknowledges the comment. Regarding the commenter's concern that glyphosate-resistant weeds would require the use of other more environmentally harmful herbicides, appendix G Table 5 in the DEIS analyses the effects of notes glyphosate-resistant weeds in agricultural systems and states that the provides references to herbicides that could be used for control of glyphosate-resistant weeds would beand which are similar to the herbicides used in conventional alfalfa farming practices. Regarding the commenter's concerns about an increased use of glyphosate over more toxic and carcinogenic herbicides, see the response to comment APHIS-2007-0044-6240-2 for issue 6.0 for additional discussion of this issue.. Also, see the response to comment APHIS-2007-0044-11037-1 for issue 6.3 for additional discussion of this comment.

Comment Excerpt Text:
Roundup Ready alfalfa system will increase use of toxic chemicals for eradication of volunteer RR alfalfa

Alfalfa stands grow dense and thick, with extremely deep roots. Removal is no easy task. This explains why many growers who use tillage have to make multiple passes, and why thorough removal of an old alfalfa stand is often accomplished with a combination of tillage and chemicals. [Footnote 24: U of Wy (2006). "Roundup Ready Alfalfa," University of Wyoming Cooperative Extension Service, B-1173, February 2006, Table 3.] Even so, volunteer plants springing up in the following season's crop are to be expected, and may prove to be significant problems for many growers. Volunteer RR alfalfa has the potential to be a widespread problem, for instance in vegetable fields previously planted to alfalfa, [Footnote 25: Tickes, B. (2002).

“Evaluation of Stinger (clopyralid) for weed control in broccoli,” 2002 Vegetable Report, College of Agriculture and Life Sciences, University of Arizona.] just as volunteer RR corn is becoming a significant weed problem in RR soybean fields planted in subsequent years. As with alfalfa stand removal, if the volunteer alfalfa is Roundup Ready, then glyphosate is eliminated as an option for controlling it. As a result, there will be an increase in the use of the non-glyphosate herbicides listed above for stand removal, and/or others appropriate to the follow-on crop, to control volunteer RR alfalfa. APHIS gives a few examples of herbicide regimes that have shown promise in controlling volunteer RR alfalfa in a following season corn crop – but once again, as with alfalfa stand removal, fails to give any quantitative estimate of the increase in herbicide usage this would require:

“Additional data demonstrated that early postemergence applications of herbicides (applied during the stage between the emergence of a seedling, and the maturity of the plant) used to control weeds in corn (Harness XTRA (acetochlor + atrazine), Degree (acetochlor), and Degree XTRA (acetochlor + atrazine) applied in tank mixtures with broadleaf herbicides Banvel (dicamba), 2,4-D, Marksman (atrazine + dicamba) and Hornet (clopyralid + flumetsulam) effectively controlled GT alfalfa in a GT corn crop.” [Footnote 26: EIS at 20.]

Thus, it appears that tank mixtures of up to 6 different herbicides will be applied to control RR alfalfa volunteers. Dicamba is a chlorophenoxy herbicide of the same class as 2,4-D, discussed above, and the State of California recently required both compounds be labeled as “probable human carcinogens.” Acetochlor was described above.

Atrazine is a potent endocrine-disrupting compound that has been found to cause gonadal malformations in frogs at concentrations as low as 0.1 part per billion, and act as an endocrine disruptor in fish and reptiles as well. [Footnote 27: Hayes, T.B. et al (2006). “Characterization of Atrazine-Induced Gonadal Malformations in African Clawed Frogs (Xenopus laevis) and Comparisons with Effects of an Androgen Antagonist (Cyproterone Acetate) and Exogenous Estrogen (17ß-Estradiol): Support for the Demasculinization/Feminization Hypothesis,” Environmental Health Perspectives 114 (Suppl. 1): 134-141.] A recent study demonstrated complete feminization and chemical castration of male African clawed toads from long-term exposure to just 2.5 parts per billion (ppb) atrazine, which is an environmentally-relevant concentration. [Footnote 28: Hayes, T.B. et al (2010). “Atrazine induces complete feminization and chemical castration in male African clawed frogs (Xenopus laevis), Proceedings of the National Academy of Sciences (Early Edition), www.pnas.org/cgi/doi/10.1073/pnas.0909519107.] Atrazine is a leading suspected culprit in the worldwide decline of amphibians, [Footnote 29: Biello, D. (2008). “World without Frogs: Combined Threats May Croak Amphibians,” Scientific American News, October 30, 2008.] as are Roundup formulations with POEA (polyethoxylated tallowamine) surfactants (see supporting materials on atrazine as well as the studies by Dr. Rick Relyea on Roundup’s toxicity to many species of frogs at quite low levels.

Atrazine is one of the most heavily used used corn herbicides, with lesser use in soybeans. In 2005, atrazine use in the U.S. totaled nearly 63 million lbs. on corn and soybeans: 62.29 million lbs. on corn and 0.61 million lbs. on soybeans. [Footnote 30: USDA NASS (2006), op. cit. For corn, 57.390 million lbs. (p. 19) reported on 93% of corn acreage (p. 2), for 57.390/0.93 = 62.29

million lbs. nationwide. For soybeans, 0.542 million lbs. (p. 97) on 89% of soybean acreage (p. 2) = 0.61 million lbs. nationwide.] Atrazine is one of the most common pesticide contaminants of ground and surface waters in the U.S. Atrazine has been demonstrated to induce breast and prostrate cancers in laboratory animals, [Footnote 31: Fan, W. et al (2007). "Atrazine-Induced Aromatase Expression Is SF-1 Dependent: Implications for Endocrine Disruption in Wildlife and Reproductive Cancers in Humans," Environmental Health Perspectives 115: 720-727.] and workers exposed to atrazine in manufacturing plants have substantially increased rates of prostate cancer, reinforcing the carcinogenic potential of this compound. [Footnote 32: Cox, C. (2002). "Group uncovers study linking atrazine with prostrate cancer," Journal of Pesticide Reform 22(2): Summer 2002.] Because of these health threats, the European Union banned atrazine in 2004. The U.S. EPA yielded to pressure from Syngenta and others, allowing atrazine use to continue despite its many harmful effects. [Footnote 33: LoE (2006). "EU on Atrazine," Living on Earth, PBS, transcript of interview with Tyrone Hays, April 21, 2006. http://www.loe.org/shows/segments.htm?programID=06-P13-00016&segmentID=1; Blumenstyk, G. (2003). "The Price of Research: A Berkeley scientist says a corporate sponsor tried to bury his unwelcome findings and then buy his silence," The Chronicle of Higher Education, October 31, 2003. http://chronicle.com/article/The-Price-of-Research/21691.
]
APHIS does not supply any estimate of the increase in the use of atrazine, acetochlor, monosodium methanearsonic acid, the chlorophenoxy herbicides 2,4-D and dicamba, clopyralid, picloram, or any other non-glyphosate herbicide that will be required for:

1) Removal of old stands of RR alfalfa
2) Eradication of Roundup Ready alfalfa volunteers in follow-on crops
3) Control of glyphosate-resistant weeds fostered by the RR alfalfa system, both independently of and in conjunction with existing RR crop systems, including RR soybeans, RR corn, RR cotton, RR canola, or RR sugar beets. (Comment Number: APHIS-2007-0044-11037-29)

Response: APHIS acknowledges the comment. Regarding the commenter's concern that glyphosate-resistant weeds would require the use of other more environmentally harmful herbicides, appendix G Table 5 in the DEIS analyses the effects of notes glyphosate-resistant weeds in agricultural systems and states that the provides references to herbicides that could be used for control of glyphosate-resistant weeds would similar toand which are similarto the herbicides used in conventional alfalfa farming practices. Regarding the commenter's concerns about an increased use of glyphosate over more toxic and carcinogenic herbicides, see the response to comment APHIS-2007-0044-6240-2 for issue 6.0.. Also, see the response to comment APHIS-2007-0044-11037-1 for issue 6.3 for additional discussion of this comment.

Comment Excerpt Text:
One source that APHIS does cite repeatedly deserves examination. This is a white paper – not peer-reviewed, not published in any journal – called "The Importance of Pesticides and Other Pest Management Practices in U.S. Alfalfa Production," published for USDA's The National Agricultural Pesticide Impact Assessment Program (NAPIAP) in 1999. [Footnote 4: Hower, A.A., J.K. Harper and R. Gordon Harvey (1999). "The Importance of Pesticides and Other Pest Management Practices in U.S. Alfalfa Production," prepared for The National Agricultural

Pesticide Impact Assessment Program, USDA, NAPIAP Document No. 2-CA-99.] While this white paper has certain useful information, it has several disadvantages that make it less reliable than USDA NASS data. First, the NAPIAP is based on data from 1988 to 1992, while USDA NASS surveyed pesticide use on alfalfa in 1998, so the latter data are more recent. Second, the NAPIAP white paper is not based on real pesticide usage data collected from alfalfa farmers themselves. Rather, it is based on responses to questionnaires mailed to unnamed "state specialists," who were asked to supply opinions about pesticide use and other weed control methods, problematic weeds and weed control costs in alfalfa farming for an "average year" in the period from 1988 to 1992 (the questionnaires were mailed out in December 1993). [Footnote 5: Ibid at 7.] Not only are state specialists less reliable sources of information about pesticide usage practices than the farmers who actually purchase and apply those pesticides, the fact that these specialists were asked to supply opinions on these matters for "an average year" over a period stretching back six years must have made real demands on their memory; and calls into question the accuracy and reliability of the extremely nuanced data supplied in the course of the paper's 65 tables. Finally, we are a bit suspicious of the objectivity of a study that insists, in its very title, on the "importance" of pesticides in a crop in which farmers demonstrably find so little use for them. (Comment Number: APHIS-2007-0044-11037-3)

Response: APHIS acknowledges the comment. Additional data were used in combination with Hower et al. for the DEIS, and thus the conclusions made in the DEIS were not dependent solely upon Hower et al. Furthermore, concerns for an increased use of glyphosate and other more toxic and persistent herbicides are addressed in the response to comment APHIS-2007-0044-6240-2 for issue 6.0. Also, see the response to comment APHIS-2007-0044-11037-1 for issue 6.3 for additional discussion of this comment.

Comment Excerpt Text:
Critique of APHIS's Assessment of the Herbicide Use Impacts of Other GT Crop Systems

APHIS finds "scientific disagreement" and "controversy" [Footnote 1: EIS at 166, N-2, N-11.] regarding the important question of whether glyphosate-tolerant, Roundup Ready crop systems have increased or reduced overall herbicide use. Yet there is there no reason at all for doubt on this question. It is absolutely clear that glyphosate-tolerant crops have fostered substantial increases in overall and per acre herbicide use, as we document below.

APHIS's confusion on this matter has several sources, chiefly:

1) Unwitting reliance on decade-old data that no longer reflect current conditions in the rapidly changing dynamic of GT crop adoption, resistant weed evolution and herbicide use;
2) Misguided rejection of high-quality pesticide usage data from its sister agency, USDA's National Agricultural Statistics Service (NASS); [Footnote 2: EIS at N-2.] and
3) Uncritical reliance on bogus "simulation studies" by organizations representing the biotechnology-pesticide industry.

CFS relies on NASS data for several reasons. First, NASS utilizes transparent, rigorous procedures and statistically valid sampling methods to deliver highly accurate pesticide data.

Second, NASS has regularly collected pesticide usage data on the major crops for which GT versions are predominant (soybeans, corn and cotton) over the entire period of GT crop adoption, offering a consistent set of data that facilitates accurate, year-to-year comparisons. Finally, NASS data and methodologies are freely and publicly available, which allows for open review and criticism of any analysis utilizing them.

NASS's Advisory Committee on Agricultural Statistics, comprised of experts from academia and industry, had this to say:

"NASS employs rigorous methods to ensure that statistically representative samples are achieved…." thus ensuring "a high level of data reliability and accuracy, which are the greatest advantage of NASS data." [Footnote 3: USDA NASS (2006). "Meeting of the Advisory Committee on Agriculture Statistics (ACAS): Summary and Recommendations," February 14-15, 2006, USDA NASS, Appendix III, at: http://www.nass.usda.gov/About_NASS/Advisory_Committee_on_Agriculture_Statistics/advisory-es021406.pdf.]

NASS data are also extensively used by the U.S. Environmental Protection Agency, state pesticide officials, pesticide firms and independent analysts.

The same Advisory Committee quoted above found fault with alternative, private sector pesticide data, finding it non-transparent and potentially based on faulty sampling techniques (e.g. overly small sample sizes). With reference to Doane, the major private-sector provider of pesticide usage information, the Advisory Committee found that:

"The proprietary agreements entered into by Doane subscribers extend well beyond prohibitions on data disclosure, to embargo revelation of the sampling and analytical procedures used to generate their data. Thus, it may be that a large number of the area wide estimates included in the Doane system are based on individual or statistically unrepresentative observations." [Footnote 4: USDA NASS (2006), op. cit., Appendix III.]

In other words, NASS is regarded by experts in the field as the authoritative source for pesticide usage information in American agriculture, while private sector companies may at times supply faulty pesticide data because of illegitimate (and secretive) sampling techniques. For these and other reasons, APHIS's criticisms of NASS data[Footnote 5: EIS at N-2.] are unfounded, and its confidence in private sector data misplaced, as explained further in Appendix 1.

Despite APHIS's dissatisfaction with NASS's pesticide reporting program, it reproduces a graph (Figure N-7, at N-17) based on NASS pesticide use data that first appeared in a USDA Economic Research Service publication (Fernandez-Cornejo 2006, Figure 3.3.3; APHIS neglected to record the source, which Fernandez-Cornejo cites as "USDA, NASS surveys"). [Footnote 6: It may well be that APHIS carelessly overlooked the fact that Fernandez-Cornejo (2006) used NASS survey data for this figure. Otherwise, it is difficult to explain how APHIS could criticize NASS data as unreliable (p. N-2) and yet here utilize the same data to support its preferred conclusion that HT crops reduce herbicide use. A second possible explanation is that APHIS has a pervasive bias leading it to uncritically accept any study or secondary article or undocumented claim to the

effect that HT crops reduce herbicide use, and condemn studies that reach the contrary conclusion, irrespective of the quality of data employed to reach these respective conclusions. Appendix __ explores the abundant evidence to support this latter explanation.] In Figure 3 below, we have used all available NASS data from 2003 to 2007 to update Figure N-7. One can confirm by inspection that all herbicide usage data points from 1995 to 2002 are the same in the two graphs (we exclude corn insecticide use). In Appendix 2, we describe the simple steps required to calculate the figures in Figure 3 from NASS data.

Although NASS does not break out herbicide use separately on GT versus conventional crops, any study purporting to do so must be consistent with NASS data. That is, if a study's conclusions are impossible or extremely difficult to explain in light of NASS data, such a study must be rejected, absent some very convincing explanation for the disparity. The study should also not be merely a number-crunching exercise, completely removed from on-the-ground farming reality. Instead, it should provide explanations for its results in terms of farmers' weed control challenges and their responses to these challenges, and how this dynamic changes over the time period covered by the study. Such explanations should be fact-based and quantitative whenever possible. This explanatory burden weighs more heavily on those whose conclusions do not comport with NASS data.

The figure below portrays the change in average herbicide use per acre per year[Footnote 7: Herbicide use per acre is preferred as a metric over total pounds of herbicide applied for the following reason. Total pounds applied to a crop in a given year depends in part on the number of acres planted, which can fluctuate, sometimes substantially, from year to year. The pounds per acre metric eliminates the effect of this arbitrary fluctuation and so provides an "acres-adjusted" measure of herbicide use to facilitate year-to-year comparisons of herbicide intensity.] in the U.S. from 1994 to 2005 (corn), 2006 (soybeans) and 2007 (cotton), based on all available NASS data. These are the three major crops with high adoption rates of glyphosate-tolerant versions, and the last years for which NASS data are available for each of them. GT versions were introduced by Monsanto in 1996 (soybeans), 1997 (cotton), and 1998 (corn). Figures 4, 5 and 6 portray the same average herbicide usage data separately for soybeans, cotton and corn, respectively. In addition, these figures plot adoption of HT varieties as a percentage of total crop acreage, in order to explore possible correlations between the two parameters.

Overall herbicide use on soybeans and cotton follow the same trend, and in fact are remarkably similar – slowly declining herbicide use in the first 5-6 years of GT crop adoption; a nadir in the year 2001 when HT varieties had reached roughly three-fourths of total crop acreage; and then, sharp, 50% spikes in herbicide intensity in the following 5-6 years. Herbicide use on corn generally fell in the first 5 years of HT corn adoption, bottoming out in 2002; and then increased slightly in 2003, remaining constant in 2005. HT corn was adopted more slowly than GT soybeans and HT cotton, with just 11% and 26% adoption in 2002 and 2005, respectively. (Comment Number: APHIS-2007-0044-11037-32)

Response: Concerns for an increased use of glyphosate and other more toxic and persistent herbicides are addressed in the response to comment APHIS-2007-0044-6240-2 for issue 6.0. Also, see the response to comment APHIS-2007-0044-11037-1 for issue 6.3 for additional discussion of this comment.

Comment Excerpt Text:
Of the many studies cited by APHIS on herbicide use and HT crops, Benbrook (2004) is the only one that both: 1) Comports with the NASS data presented above; and 2) Offers real-world farming explanations for the trends these data reveal. Dr. Benbrook has recently published another study on GE crops and pesticide use (Benbrook 2009) that employs the same methods as his earlier study, but extends the analysis through crop year 2008.

Benbrook (2004 & 2009) explains the reduction in herbicide use in the early years of GT crop adoption in the same terms as industry does. GT crops permitted field crop farmers to make much greater use of glyphosate, an extremely effective herbicide. In particular, RR crops' tolerance to glyphosate enabled farmers to apply the chemical "post-emergence" – that is, directly to the growing crop in order to kill nearby weeds – whereas prior to RR crops (i.e. and now with conventional crops), glyphosate use was/is limited to before planting or prior to seedling emergence to avoid crop damage. GT crops thus enabled farmers to better time their glyphosate applications to more efficiently kill weeds. This efficiency factor helped farmers kill more weeds with less herbicide than was possible with conventional crops in the first 3 years of GT crop adoption, resulting in slightly less herbicide use on GT crops relative to the conventional crop acres they displaced from 1996 to 1998.

The situation stayed relatively constant for the next two years, although the slight decline in herbicide use from 1996-98 from HT crops shifted over to a slight increase in 1999 to 2000. Two factors changed this situation. First, the dramatic upsurge in glyphosate use with Roundup Ready crops, as well as often exclusive reliance on glyphosate as the sole means of weed control, led inexorably to the rapid emergence of weed populations tolerant of or resistant to this chemical. This is the same principle by which bacteria evolve resistance to overused antibiotics. Resistant weeds, in turn, require higher doses or more applications of glyphosate to kill. In recent years, glyphosate use continues to rise, while aggregate non-glyphosate herbicide use remains constant. In some cases, increased rates of glyphosate are accompanied by higher doses of non-glyphosate herbicides as well (e.g. 2,4-D on soybeans).

The second factor involves the introduction of new, low-dose soybean herbicides for use on conventional soybeans. As RR crop adoption increased dramatically, use of glyphosate (a moderate- to high-dose herbicide) rose in tandem, and displaced the low-dose herbicides that would otherwise have been applied had those RR crop acres remained conventional. Together, these two factors are responsible for the herbicide-promoting impacts of HT crops over the past decade.

Beginning in earnest by 2001, GT crops have been responsible for a growing herbicide surplus relative to the hypothetical situation where they had never been introduced. Over the 13 year period from 1996 to 2008, GT crops are responsible for an additional 383 million lbs. of herbicides applied. Significantly, 46% of this additional herbicide burden accrued in just the past two years – 2007 and 2008 – which reflects farmers' use of substantially greater amounts of herbicide to counter the accelerated emergence of particularly damaging glyphosate-resistant weed populations, such as GR Palmer amaranth that has exploded to infest millions of acres of

cotton-growing land in the South, and the spread of GR marestail from southern and eastern states deeper into the Midwest. (Comment Number: APHIS-2007-0044-11037-33)

Response: See the response to comment APHIS-2007-0044-6240-2 for issue 6.0. Also, see the response to comment APHIS-2007-0044-11037-1 for issue 6.3 for additional discussion of this comment.

Comment Excerpt Text:
Additional real-world evidence supporting increased herbicide use with GT crops includes: 1) The sheer prevalence of glyphosate-resistant weed reports and analysis and beefed up herbicide recommendations to counter these weeds in the nation's farm press publications; 2) Increased exhortations from university extension agents to farmers to utilize full/increased glyphosate application rates, and supplement glyphosate with other herbicides to control or forestall GR weeds; 3) Monsanto's recently introduced program to subsidize RR farmers' purchase of non-glyphosate herbicides, with the aim of controlling or forestalling GR weeds; 4) The rapid development of new herbicide-tolerant crops by numerous biotech companies that are: a) Resistant to non-glyphosate herbicides; b) Resistant to multiple herbicides, usually glyphosate in combination with one or more non-glyphosate herbicides; and/or c) Engineered for tolerance to higher doses of glyphosate. All of these developments are explicitly or implicitly geared to enabling farmers to better control or forestall GR weeds – at least in the short term – through further increases in the use of multiple toxic herbicides. The resistant weed section below provides a fuller description of these and other developments.

The other studies or secondary articles cited by APHIS for the proposition that GT crops reduce herbicide use have one or more of several flaws: 1) They rely on NASS data from the late 1990s period, which have no relevance to the dramatically altered situation today; 2) They present no original research or findings of their own, but rather superficially cite the results of other studies that often in their turn uncritically cite the results of still other studies, creating an echo chamber effect; or 3) They are "simulation studies" that arrive at the conclusion that HT crops reduce pesticide use. These latter require some discussion.

Unlike NASS chemical usage reports, these simulation studies are not based on surveys of farmers' herbicide usage practices – much less surveys of thousands of farmers selected to comprise statistically representative populations of their states' farmers. Instead, the researchers requested university weed control experts in various states to supply them with typical herbicide regimes that farmers in their states might use: a) For the Roundup Ready crop; and b) To achieve RR crop-equivalent weed control with the corresponding conventional crop. These two "typical" herbicide regimes are then expanded to simulate the overall herbicide use of all Roundup Ready vs. all conventional growers, using USDA NASS data on the percent acres RR vs. percent conventional in the respective state. In other words, it is assumed that every RR soybean grower in a particular states uses exactly the same herbicide regime (e.g. 1 application of glyphosate at 0.95 lbs./acre for the year), while every conventional soybean grower uses a second herbicide regime that the expert deems is needed to achieve weed control equivalent to that of the Roundup Ready grower. To put it another way, NASS's pesticide use figures are built solidly on thousands of data points, derived from interviews with hundreds of growers in each state. In contrast,

Sankula et al (2006) have constructed an extremely shaky "simulation" of herbicide use based essentially on just two data points for each state: one for weed control in the RR crop, and the second for the conventional crop. If one or both of the two herbicide regimes cited by the expert is even modestly "off-base" with respect to average state-wide farmer practice, the modest errors will ramify tremendously in the expansion. With NASS surveys, however, the multitude of data points ensures that the inevitable inaccuracies in individual farmer reports (underestimates or overestimates of this or that herbicide) are ironed out in the wash.

There is nothing inherently wrong with simulation studies (also called models or modeling studies) of this sort, as long as their limitations are kept firmly in mind. The biggest limitation is that the results of simulation studies do not represent statistically valid representations of the real world parameters they model, and they should not be presented as if they did. Unfortunately, this fundamental stricture is not observed by Sankula et al (2006) or Johnson et al (2008), each of whom present their results as if they represented actual farmer herbicide use data.

Second, to the extent that models or simulations of this sort do become reliable indicators of real world phenomena, it is only through an iterative process of checking simulation results against actual data. If the simulation results deviate from the data, it is a clear sign that the model assumptions are flawed and need to be revised. In this case, the simulation results in Sankula et al (2006) and Johnson et al (2008) – namely, that HT crops reduce herbicide use by such and such an amount – are simply irreconcileable with NASS data showing sharply increasing herbicide usage rates with increasing adoption of GT crops (soybeans & cotton) since the year 2001. The authors of both studies could have performed an easy "check" of their simulation results against NASS data. Add up the total herbicide use of RR crop growers and non-RR crop farmers as predicted by their simulations (= 100% of crop acreage), and compare it with the NASS figure, which represents total herbicide use by all growers of the given crop. In Appendix __, we have carried out this check and several others on Sankula et al (2006)'s simulation values for herbicide use on RR vs. conventional soybeans in 2005. As discussed there, the large discrepancies with NASS data are indicative of seriously flawed model assumptions. In short, the models of Sankula et al (2006) and Johnson et al (2008) are pure fabrications because they conflict dramatically with real herbicide usage data. Thus, these simulations simulate nothing but the authors' flawed assumptions, and have no grounding in fact or farming practice.

One of those flawed assumptions is that conventional crop growers seek out and utilize herbicide regimes that will give them weed control equivalent to that of the Roundup Ready system. Conventional growers are more likely to be satisfied with adequate weed control that eliminates economic yield loss[Footnote 8: Shorthand for "yield loss that reaches economically significant levels in terms of reducing farmer income."] from weed competition, but does not reach the cosmetic standards of a Roundup Ready system. [Footnote 9: In those areas of the country where glyphosate-resistant weeds have either not emerged or only begun to appear (e.g. most Western and Northern Plains states), glyphosate can still deliver good weed control.] After all, if the conventional grower wanted RR crop-similar weed control, he would presumably switch to the RR crop. Extension agents have long advised growers to spare both their pocketbooks and the environment by limiting pesticide use to that needed to prevent economic damage, and refraining from application of the greater amount needed to achieve a cosmetically perfect, weed-free field. The RR crop system has been criticized for encouraging this unnecessary, herbicide-promoting

cosmetic weed control standard. Irrespective of this, however, it is clearly inappropriate for these authors to solicit the expert for a conventional crop herbicide regimen that will meet some arbitrary standard (here, weed control similar to an RR crop system) foreign to the farmer, rather than simply ask for typical herbicide regimen(s) that conventional growers in fact use. By this neat trick, Sankula et al (2006) and Johnson et al (2008) solicited conventional crop herbicide regimes that employed more weedkiller than the average conventional grower would likely use, which in turn helped them to reach the false conclusion of reduced pesticide use with RR crops.

Finally, these simulation studies are purely number-crunching exercises that make no attempt to explain their findings in terms of farmers' experience. Most strikingly, neither of these two studies make a single mention of: 1) Glyphosate-resistant weed evolution and its clear and growing stimulation of greater herbicide use; 2) The rapid development of multiple-herbicide and enhanced glyphosate-tolerant crops as a response to this problem; 3) The grave warnings from eminent weed scientists about the serious nature of the threat posed by resistant weeds.

Given these facts, one cannot help but wonder if the funding source of the group which turns out these simulation studies – the major biotechnology companies – has distorted their methodologies or conclusions. Clearly, the biotechnology industry has a great stake in presenting their products as environmentally friendly, and the alleged reduction in pesticide use with GM crops has been the central myth supporting this image. A hard analysis of the facts – using real data – shows the fraudulent nature of such "simulation studies." (Comment Number: APHIS-2007-0044-11037-34)

Response: See the response to comment APHIS-2007-0044-6240-2 for issue 6.0. Also, see the response to comment APHIS-2007-0044-11037-1 for issue 6.3 for additional discussion of this comment.

Comment Excerpt Text:
APHIS's main treatment of herbicide usage related to glyphosate-tolerant crops is found in Appendix N: page N-2 and Section 1.3, pages N-11 to N-18. Disjointed fragments appear in the cumulative impacts section as well (pp. 169 ff). The chief flaws in APHIS's treatment are its reliance on outdated studies with decade-old pesticide usage data that reporting on pesticide usage a decade or more ago; confusion of tendentious secondary literature for actual studies; reliance on unreviewed, bogus "simulation studies" that misrepresent pesticide use on GE and conventional crops; and an obvious and pervasive bias that leads APHIS to accept uncritically any study or secondary article that purports to show reduced herbicide use with HT crops.

APHIS describes a 2004 study by Dr. Charles Benbrook that found an aggregate increase in herbicide use of 138 million pounds due to the cultivation of GE herbicide-tolerant soybeans, corn and cotton over the nine years from 1996 to 2004. In other words, 138 million lbs. more herbicide were used than would have been the case had these HT crops not been introduced. Benbrook found that HT crops slightly reduced herbicide use from 1996 to 1998; but then stimulated a much greater increase in herbicide use from 1999 to 2004 (as portrayed in Figure N-1, p. N-12). Benbrook discusses two factors as being chiefly responsible for these findings. First, the rapid emergence of glyphosate-resistant weeds beginning in the year 2000, attributable to

excessive reliance on glyphosate for weed control in Roundup Ready crop systems, led to increased herbicide application frequency and rates as more and more farmers were forced to respond to increasingly resistant weeds. Second, the introduction and greater use of low-dose soybean herbicides applied primarily to conventional soybean acres also widened the herbicide usage gap between conventional vs. Roundup Ready soybeans (i.e. glyphosate is a relatively high dose herbicide).

APHIS then cites a number of studies it claims contradict Benbrook's results and find lower herbicide use on HT crops, thus generating "controversy" (N-11) and "scientific disagreement" (p. 166). APHIS uses this controversy and disagreement as an excuse to avoid an assessment of the herbicide usage impacts of currently grown RR crops, and to avoid conducting a prospective assessment of the herbicide usage impacts of Roundup Ready alfalfa. Thus, it is very important to determine whether this supposed controversy has any merit, and what the true impact of RR crops has been.

In several cases, the conflict is only apparent. For instance, APHIS cites Heimlich et al (2000) as one of those studies that conflict with Benbrook [cited twice for different and conflicting statements]. Yet, examination of Heimlich et al (2000) reveals that the study's conclusions of reduced pesticide use with GE crops (including HT crops) applies only to crop years 1997 and 1998. These are among the same years that Benbrook (2004) also found that GE crops reduced herbicide use. It is fairly clear that APHIS officers or consultants made this simple error because they simply never read Heimlich et al (2000).

The conflict with Benbrook (2004) is only apparent with a second report cited by APHIS as well – Fernandez-Cornejo (2006). This report, by an USDA Economic Research Service analyst, has no original research on GE crops and pesticide use. Instead, the author reiterates the conclusions of a decade-old study that compared pesticide use on GE vs. conventional crops from 1996 to 1998 – 8 to 10 years before the publication date. [Footnote 10: "The overall reduction in pesticide use associated with the increased adoption of GE crops (Bt cotton; and HT corn, cotton, and soybeans, using 1997/1998 data) also resulted in a significant reduction in potential exposure to pesticides. The decline in pesticide applications was estimated to be 19.1 million acre-treatments (Fernandez-Cornejo and McBride, 2002, pp. 26-28)." (p. 72) (emphasis added). Reference to Fernandez-Cornejo and McBride (2002) (p. 27) reveals that while most of the data are indeed for 1997/1998, the HT corn data is based on crop years 1996/1997.] Once again, Benbrook also found that GE crops reduced pesticide use in that time frame. However, such findings are completely useless in 2010. The rapidly evolving dynamic between increasing RR crop adoption and rising herbicide use and widespread emergence of resistant weeds has produced a an agronomic landscape that has altered dramatically for most American field crop growers since 1996.

Fernandez-Cornejo (2006) also states that "pesticide use on corn and soybeans has declined since the introduction of GE corn and soybeans in 1996" referring to a Fig. 3.3.3 (p. 72). APHIS reproduces this Figure 3.3.3 as Figure N-7 (p. N-17) in the EIS. The graph plots average herbicide usage from 1995 to 2001 (for cotton) or 2002 (for corn and soybeans), based on NASS data. [Footnote 11: APHIS neglects to include the information source in the EIS, but the original Figure 3.3.3 cites USDA NASS pesticide survey data. (We will come back to this point.)] For

some unexplained reason, in this 2006 report, Fernandez-Cornejo failed to plot available NASS data for herbicide use on cotton and corn (2003, 2005) and soybeans (2004, 2005). The insistence on referring to outdated data and the curious reluctance to discuss recent data is puzzling, and positively misleading in an area that is changing so rapidly.

A third study cited by APHIS for the proposition that HT crops reduce herbicide use is Gianessi and Reigner (2006). This study, entitled "Pesticide Use in U.S. Crop Production 2002: With Comparisons to 1992 and 1997 – Fungicides and Herbicides," was written by employees or contractors of the pesticide lobby group, CropLife Foundation. Once again, APHIS gets it wrong. This study has nothing to do with GE crops, and Gianessi and Reigner say nothing about whether HT crops reduce or increase herbicide use. Instead, this publication is a collection of tables with figures that purport to give a broad-brush numerical overview of fungicide and herbicide use in the U.S. in 1992, 1997 and 2002, with the data broken down by crop, herbicide, state, etc. While a variety of sources are listed, Gianessi and Reigner fail to present any methodology. Interestingly, Gianessi and Reigner falsely claim that a widely used herbicde – metolachlor – was phased out in 2001, when USDA NASS data clearly show that it continued to be used in the millions of pounds each year, for some years afterwards. This is demonstrated in the supporting materials as well as NASS data.

APHIS refers to a fourth study as follows: "Trewavas and Leaver (2001) conducted an analysis which revealed that 3.27 million kg of other herbicides have been replaced with 2.45 million kg. of glyphosate in soybean fields in the US." Over which years? How was this "analysis" conducted? Did GE soybeans have anything to do with this alleged change in herbicide use? We checked this article to seek answers, and found the following: 1) The findings quoted above are taken directly from Heimlich et al (2000) (discussed above), and so provides no new information to corroborate APHIS's "less pesticide with GE crops" story line; 2) As noted above the results apply to crop years 1996 to 1998, and so do not conflict with Benbrook (2004); and 3) APHIS for some reason alters the lb. units used in Trewavas and Leaver (2001) to kilograms, perhaps to give the false impression that the reported results are indeed new rather than duplicative of Heimlich et al (2000).

In at least seven cases, it is clear that APHIS has not even taken the trouble to read the articles/studies it cites. Instead, APHIS has "lifted" citations for these seven works from a review article where the conclusion of each is briefly and uncritically described. Such third-hand reporting is a flagrant breach of scientific protocol. The legal equivalent would be for a witness to present second-hand hearsay (he said she said) as if it were his/her personal experience. It is no more permissible in science than in law. It is irresponsible to report the bare conclusions of a study one has not read, because one does so on faith, without having made a critical assessment of the validity of the study's methodology, the assumptions upon which it is based, or possible errors. The fact that error is a huge and ineradicable part of scientific endeavor is implicit in the discipline of peer-review. When one uncritically cribs conclusions and citations at third hand, as APHIS has done here, it represents a betrayal of this core scientific principle. (Comment Number: APHIS-2007-0044-11037-35)

Response: See the response to comment APHIS-2007-0044-6240-2 for issue 6.0. Also, see the response to comment APHIS-2007-0044-11037-1 for issue 6.3 for additional discussion of this comment.

Comment Excerpt Text:
USDA NASS Agricultural Chemical Usage reports are not based on opinions of specialists, who in our experience are often biased to favor more input-intensive practices, but rather on detailed surveys of individual farmers chosen so as to form a statistically representative picture of the pesticide usage practices of farmers in their state or region. The surveys are conducted by trained enumerators, and the results are carefully assessed as to their reliability. In 1998, USDA NASS collected 755 usable reports of pesticide usage from alfalfa hay farmers in 48 states across the country (p. 6), with appropriate weighting of numbers surveyed from each region according to its relative importance in alfalfa production: Western region (274); North Central region (317); Northeast (62); and South (102). The survey procedure and reliability assessment are explained on pages 125-26. The major result was that just 7% of alfalfa hay acres were treated with herbicides:

"Alfalfa Hay: Growers applied herbicides to 7 percent of their acres across the United States." (p. 3)

In contrast, according to the opinions of the unnamed state specialists consulted by questionnaire by Hower et al (1999): "an average of only 16.6% of the alfalfa hay acreage was treated with herbicides…"[Footnote 6: Hower et al, op. cit., p. 59.] – over twice as much as the 7% determined by NASS. APHIS mistakenly cites Hower et al (1999) as stating that 22% of alfalfa hay acreage was treated with herbicides[Footnote 7: EIS at 67-68. APHIS wrongly cites Hower et al as stating that "16.6% of total fields; 22 percent of acreage" of hay fields were treated with herbicides. Hower et al (1999) say nothing about "total field," but rather refer explicitly to 16.6% of hay acreage as being treated with herbicides, as quoted above.] – thus arriving at a figure more than three times as high as the NASS figure. This is by no means an insignificant error (or misrepresentation) on APHIS's part. It makes herbicide use appear to be more than three times more prevalent than it actually is, which as we will see fits a pattern of pervasive bias throughout the EIS. APHIS's intent is to make alfalfa seem to be a much more herbicide-intensive crop than it really is, in order to make it seem that the huge increase in glyphosate use with RR alfalfa would be offset by significant decreases in the use of other herbicides. As we shall see, this is not the case.

APHIS also refers to Wilke (1998) [Footnote 8: EIS at 61 and N-18.] as the source of the latest available estimate for the percentage of alfalfa hay acres treated with herbicides – 17% -- which is incorrect. Wilke (1998) quotes one of the co-authors of the Howe et al (1999) study we referred to above, R. Gordon Harvey, who is referring to the 16.6% figure found in that study for the "average year" between 1988 ad 1992. As we noted above, USDA NASS's 1998 figure of 7% of hay acreage treated with herbicides is 6-10 years more recent, as well as being more accurate and reliable. (Comment Number: APHIS-2007-0044-11037-4)

Response: See the response to comment APHIS-2007-0044-6240-2 for issue 6.0. Also, see the response to comment APHIS-2007-0044-11037-1 for issue 6.3 for additional discussion of this comment.

Comment Excerpt Text:
The EPA estimates that 200,000 lbs. a.e. glyphosate are applied to alfalfa nationwide. [Footnote 1: EPA (2008), op. cit. a.e. = acid equivalents, which represents the weight of glyphosate acid itself, excluding the weight of the salt that commercial formulations of glyphosate normally come with.] Two recent studies on glyphosate use and weed control with RR alfalfa funded in part by Monsanto are used below to estimate the likely increase in glyphosate use with introduction and varying degrees of adoption of RR alfalfa. These studies are included in the supporting material; McCordick et al (2008) is cited in the EIS.

McCordick et al (2008) conducted field studies in Michigan in 2004 and 2005 to compare the effects of different establishment and weed control methods on glyphosate-tolerant alfalfa production. Four glyphosate treatments of 0.8 kg a.e./hectare (= 0.71 lbs./acre) were applied over the course of the season, once roughly 5 weeks after seeding, then 7-10 days after each of three harvests. The total glyphosate applied for the season was thus 3.2 kg a.e./ha (= 2.86 lbs./acre). [Footnote 2: 1 kg = 2.2046 lbs.; 1 hectare = 2.4711 acres. Multiplication of the kg/ha figures by 0.8922 gives lbs./acre.] In the second study, Wilson and Burgener (2009) tested RR alfalfa for three years from 2005 to 2007 in Nebraska, using a number of different glyphosate application regimes involving one or two applications of 0.75, 1.12 or 1.50 lbs. a.e./acre glyphosate at different alfalfa growth stages. Seasonal application rates of glyphosate thus ranged from (1 x 0.75) to (2 x 1.50) = 0.75 to 3.0 lbs. a.e./acre/year. In both studies, glyphosate was compared to other weed control regimes (discussed further below). Finally, the theoretical, legally permissible, upper limit of glyphosate use on RR alfalfa (based on the current maximum label rate) is also modeled.

Below, we discuss nationwide use of glyphosate use with several of the RR alfalfa system glyphosate regimens noted above, under each of three different adoption scenarios: 20%, 50% or 80% of total alfalfa acreage = Roundup Ready alfalfa. The figure we use for total alfalfa acreage (22.25 million acres) was derived by averaging the acreage of alfalfa harvested over the past decade (2000 to 2009), as reported by USDA NASS.

Glyphosate use varies quite widely under the different scenarios. At the low end, a single application per year of roughly half the maximum, single application label rate would mean 3.3, 8.3 or 13.3 million lbs. of glyphosate applied to RR alfalfa at 20%, 50% or 80% adoption rates, respectively. Relative to current annual nationwide use of glyphosate on alfalfa of 200,000 lbs. a.e. (= 0.2 million lbs), these scenarios yield 16-fold, 41-fold or 66-fold increases in glyphosate use, respectively.

At the high end, the maximal seasonal rate applied by Wilson and Burgener (2009) of 3.0 lbs. a.e./acre/year (2 application of 1.5 lbs./acre) would mean 13.3 million, 33.4 million or 53.4 million lbs. glyphosate a.e. applied at 20%, 50% or 80% RR alfalfa adoption, respectively. In this scenario, glyphosate use would increase by 66 times over current levels with just 20% of alfalfa acreage converted to the Roundup Ready alfalfa system. Glyphosate use would increase 167-fold or 267-fold over current levels in the 50% or 80% adoption scenarios.

Finally, given the current maximum label rates for use of glyphosate on RR alfalfa, it would be legally permissible to apply 26.5, 66.3 or 106.1 million lbs. a.e. of glyphosate to RR alfalfa, if adopted at the 20%, 50% or 80% level, respectively – yielding 130 to 530 times as much glyphosate as is currently applied to alfalfa. It is unlikely that this much glyphosate would ever be applied to Roundup Ready alfalfa, however; we report these figures merely to delineate the theoretical, legally permissible limits to glyphosate use in the Roundup Ready alfalfa system. [Footnote 3: With conventional alfalfa, the maximal single application rate of 1.55 lbs. a.e./acre is also the seasonal maximum, since only one application per year is permitted (at least for alfalfa that will be grazed or fed as forage). See Monsanto UltraMAX II label (2004), p. 11.]

In general, the amount of glyphosate applied with use of the RR alfalfa system will increase over time, with evolution of glyphosate-resistant weeds and weed shifts to more glyphosate-tolerant species. (Comment Number: APHIS-2007-0044-11037-5)

Response: APHIS acknowledges the comment. -See the response to comment APHIS-2007-0044-6240-2 for issue 6.0. Also, see the response to comment APHIS-2007-0044-11037-1 for issue 6.3 for additional discussion of this comment.

Comment Excerpt Text:
To what extent would the 16- to several hundred-fold increase in glyphosate use with the RR alfalfa system displace use of other "more toxic," "more environmentally harmful," herbicides, as APHIS claims ad nauseum, without any serious quantitative analysis, throughout the EIS? The NASS and EPA alfalfa pesticide usage data that APHIS somehow neglected to consult provide the answer. Overall herbicide use on alfalfa in 1998 was 1.468 million lbs.; [Footnote 4: USDA NASS (1999), op. cit., p. 9. See figure in row "U.S." and column "1,000 Lbs" under "Herbicide."] if one subtracts the 0.2 million lbs. of glyphosate, that leaves roughly 1.3 million lbs. of non-glyphosate herbicides applied to alfalfa. Even the low-end scenario of glyphosate use with RR alfalfa was 3.3 million lbs., with more likely scenarios roughly ten times higher (see below). The idea of replacing just over a million lbs. of non-glyphosate herbicides with 10 to 20 to 30 million or more lbs. of glyphosate-based formulations makes sense only to those who understand nothing about this pesticide's toxicity, its numerous harmful effects on the interests of agriculture, human health and the environment.

The scenarios above give a very wide range of possible glyphosate use with the RR alfalfa system. How much glyphosate would actually be used? No definitive answer is possible, yet it was clearly incumbent on APHIS to carefully analyze this matter rather than merely throwing out a casual upper-bound estimate. (Comment Number: APHIS-2007-0044-11037-6)

Response: APHIS acknowledges the comment. See the response to comment APHIS-2007-0044-6240-2 for issue 6.0. Also, see the response to comment APHIS-2007-0044-11037-1 for issue 6.3 for additional discussion of this comment.

Comment Excerpt Text:

An important factor that must be considered is that one substantial application of glyphosate is "built-in" to the RR alfalfa system – that is, necessary even in the event that a farmer doesn't have weed problems and otherwise wouldn't apply Roundup. According to the Monsanto label for several Roundup products:

"….up to 10% of the [RR alfalfa] seedlings may not contain a Roundup Ready gene and will not survive the first application of this product. To eliminate the undesirable effects of stand gaps created by this loss of plants, a single application of at least 22 fluid ounces per acre of this product should be applied at or before the 4-trifoliate growth stage." [Footnote 5: Roundup WeatherMAX label (2007), Section 12.1, Roundup Ready Alfalfa, p. 14. Virtually identical wording is found in the Honcho label (2007), Section 12.1, Roundup Ready alfalfa, p. 14.]

The recommended application rate for this purpose is 22 to 44 fluid ounces of Roundup WeatherMax, or 1 to 2 quarts of Honcho, both equivalent to a dose of 0.75 to 1.5 lbs. glyphosate a.e./acre. Thus, a farmer who wishes to avoid stand gaps in his/her RR alfalfa (which provide opportunities for weeds to invade the alfalfa stand, defeating the weed control purpose of the RR system) must make a quite early application of Roundup whether weeds are present or not. Reference to the scenarios in Table 1 shows that this "built-in" application by itself ensures that the RR alfalfa system will require from 3.3 to 13.3 million lbs. (if 0.75 lbs./acre are used) or from 6.6 to 26.6 million lbs. (if 1.5 lbs./acre) are used, depending on the RR alfalfa adoption rate.

For some growers, this application of glyphosate that is required to remedy defects in the RR alfalfa technology will do double duty for adequate, season-long weed control, at least in the short term. However, most growers will make at least one and in some cases several additional applications of glyphosate. This is because, generally speaking, somewhat later applications when the alfalfa seedlings are bigger provide more effective weed control than early treatments. Of the treatments tested by Wilson & Burgener (2009), the one that provided the best weed control was two applications of glyphosate (2 x 1.5 lbs. a.e./acre), one each at the four- and 16-trifoliate alfalfa growth stages. The second best treatment involved two treatments (2 x 1.12 lbs. a.e./acre) at the two- and eight-trifoliate stages. [Footnote 6: Wilson & Burgener (2009), Table 2. Note that the corresponding treatments in the paper, in kg/ha, are 2 x 1.25 and 2 x 1.68. We have converted units to lbs./acre, as in Table 1 of these comments.] Improved weed control with a second, later application is attributable to "catching" more weeds that have had the time to sprout since the earlier treatment. [Footnote 7: Many growers of other RR crops attempt to make do with one late or very late application of glyphosate, to both "catch" more weeds and economize. This popular practice greatly enhances the risk of glyphosate-resistant weed evolution.] The common use of a second application of glyphosate by RR alfalfa growers would correspond to the scenarios in Table 1 that project from 10 to over 50 million lbs. of glyphosate, depending on the adoption rate. Once again, this substantial amount of glyphosate could displace no more than just over 1 million lbs. of non-glyphosate herbicides. (Comment Number: APHIS-2007-0044-11037-7)

Response: APHIS acknowledges the comment. See the response to comment APHIS-2007-0044-6240-2 for issue 6.0. Also, see the response to comment APHIS-2007-0044-11037-1 for issue 6.3 for additional discussion of this comment.

Comment Excerpt Text:
GE alfalfa would significantly increase pesticide use, harming both human health and the environment. USDA admits (correctly) that introduction of Roundup Ready alfalfa will increase Roundup use. However, USDA's claims that the increase is not significant and that Roundup will replace other, more toxic herbicides are wrong and unsupported by any evidence. (Comment Number: APHIS-2007-0044-11969-4)

Response: See the response to comment APHIS-2007-0044-6240-2 for issue 6.0.

Comment Excerpt Text:
The first of these two concerns is by the far the greater, although I understand that the USDA and its sub-a~encies will likely defer this to the EPA, since it deals with the nature of a pesticlde and not of the plants in question themselves. I consider it a relevant concern though, since the APHIS'S EA and Draft EIS are based on the use of the herbicide glyphosate. Since these varieties of alfalfa are patented by Monsanto and FGI to be used specifically with Monsanto's Roundup line of herbicidal products, it is most certainly relevant to note that Roundup is NOT simply glyphosate; that glyphosate in fact is the minority portion of the product's chemical composition. Roundup is a mixture of glyphosate and other undisclosed chemical(s) which are considered a 'trade secret', and thus not made known to the consumer, or, as far as I can find, anyone outside of Monsanto. (1) Because the actual herbicide to be used includes unknown chemicals with unknown effects, I find that the assessment of the APHIS, based on the incorrect equation that Roundup IS ~lyphosate, to be unconscionably false and misleading. I see that POEA is mentioned ln the dEIS, but that the remainder of surfactants are simply referred to as "trade secrets." The toxicity of these secret ingredients, though not their identities, has been established (2).
The literature online regarding glyphosate suggests that it is taken up by the plants treated, and translocated throughout the plant tissues. since the remainder of the chemical composition of Roundup is not described, it seems to be up in the air as to whether this remainder is also translocated. I do not see how the APHIS could fail to address these issues. unless it does address them, I do not see how it could possibly issue a finding of 'no significant impact'.
If the USDA and APHIS are to maintain credibility in the eyes of the individuals who will be making a choice between GMO and conventional varieties of alfalfa (as well as products from animals fed alfalfa as forage) then this issue of Roundup's chemical composition must be addressed thoroughly and timely. (Comment Number: APHIS-2007-0044-12319-2)

Response: Regarding the commenter’s concerns about the total chemical composition of Roundup and the effect of compounds other than glyphosate in Roundup to human health, such as polyethoxylated tallow amine (surfactant), see the response to comment APHIS-2007-0044-0352-1 for issue 6.3.

Comment Excerpt Text:
Oppose approval of genetically engineered alfalfa.
Organic consumers strongly care about genetically engineered alfalfa (and soybeans, corn, etc):
- Contaminating natural crops, and entering into the human food chain,
- Devaluing or destroying the marketability of food crops,
- Adding increased glyphosate pesticide toxicity to the environment and food chain,
- Causing serious disease to humans (link between glyphosate and non-Hodgkins lymphoma: Journal of the American Cancer Society).
Only Monsanto profits from genetically altered seeds/plants; we the people suffer the consequences.
(Comment Number: APHIS-2007-0044-2207-1)

Response: Regarding the commenter's concerns about genetically engineered alfalfa contaminating natural crops and entering the food chain, see the first paragraph of the response to comment APHIS-2007-0044-0677-1 for issue 6.1.

Comment Excerpt Text:
I object to the proposed USDA approval of genetically modified "Roundup Ready" alfalfa. Please do not approve this request. It is perverse to engineer crops so as to be able to dump more and more toxic Glyphosate onto them and then feed these crops to the animals in our own food chain. Please think of the children in future generations before you act! We must find less toxic ways to live in harmony with this beautiful land of ours. Roundup is not the answer to our food supply problems. (Comment Number: APHIS-2007-0044-2224-1)

Response: Regarding the commenter's concerns about an increased use of glyphosate, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3.

Comment Excerpt Text:
The utilization of genetically modified crops has impacted me personally - in a positive manner. I own and operate a crop consulting firm that implements various crop and pest management programs for farmers in Wisconsin. I can say that the use of Bt corn and Roundup Ready corn and beans has drastically reduced the exposure I and my employees face as we go about our daily routines of field scouting to implement our Iintegrated Pest Management plans for farmers we serve. The use of the transgenic crops has virtually eliminated our exposure to insecticides used to control European Corn Borer and dramatically reduced our exposure to corn rootworm insecticides. Our exposure to herbicides has been reduced as well with the advent of glyphosate tolerant corn and beans. We typically use rates of soil applied herbicides such as acetochlor and metolachlor that are 40 to 70 percent of the rates of active ingredient used prior to the use of glyphosate tolerant crops. Our emphasis on sound principles of weed resistance management has helped us to avoid problems with glyphosate resistant weeds that have been a problem for some. (Comment Number: APHIS-2007-0044-2240-2)

Response: APHIS acknowledges the comment. The analysis in the DEIS supports your comments, as discussed in section III.D.2 of the DEIS.

Comment Excerpt Text:
I will not buy GE Alfalfa and GE Alfalfa-Derived Meat Dairy Products. This regulation/non-regulation does not Protect All Farmers, Organic Included, Who Wish to Choose to Grow Non-GE Crops; this documentation must be or re-written to do so. GE Alfalfa Would Significantly Increase Pesticide Use and Increase Harm to Human Health and the Environment and that is incredibly undesirable for me and for the sake of my children. Protecting Organic Farmers is part of the mandate of the USDA. Any threat to the sustainability of small farmers is a threat to small communities and local economies; if this legislation passes as written, then broken local economies, bankrupt small farms, and the torn fabric of small town America would lay at the feet of the USDA. The EIR is completely inadequate and the conclusions made in this document are not sufficently supported to merit approval. (Comment Number: APHIS-2007-0044-2256-1)

Response: Regarding the commenter's concerns about increased use of glyphosate, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3. In regard to impact on small farmers, see the response to comment APHIS-2007-0044-4913-7 for issue 5.1.

Comment Excerpt Text:
I am very concerned about the issue of chemicals on or near organic alfalfa. I try my best to ingest as few chemicals in my food as possible and buy organic foods and milk because they support my health. I do not want to worry that a weed killer has been added to my organic food or milk wether on purpose by being fed to cows or by "accident". Please do not approve Monsanto's GE Alfalfa. (Comment Number: APHIS-2007-0044-3212-1)

Response: Regarding the commenter's concerns about increased use of glyphosate, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3. In regard to the impact on organic farming, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Glyphosate Human Toxicity: Glyphosate based herbicides are toxic and endocrine disrupters These impacts appeared at very low concentrations of the herbicide. The main targets for cell damage included membrane, energy metabolism and programmed cell death involing nuclear DNA fragmentation.(Footnote 1: Gasnier C, Dumont C, Benachour N, Clair E, Chagnon MC, Séralini GE. Glyphosate-based herbicides are toxic and endocrine disruptors in human cell lines. Toxicology. 2009 Aug 21;262(3):184-91) (Footnote 2: Ho.M-W. Ban Glyphosate Herbicides Now Science in Society 2009,43, 34-5).
Glyphosate formulations induce apoptosis and necrosis in human umbilical , embryonic and placental cells the adjutants in herbicide formulations are not inert but contribute to the herbicide toxicity (Footnote 3: Benachour N, Séralini GE. Glyphosate formulations induce apoptosis and necrosis in human umbilical, embryonic, and placental cells.Chem Res Toxicol. 2009 Jan;22(1):97-105.). (Footnote 4: Ho,M-W, Cherry,B. Death by Multiple Poisoning ,Glyphosate and Roundup Science in Society 2009,42, 14) (Footnote 5: Ho,M-W,Cummins,J. Glyphosate Toxic and Roundup Worse Science in Society 2005,26, 12). Glyphosate is implicated in

oxidative stress in liver and brain (Footnote 6: Astiz M, de Alaniz MJ, Marra CA Effect of pesticides on cell survival in liver and brain rat tissues. Ecotoxicol Environ Saf. 2009 Oct;72(7):2025-32).Glyphosate has been proven teratogenic in rats and the implication for humans is clear (Footnote 7: Dallegrave E, Mantese FD, Coelho RS, Pereira JD, Dalsenter PR, Langeloh A. The teratogenic potential of the herbicide glyphosate-Roundup in Wistar rats. Toxicol Lett. 2003 Apr 30;142(1-2):45-52.) (Footnote 8: Ho,M-W, Glyphosate Herbicide Could Cause Birth Defects Science in Society 2009, 43, 36)
Roundup (glyphosate formulation) effects human reproduction and fetal development in case of contramination based on studies employing human embryo cells (Footnote 9: Benachour N, Sipahutar H, Moslemi S, Gasnier C, Travert C, Séralini GE. Time- and dose-dependent effects of roundup on human embryonic and placental cells. Arch Environ Contam Toxicol. 2007 Jul;53(1):126-33) Glyphosate formulations effect cell cycle regulation. Which in turn effects chromosome stability according to studies with sea urchin cells in culture(Footnote 10: Marc,J,Mulner-Lorillon,O,Belle,R. Glyphosate based pesticides affect cell cycle regulation Biology of the Cell 2004,96,245-9). Glyphosate caused alteration in estrogen regulated genee expression in humans as determined by powerful micro array analysis (Footnote 11: Hokanson R, Fudge R, Chowdhary R, Busbee D. Alteration of estrogen-regulated gene expression in human cells induced by the agricultural and horticultural herbicide glyphosate. Hum Exp Toxicol. 2007 Sep;26(9):747-52.). Glyphosate breaks and damages the chromosomes in bone marrow cells of mice (Footnote 12: Prasad,S,Srivastava,S, Singh,M, Shukla,Y. Clastogenic Effects of Glyphosate in Bone Marrow Cells of Swiss Albino Mice Journal of Toxicology Volume 2009 (2009), Article ID 308985, 6 pages doi:10.1155/2009/308985). Glyphosate damages and breaks the chromosomes of normal and cancerous human cells in culture (Footnote 13: Monroy CM, Cortés AC, Sicard DM, de Restrepo HG. Cytotoxicity and genotoxicity of human cells exposed in vitro to glyphosate Biomedica. 2005 Sep;25(3):335-45.). The genotoxicity of glyphosate is well supported by the studies listed. That fact should be recognized by APHIS not denied.

The main breakdown product of glyphosate is aminoethylphosphoric acid (AMPA). That product accumulates in a treated hepatocellular carcinoma cell line and is genotoxic is such cells. The genotoxicity was well established (Footnote 14: Manas F, Peralta L, Raviolo J, García Ovando H, Weyers A, Ugnia L, Gonzalez Cid M, Larripa I, Gorla N. Genotoxicity of AMPA, the environmental metabolite of glyphosate, assessed by the Comet assay and cytogenetic tests. Ecotoxicol Environ Saf. 2009 Mar;72(3):834-7). APHIS denies that glyphosate and its breakdown product is genotoxic but did not provide any indication that they had studied the scientific literature.
An epidemiologic study o f Swedish people exposed tio glyphosate showed that the herbicide exposure doubled the risk of non-Hodgkin lymphpma with a ten year latency periode (Footnote 15: Eriksson M, Hardell L, Carlberg M, Akerman M. Pesticide exposure as risk factor for non-Hodgkin lymphoma including histopathological subgroup analysis. Int J Cancer. 2008 Oct 1;123(7):1657-63.). Aphis does not acknowledge that study, but they should. Studies of glyphosate induced cancer in mouse skin show that the herbicide is a powerful promoter of cancer (Footnote 16: George J, Prasad S, Mahmood Z, Shukla Y. Studies on glyphosate-induced carcinogenicity in mouse skin: A proteomic approach.J Proteomics. 2010 Mar 10;73(5):951-964). A clinical study of an accident describes a 26-year-old teacher who used glyphosate correctly but suffered from severe dysphonia after some hours. Laryngostroboscopy revealed decreased

vocal fold mobility suggesting innervation impairment. The symptoms resolved spontaneously 6 weeks later and vocal fold mobility returned to normal. Glyphosate neurotoxicity has been discussed in the literature therefore, the dysphonia observed here may have been due to an intermittent neuropraxia of the laryngeal nerve (Footnote 17: Ptok M. Dysphonia following glyphosate exposition [Article in German] HNO. 2009 Nov;57(11):1197-202.) (Comment Number: APHIS-2007-0044-3410-2)

Response: See the response to comment APHIS-2007-0044-10525-1 for issue 6.0

Comment Excerpt Text:
Studies have shown a clear link between glyphosate and non-Hodgkins lymphoma (Journal of the American Cancer Society), and have found that glyphosate damages and kills human cells even at diluted levels far below recommendations (American Chemical Society). Glyphosate/Roundup also is used on GE soybeans and GE corn. (Comment Number: APHIS-2007-0044-4268-1)

Response: The commenter refers generally to evidence about the link between Roundup (glyphosate) and non-Hodgkins lymphoma, but no specific studies are cited and thus APHIS cannot validate the accuracy of the comment. Regarding the commenter's concern about a link between Roundup (glyphosate) and non-Hodgkins lymphoma, see the response to comment APHIS-2007-0044-2243-1 for issue 6.0.

Comment Excerpt Text:
This GM Alfalfa Would Significantly Increase Pesticide Use and Thereby Harm Human Health and the Environment. (Comment Number: APHIS-2007-0044-6207-4)

Response: Regarding the commenter's concern about the increased use of pesticides and their harmfulness to human health and the environment, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3.

Comment Excerpt Text:
As a consumer I am extremely concerned that the government allows the use of genetically modified seeds which enable the chemical ROUNDUP, a weed killer to be sprayed directly on crops and kill the weeds and not the crop plant. Which means we would be eating roundup in our food. As I understand, this already happens to our corn crop. I strongly urge you to rethink the above practice. When you comment that most consumers and farmers do not care, I believe you are seriously misinformed. My belief is that most consumers have no knowledge that this is happening.
There is a multitude of information that directly links chemicals in our food, air, and water to a plethora of diseases.
WHY ADD MORE CHEMICALS? There is no convincing argument to do so. (Comment Number: APHIS-2007-0044-6209-1)

Response: The commenter refers generally to studies about links in our environment to a plethora of diseases, but does not cite any specific studies and thus APHIS cannot validate accuracy of the comment. Regarding the commenter's concern about the use of glyphosate on GT alfalfa and its effects to human health, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3.

Comment Excerpt Text:
Based on the preponderance of evidence that GM crops can and do contaminate nearby crops and the many polls showing that Americans have looked at the evidence and concluded that eating GM foods is not good for their health or the environment, I would like to request that you not grant Monsanto permission to grow its Round-up ready alfalfa. Among the many reasons not to consume this type of food is that the pesticide cannot be washed off. And the levels of this pesticide are not in the safe range if consumed on a basis as regular as the average American diet. (Comment Number: APHIS-2007-0044-6295-1)

Response: Regarding the commenter's concerns about human health effects of potential glyphosate exposure, see the second section of the response to comment APHIS-2007-0044-0278-1 for issue 6.0. In regard to past mixing (GT alfalfa and conventional alfalfa), see the response to comment APHIS-2007-0044-9936-10 for issue 11.15.

Comment Excerpt Text:
I have been concerned for several years about the increasing use of genetically engineered seeds for food productionwith no long term studies proving them safe for human consumption or the environment.
Monsanto has a poor history of safety for the consumer and recent studies have shown glyphosate has a longer period to disperse into non-toxic forms than was reported for many years.
These two factors should be enough for USDA denial of request for nonreuglated status. (Comment Number: APHIS-2007-0044-6329-1)

Response: Regarding the commenter's concerns about the long –term studies proving the safety of GT alfalfa for consumption, see the second part of the response to comment APHIS-2007-0044-0278-1for issue 6.0.

Comment Excerpt Text:
Studies have shown a clear link between glyphosate and non-Hodgkins lymphoma (Journal of the American Cancer Society), and have found that glyphosate damages and kills human cells even at diluted levels far below recommendations (American Chemical Society). (Comment Number: APHIS-2007-0044-6370-2)

Response: The commenter refers generally to evidence about the link between Roundup (glyphosate) and non-Hodgkin's lymphoma, but does not provide a complete citation and thus APHIS cannot validate the accuracy of the comment. Regarding the commenter's concern about

a link between Roundup (glyphosate) and non-Hodgkin's lymphoma, see the response to comment APHIS-2007-0044-2243-1 for issue 6.0.

Comment Excerpt Text:
Why is the USDA ignoring evidence that show a direct link between Roundup (glyphosate) and non-Hodgkin's lymphoma and that it damages and kills human cells even at diluted levels far below recommendations? (Comment Number: APHIS-2007-0044-6626-1)

Response: The commenter refers generally to evidence about the link between Roundup (glyphosate) and non-Hodgkin's lymphoma, but no specific studies are cited and thus APHIS cannot validate the accuracy of the comment. Regarding the commenter's concern about a link between Roundup (glyphosate) and non-Hodgkin's lymphoma, see the response to comment APHIS-2007-0044-2243-1 for issue 6.0.

Comment Excerpt Text:
I'm outraged that the USDA is allowing agri-business to slowily kill us all. What will it take for you to wake up to the poisoning that's occurring on our farmlands? Genetically-engineered corn, soybeans, and cotton now account for the majority of acres planted to these three crops. A model was developed that utilizes official USDA pesticide use data to estimate the differences in the average pounds of pesticides applied on GE crop acres, compared to acres planted to conventional, non-GE varieties. Compared to pesticide use in the absence of GE crops, farmers applied 318 million MORE pounds of pesticides over the last 13 years as a result of planting GE seeds.
GE crops are pushing pesticide use upward at a rapidly accelerating pace. In 2008, GE crop acres required over 26% MORE pounds of pesticides per acre than acres planted to conventional varieties. The report projects that this trend will continue as a result of the rapid spread of glyphosate-resistant weeds. (Comment Number: -1)

Response: The commenter refers generally to a model that can estimate the differences in the average pounds of pesticides applied on GE crop acres, compared to acres planted to conventional, non-GT varieties, but does not provide a citation or evidence of the model and thus APHIS cannot validate the accuracy of the comment. Regarding the commenter's concern about the increased use of glyphosate and its effect on human health, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3.

Comment Excerpt Text:
I am writing to you about my concerns about Monsanto's glyphosate which pollutes ground water and transfers to rivers and fish populations. Glyphosate in Roundup (made by Monsanto) enters crops after crop dusting and is moved through the food chain to humans. Glyphosate is linked to lymphoma according to the Journal of the American Cancer Society. The American Chemical Society also noted that glyphosate damages and kills human cells.
Please make labeling for foods that contain GMOs, GE seeds, and Roundup so consumers can tell what's in their food.

In addition, as an organic consumer, I want you to ban genetically engineered foods and food products so they do not contaminate organic food products.
Thanks for your time and I hope decisions can be made now that will support the future of healthy foods in this country. (Comment Number: APHIS-2007-0044-6820-1)

Response: Regarding the commenter's concerns about the effects of potential glyphosate exposure on human health, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3. Section III.D of the DEIS analyzes the fate(?) of glyphosate within the living body and state that oral exposure only 30 percent of glyphosate is absorbed from the gastrointestinal tract. Glyphosate does not significantly concentrate or persist in any tissue. As discussed in the response to comment APHIS-2007-0044-11037-10 for issue 4.2, most alfalfa acreage (e.g., 80 to 90%) has not been treated by herbicides at all. In general, herbicides are not necessary for alfalfa used for grazing for the reasons listed by the commenter, whereas herbicides can be required for alfalfa to be harvested and certified as weed-free hay. Herbicide-treated alfalfa crops account for a small fraction (less than 5%, DEIS table N-2, for the years 1992, 1997, and 2002) of total herbicides applied to crops (and total herbicide-treated agricultural lands). Therefore, changing the herbicide-treated fraction of alfalfa to GT alfalfa with glyphosate application would be replacing one set of herbicides with another and result in a relatively small change in the pattern of herbicide application nationwide as discussed in the DEIS section IV.C.3 and appendix N-1 and appendix J.
For more on FDA responsibilities, see the response to comment APHIS-2007-0044-11865-1 for issue 6.1.

Comment Excerpt Text:
An epidemiological study in the Ontario farming populations showed that glyphosate exposure nearly doubled the risk of late spontaneous abortions [2], and Prof. Eric-Giles Seralini and his research team from Caen University in France decided to find out more about the effects of the herbicide on cells from the human placenta.
They have now shown that glyphosate is toxic to human placental cells, killing a large proportion of them after 18 hr of exposure at concentrations below that in agricultural use [3]. Moreover, Roundup is always more toxic than its active ingredient, glyphosate; at least by two-fold. The effect increased with time, and was obtained with concentrations of Roundup 10 times lower than agricultural use.
The enzyme aromatase is responsible for making the female hormones estrogens from androgens (the male hormones). Glyphosate interacts with the active site of the enzyme but its effect on enzyme activity was minimal unless Roundup was present.
Interestingly, Roundup increased enzyme activity after 1 h of incubation, possibly because of its surfactant effect in making the androgen substrate more available to the enzyme. But at 18h incubation, Roundup invariably inhibited enzyme activity; the inhibition being associated with a decrease in mRNA synthesis, suggesting that Roundup decreased the rate of gene transcription. Seralini and colleagues suggest that other ingredients in the Roundup formulation enhance the availability or accumulation of glyphosate in cells.
There is, indeed, direct evidence that glyphosate inhibits RNA transcription in animals at a concentration well below the level that is recommended for commercial spray application.

STOP GENETIC CONTAMINATION AND FURTHER POLLUTION OF OUR ENVIRONMENT!!!1 (Comment Number: APHIS-2007-0044-6863-1)

Response: Regarding the concern about the effects of GT alfalfa and/or glyphosate on human health and fertility, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3 and the response to comment APHIS -2007-0044-2840-1 for issue 6.0. Also, for a discussion of the referenced studies, see the response to comment APHIS-2007-0044-0352-11328-1 for issue 6.0.

Comment Excerpt Text:
I eat organic and want organic to be GE free; It will increase pesticide use harming the environment and our health; It will harm organic and small farmers. (Comment Number: APHIS-2007-0044-7238-2)

Response: Regarding concern about the harmfulness of glyphosate to humans and environment, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3.

Comment Excerpt Text:
* GE crops increase pesticide use, harming human health and the environment (Comment Number: APHIS-2007-0044-7266-5)

Response: Regarding the commenter's concern about the harmfulness of glyphosate to humans and environment, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3.

Comment Excerpt Text:
Increased use of RoundUp. A number of studies have demonstrated that, after several harvests, RoundUp use increases dramatically when RR crops are planted. There is a growing body of evidence that both glyphosate and the adjuvant ingredients in RoundUp are harmful at very low levels to both humans [e.g. Relvea] and to wildlife – especially to amphibians [e.g. Benachour and Seralini]. Increasing the amount of RoundUp sprayed on our farms is not something we should be encouraging. (Comment Number: APHIS-2007-0044-7408-4)

Response: The commenter refers generally to studies about the potentially harmful effects of Roundup on humans and wildlife, but does not provide complete citations and thus APHIS cannot validate the accuracy of the comments. Nevertheless, these appear to be the studies discussed in response to comments APHIS-2007-0044-11328-1 and APHIS-2007-0044-10525-1 for issue 6.0. Regarding concern about potential harm from glyphosate and adjuvant ingredients on humans and wildlife, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3. Sections III.D.2, IV.E.3, appendices L, Q of the DEIS analyze the health risk associated with glyphosate exposure and conclude that in most populations (human and wildlife) there is no a risk of adverse health effects associated with acute exposure to glyphosate.

Comment Excerpt Text:

In its Draft EIS, APHIS has provided a comprehensive analysis of the potential that glyphosate use will increase as a result of the deregulation of RRA as well as the related potential for the development of weeds resistant to glyphosate. As discussed in more detail below and in the attached Comment Appendix 4, the record demonstrates that glyphosate is a more environmentally benign herbicide than many presently-used alternative herbicide products and its use as a substitute for those less benign products would represent a net benefit resulting from the full deregulation of RRA. As with any increase in the use of a particular herbicide, however, there is the potential that there could be an associated increase in the development of weeds resistant to that herbicide and a proportional decrease in the development of weeds resistant to the presently-used alternatives. See, e.g., Comment Appendix 3 (explaining how and why weeds might develop herbicide-resistance). As a result, the Draft EIS presents a thorough analysis of the potential for increased development of weeds resistant to glyphosate as a result of the deregulation of RRA, demonstrates that any weed resistance will not result in significant environmental impacts, and identifies a suite of effective measures that can be used to address the issue. See, e.g., Draft EIS at 105-114, Ap. G, and Ap. H. (Comment Number: APHIS-2007-0044-7620-11)

Response: APHIS acknowledges the comment. Regarding use profiles for glyphosate and other more toxic and persistent herbicides, see the response to comment APHIS-2007-0044-6240-2 for issue 6.0. Also, please note that the main comments and appendices provided by this comment includes numerous additional comments, many of which identify needed clarifications, corrections of errors, and additional data for the EIS. The FEIS reflects these edits, as appropriate. For example, the request to remove the acute toxicity risk assessment, while denied, did result in the addition of caveats highlighting the screening-level and highly conservative nature of that assessment. Other comments from these appendices did not result in changes to the FEIS either because they would not have provided a substantive change or because the agency does not agree with the comment. For example, the first comment in appendix 5 that refers to p. 63 of the DEIS (p. 24 of the appendix) states that AMPA is believed to be formed by microbial metabolism within the GI tract microflora and is not a systemic mammalian metabolite, with the implied reference being the EPA RED (2003) in the previous sentence. But APHIS did not find information in any EPA reference that would lead to these conclusions.

Comment Excerpt Text:
Glyphosate has a complete and comprehensive regulatory database (toxicity, environmental fate, and ecological toxicity) that has been evaluated by EPA to support all currently approved uses including use in conjunction with glyphosate-tolerant alfalfa. EPA has stated that it has a high level of confidence in the quality of the existing studies and the reliability of the toxicity endpoints that are the basis for its risk assessment. [Footnote 12: See U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Glyphosate New Use (bent-grass): Environmental Fate and Effects Risk Assessment, DP No. D324409 (May 26, 2009); U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Glyphosate Human Health Risk Assessment for Proposed Uses on Safflower and Sunflower, Petition No. 4E6878, DP No. 314476 (Sept. 5, 2006); U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Glyphosate Human Health Risk Assessment for Proposed Use on Indian Mulberry and Amended Use on Pea, Dry, Petition No.

536987, DP No. 321992 (Sept. 29, 2006).] In establishing food and feed tolerances to support the use of glyphosate on animal feed and forage crops (the group tolerance that supports the use of glyphosate in conventional and glyphosate-tolerant alfalfa), EPA noted that it had conducted "a complete and thorough review of the available data for glyphosate," and determined that "glyphosate will not pose unreasonable risks or adverse effects to humans or the environment." [Footnote 13: Glyphosate; Pesticide Tolerances, 67 Fed. Reg. 60934, 60938-39 (Sept. 27, 2002).] See also Comment Appendix 3 at 7-8 (discussing EPA authority to regulate herbicides, including glyphosate, and noting that under "FIFRA's strict provisions, the process of bringing pesticides to market by securing an EPA registration is complex and demanding, based on strong scientific principles and undertaken according to stringent government review and regulation."). (Comment Number: APHIS-2007-0044-7620-13)

Response: APHIS acknowledges the comment and the additional background and other supporting material that it provides. Also, see the response to comment APHIS-2007-0044-7620-11 for issue 6.3 for additional discussion of this comment.

Comment Excerpt Text:
1. APHIS correctly identifies EPA as the federal agency responsible for pesticide registration and tolerance setting.

FIFRA requires that before sale or distribution of a pesticide in the United States, a registration must be obtained from EPA. See, e.g., Draft EIS at 92 (explaining that EPA is the agency charged with the responsibility to regulate glyphosate use pursuant to FIFRA). Before registering a new pesticide or a new use for a previously registered pesticide, EPA must first ensure that the pesticide, when used according to its label directions, will not cause unreasonable adverse effects on the environment. In order to address this standard, EPA must evaluate potential risks to humans and the environment, and may require applicants to submit more than 100 different scientific studies and tests conducted according to EPA guidelines.

The data required by EPA are used to evaluate whether a pesticide has the potential to cause adverse effects on humans, wildlife, fish, and plants (including endangered species and "non-target" organisms – organisms that the pesticide is not intended to act against). The registration applicant must also supply data addressing the pesticide's potential impact on surface water or ground water (which might result from leaching or runoff, for example). Potential human health and safety risks that are assessed range from short-term toxicity to long-term effects such as cancer and reproductive system disorders.

Based on its assessment of a pesticide's potential health and environmental effects, EPA approves the language that appears on the pesticide label. It is a violation of FIFRA for any person to use a pesticide in a manner inconsistent with its labeling. 7 U.S.C. § 136j(a)(2)(G).

A pesticide's registration is not the only opportunity EPA has to evaluate that product's safety. EPA is required to review older pesticides (those initially registered before November 1984) under FIFRA to ensure that they meet current scientific and regulatory standards. This process, called reregistration, considers the human health and ecological effects of pesticides and results

in actions to reduce risks that are of concern. EPA concluded its reregistration evaluation of glyphosate in 1993. At that time, the Agency produced a 291-page Reregistration Eligibility Decision document ("RED") on glyphosate, setting forth the data on which it made a decision to reregister all then-existing uses of the pesticide, based on the pesticide having met the no unreasonable adverse effects standard found in FIFRA.

Where pesticides may be used on food or feed crops, EPA also sets tolerances for the amount of the pesticide that can legally remain in or on foods. EPA undertakes this analysis under the authority of the Federal Food, Drug, and Cosmetic Act ("FFDCA"). Under the FFDCA, EPA must find that such tolerances will be safe, meaning that there is a reasonable certainty that no harm will result from aggregate exposure to the pesticide chemical residue. This finding must be made and the appropriate tolerance established before a pesticide can be registered for use on the particular food or feed crop in question, including glyphosate-tolerant crops. Taken together, the provisions of FIFRA and FFDCA vest EPA with comprehensive responsibility for the regulation of glyphosate and for addressing the cumulative health, safety and environmental effects of glyphosate use in the United States. (Comment Number: APHIS-2007-0044-7620-14)

Response: APHIS acknowledges the comment and notes that regarding U.S. regulatory agencies involved in the oversight of GT alfalfa prior to deregulation, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0. Also, see the response to comment APHIS-2007-0044-7620-11 for issue 6.3 for additional discussion of this comment.

Comment Excerpt Text:
2) By reducing the number of herbicides and applying glyphosate less often, we are being more environmentally friendly in applying less herbicide and burning less fuel to apply it. (Comment Number: APHIS-2007-0044-7953-4)

Response: Regarding concerns about an increased use of glyphosate, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3.

Comment Excerpt Text:
There also are serious concerns about the real increase in the amount of pesticides and herbicides actually used when GE crops are grown. (Benbrook, the Organic Research Center). (Comment Number: APHIS-2007-0044-7955-2)

Response: In regard to concerns about the increased use of glyphosate, see the response to comment APHIS-2007-0044-6240-2 for issue 6.0.

Comment Excerpt Text:
We also are very concerned about the health and environmental impacts of glyphosate. We are familiar with studies published in the Journal of the American Cancer Society, that found a link between glyphosate use and Non-Hodgkin's lymphoma.

We also are familiar with a study published in the American Chemical Society Journal, that glyphosate damages and kills human cells at diluted levels far below label directions. (Comment Number: APHIS-2007-0044-7955-8)

Response: The commenter refers to studies about the health and environmental impact of glyphosate, but citations provided are incomplete and thus APHIS cannot validate the accuracy of the comment. Regarding concern about the effects of potential glyphosate exposure on human health, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3. For a discussion about risk of developing non-Hodgkin's lymphoma from glyphosate exposure, see response to comment APHIS-2007-0044-2243-1 for issue 6.0.

Comment Excerpt Text:
Page 23. EPA includes instructions and restrictions on how glyphosate herbicides can be applied, and has determined that there is no unreasonable environmental risk if the user adheres to the directions when applying glyphosate herbicide formulations. …… farmers who use glyphosate are very likely to follow its label restrictions, and adverse impacts from the predicted increased glyphosate use will be minimized.

Comments: It is important to recognize that Roundup (glyphosate) is a regulated and registered pesticide with EPA. As such, considerable information is known about its characterics and toxicology. The label approved by EPA provides information regarding its properties and safe use. Roundup is a synthetic herbicide and even though considered a "toxicologically and ecologically low-risk herbicide" and it does pose some risks to the environment if used incorrectly. Because of the public concern around use of Roundup-ready alfalfa, I think we should support a no tolerance approach to misuse of the product or technooogy. (Comment Number: APHIS-2007-0044-9164-3)

Response: Regarding concerns about increased use of glyphosate herbicide, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3.

Comment Excerpt Text:
GMOs have higher residues of poisonous herbicide
The primary reason crops are engineered is to allow them to drink poison. Theyre called herbicide tolerant, and are inserted with bacterial genes that allow them to survive otherwise deadly doses of toxic herbicide.
Biotech companies sell the seed and herbicide as a package. Monsanto sells Roundup Ready crops and Roundup herbicide. Bayer CropScience sells Liberty Link crops and Liberty herbicide. Between 1996 and 2008, US farmers sprayed an extra 383 million pounds of herbicide on these poison drinking GMOs.[26]
Because weeds are becoming resistant to the overused herbicide, farmers are spraying considerably more each year. The last 2 years of the 13-year study alone accounted for 46 percent of the increased herbicide use.
(Comment Number: APHIS-2007-0044-9298-9)

Response: Regarding concerns about an increased use of glyphosate herbicide, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3.

Comment Excerpt Text:
The impacts of the Glyphosate-Tolerant Crop System on health must also be analyzed. Roundup use has been associated with increased risk of non-Hodgkin's lymphoma and hairy cell leukemia in pesticide applicators, [Footnote 74 Hardell et al (2002). Exposure to pesticides as risk factor for non-Hodgkin's lymphoma and hairy cell leukemia: pooled analysis of two Swedish case-control studies," Leuk. Lymphoma, 43(5):1043-9.] and increased risk of neurobehavioral disorders in children of Roundup applicators. [Footnote 75 Garry et al (2002). "Birth Defects, Season of Conception, and Sex of Children Born to Pesticide Applicators Living in the Red River Valley of Minnesota, USA," Environmental Health Perspectives, 110, Suppl. 3, 441-449.] Roundup/glyphosate has been shown to inhibit steroidogenesis. [Footnote 76 Walsh et al (2000). "Roundup inhibits steroidogenesis by disrupting steroidogenic acute regulatory (StAR) protein expression," Environmental Health Perspectives, 108(8):769-76.] Both Roundup and glyphosate have been found to inhibit the aromatase enzyme involved in estrogen production, though Roundup was more potent. [Footnote 77 Richard et al (2005). "Differential Effects of Glyphosate and Roundup on Human Placental Cells and Aromatase," Environmental Health Perspectives, 113: 716-720; for a comprehensive review of the adverse human and environmental impacts of glyphosate, see: FoE UK (2001). "Health and Environmental Impacts of Glyphosate," Friends of the Earth UK, July 2001.
http://www.foe.co.uk/resource/reports/impacts_glyphosate.pdf. (Comment Number: APHIS-2007-0044-9936-25)

Response: Regarding concerns about the complete safety of glyphosate, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3. For discussion about the risk of developing cancer from glyphosate exposure, see response to comment APHIS-2007-0044-10525-1 in issue 6.0.

6.4 Issue 6.4 – Consumption of GT Alfalfa Events J101 and J163

No comments are associated with this issue.

6.5 Issue 6.5 – Impacts from Changes in Production Practices to Human Health and Safety

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Comment Excerpt Text:
I have an interest in maintaining the integrity of organic foods for myself and my children. Genetically modifying the nature of a plant to be resistant to natural elements is not good for the livestock that it the plant nor the ground the plant grows from. Making food production cheap and easy is not a good excuse for destroying the nutritional integrity of the food. Filling our bellies is not enough. We need to be getting nutritional value from the food as well.
Like I said, I'm not an expert, and I highly doubt that you value the voice of a regular citizen over large corporations, but from what I've read, this trend toward genetically engineered plants and animals is not in our body's best interest. (Comment Number: APHIS-2007-0044-3247-1)

Response: APHIS acknowledges the comment. In regard to the commenter's concern about human health and safety, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0. In regard to the health of livestock and nutritional quality of GT alfalfa, see the response to comment APHIS-2007-0044-2301-3 for issue 4.0. In regard to the impact on organic markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
I am very concerned about the latest Monsanto GMO alfalfa that is up for approval. This will seriously damage our soil, our livestock, our horses. PLEASE DO NOT PASS THIS BILL. It will have serious repercussions for the health and well being of humans, plants and animals. This is very serious and we need to act responsibly. DO NOT LET THIS BILL PASS. (Comment Number: APHIS-2007-0044-7240-1)

Response: APHIS acknowledges the comment. In regard to the commenter's concern about human health and safety, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0. In regard to the health of livestock and nutritional quality of GT alfalfa, see the response to comment APHIS-2007-0044-2301-3 for issue 4.0.

7.0 Issue 7 – Land Use and Production Practices

Comment Excerpt Text:
RR Alfalfa seed will eventually contaminate conventionally produced alfalfa seed so ALL alfalfa seed sold will contain GMO's.
RR Corn, Soybeans, Canola, Cotton, Rice etc. continue to spread GMO's around the world with unforeseen consequences. These seed technologies appear benign now, but over time can have unintended consequences. I believe RR Alfalfa should not be approved.
I own and operate an 80 year old Regional Farm Seed company in the Midwest. We produce, process, and market GMO Corn and Soybean Seed from Monsanto, Agrisure and Dow. We are ALSO the largest producer of USDA Organic Farm Seed in the United States.
We have watched small sustainable farms disappear for 40 years as government programs and large agri-business took over the land. Monsanto is a large agri-business that now owns 90% of the Seedcorn and Soybean seed business worldwide. I believe RR Alfalfa seed is another area they will eventually control if they are allowed to market RR Alfalfa. RR Alfalfa would be bad for our conventional alfalfa seed business, for conventional alfalfa seed producers and conventional processors because Monsanto will take control of US alfalfa seed production.
RR Alfalfa is not necessary to produce quality forage for livestock.
In the end RR Alfalfa is not sustainable any more than 3000 and 10,000 acre crop production farms are sustainable. RR Alfalfa will not decrease the amount of herbicide or insecticide or pesticide being used. RR Alfalfa will not increase forage yields.
Though Monsanto and large agri-businesses market themselves as "sustainable" and as companies who offer more "choice", in the end they are offering nothing sustainable and with RR Alfalfa ultimately and effectively REDUCING the amount of choice farmers have for seed
(Comment Number: APHIS-2007-0044-0383-1)

Response: In regard to the adventitious presence of non-GE or organic alfalfa with GT-alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to the effects of deregulation of GT alfalfa on alfalfa seed markets, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0. In regard to the effect of deregulation on pesticide use, see the response to comment APHIS-2007-0044-0402-1 for issue 6.3.

Comment Excerpt Text:
January 5, 2010
Docket Number: APHIS-2007-0044
Regulatory Analysis and Development
USDA PPD APHIS Station 3A-03.8
4700 River Road, Unit 118
Riverdale, MD 20737-1238
As a seed company professional, I support the deregulation of alfalfa engineered for tolerance to the herbicide
glyphosate. The environmental impact statement prepared by the Animal and Plant Health Inspection Service in

Docket No. APHIS-2007-0044 validates and ensures the safe production of glyphosate tolerant alfalfa.
Biotechnology-based breeding methods safely enhance and extend a crops yield potential, feed value, adaptation,
pest tolerance, environmental benefits, crop management and utilization options, as other biotech crops have
demonstrated.
The overwhelming majority of alfalfa acres 99.6 percent produce only forage, which means farmers harvest their
fields before alfalfa plants accept or produce pollen. More than 75 percent of alfalfa forage is used on the same farm where it is grown. Only 1 percent of U.S. forage is organically grown. Stewardship practices allow for the successful
coexistence of organic, conventional and Roundup Ready alfalfa, allowing each market segment to be served.
A national alfalfa industry consensus plan for seed and hay industry coexistence and stewardship was adopted in
June 2008 under the auspices of the National Alfalfa and Forage Alliance (NAFA). Coexistence plans for seed
production and other markets are comprehensive and science-based. The NAFA best practices have been validated
in two years of commercial seed production.
I urge the USDA to consider biotechnologys long history of success and allow alfalfa growers to join other American
farmers in the benefits and new opportunities offered by biotechnology.
Sincerely,
Mark Holloway
(Comment Number: APHIS-2007-0044-0487-1)

Response: APHIS acknowledges the comment. Section IV.B.3 and appendix V of the FEIS have been updated to include discussion of NAFA BMPs.

Comment Excerpt Text:
The US regulatory process for GE crops/foods is failing the U.S. public and indeed billions of people around the world who are daily consuming crop/foods which have never been adequately tested for food safety and whose human environments could be experiencing significant negative impacts from GE plantings. Despite institutionalized obstacles to legitimate scientific investigation of GE crops/foods, an increasing body of research is showing these novel "events" to be ecologically destructive crops and hazardous foods. Of particular relevance to consideration of glyphosate-tolerant GE alfalfa, is research documenting the explosion in use of herbicides since the introduction of this GE trait in numerous crops (Benbrook, 2009). Authors of a recent independent analysis of Monsanto data that were the basis for US deregulation of Monsanto GE maize events, data available for scrutiny by the scientific community only after a EU court decision, state "Our analysis clearly reveals for the 3 GMOs new side effects linked with GM maize consumption, which were sex- and often dose-dependent. Effects were mostly associated with the kidney and liver, the dietary detoxifying organs, although different between

the 3 GMOs. Other effects were also noticed in the heart, adrenal glands, spleen and haematopoietic system...(de Vendmois JS, Roullier F, Cellier D, Sralini GE. A Comparison of the Effects of Three GM Corn Varieties on Mammalian Health. Int J Biol Sci 2009; 5:706-726. Available from http://www.biolsci.org/v05p0706.htm)
It's worth reiterating that alfalfa is a critical forage crop and negative effects in livestock should be of concern. Additionally, humans utilize alfalfa as a raw edible sprout, and medicinal tea. Novel toxic and allergenic substances are of concern in this and any GE food crop, yet one certainly wouldn't know it by USDA's and FDA's absolute failure/unwillingness to incorporate independent, conflict-free food safety investigation. (Comment Number: APHIS-2007-0044-10501-1)

Response: In regard to the use of herbicides, see the response to comment APHIS-2007-0044-0402-1 for issue 6.3.
In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for issue 5.2.

Comment Excerpt Text:
Allowing GMO alfalfa would harm our small, direct-market organic vegetable farm. We rely on alfalfa for fertility in our high tunnels; alfalfa meal is an easy, affordable way to provide a nutrient boost between crops. But if GMO alfalfa is allowed, this important source of nutrients would no longer be allowable under the National Organic Program. We have already had to drop cottonseed meal because so much cotton is genetically modified now, and soy meal is also likely to be banned because of roundup-ready soybeans.
USDA has created a special program to encourage high tunnel production in order to increase local foods. Organic food continues to be one of the most profitable sectors of agriculture. Yet the approval of an increasing number of genetically modified crops is making it so difficult to grow organically. Please keep GMO alfalfa out of the environment, and preserve at least this one source of soil nutrients for organic growers. (Comment Number: APHIS-2007-0044-1241-1)

Response: In regard to gene flow due to alternative use of crop products, see the response to comment APHIS-2007-0044-6769-5 for issue 3.4. In regard to the National Organic Program, see the response to comment APHIS-2007-0044-10866-5 for issue 3.3.

Comment Excerpt Text:
It is clear from the EIS that the inevitable consequences of this decision would negatively impact organic farmers in the interest of Monsanto's Profits. This would create undue hardship on small farmers trying to avoid GMO's. The impact on our export market would surely be impacted.In the interest of protecting the future of sustainable varied american agriculture, please disallow this proposal. Allowing this to continue will just compound the negative consequences we've already seen from similar such actions in the past. We are digging ourselves a hole without a ladder to climb out. (Comment Number: APHIS-2007-0044-2205-1)

Response: In regard to economic impacts on organic farmers, see the response to comment APHIS-2007-0044-2205-1 for issues 5.2 and 5.4.

Comment Excerpt Text:
And I will end with a incentive to try and really put into practice what FAO keeps talking about vulnerability of monogenic crops and the necessity to use different natural selected breeds in one crop , to stimulate farmers perpetrate their own seed or one that best fits to microclimate in times of massive abandon of varieties existent and of dangers of genetic heritage degradation in ex-situ deposits. (Comment Number: APHIS-2007-0044-2225-2)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to the lack of genetic variation in alfalfa cultivars and the loss of cultivar choice, all alfalfa varieties have some inherent level of genetic variation and there are currently many different varieties and cultivars of alfalfa available to farmers. For example, large alfalfa seed producers have many varieties of alfalfa available for farmers, often tested for optimal growth in specific geographies. For example, Dairyland seeds have 23 cultivars and Cal West Seeds have 75+ cultivars.

Comment Excerpt Text:
As a farmer, I don't think its fair to contaminate my untreated fields without my permission. Plus, soon weeds, etc will build up resistance with round up use and then what chemical do we then create to deal with that?
Dan Welter
(Comment Number: APHIS-2007-0044-5298-1)

Response: In regard to the adventitious presence of non-GE or organic alfalfa with GT-alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to strategies for reducing the emergence of glyphosate-tolerant weeds and the management of such weeds, see the response for comment APHIS-2007-0044-9936-19 for issue 3.6.

Comment Excerpt Text:
We do not support the use of gmo alfalfa. Telling organic farmers to avoid contamination is like blaming a dairy farmer when someone else's bull gets out and impregnates his cows.

We have bees for pollination of our vegetables and are concerned about risks to our livelihood - vegetables and honey. Given the problems with bees this spring, couldn't we avoid ANY unnecessary potential problems like gmo alfalfa. We don't see how we can keep the bees away from gmo alfalfa within 4 - 6 miles of our property.

The use of and resulting contamination of organic products will harm our domestic and international sales. Yes, Monsanto can reap large profits, but please consider the MANY organic growers and producers affected by this decision. We do not have a huge lobbying force to attempt to portray this insane use of gmo's as beneficial. Please also consider the consumer. Concerned consumers of this country do NOT support the use of gmo's and neither does the

international consumer. Why hurt our market and reputation for the benefit of one large company - Monsanto?

The history of canola, an annual crop that was contaminated by gmo canola, should serve as a warning. If this has created so many problems for farmers and consumers, why would we even consider a perennial crop like alfalfa? It will promote Monsanto's stranglehold on small farmers who do not want gmo contamination and only want to save their seed. With contamination lawsuits like Percy Schmeiser's in Canada will result. Monsanto and other near monopolies will have greater power than they already have at present.

As a small grower I wish the USDA would consider me in the "protecting of American agriculture" that is in the mission statement. As we see industrial agriculture's failures - food insecurity, decline in nutrition and dependence on government subsidies- couldn't we envision a country of smaller, independent local growers supplying nutrient dense food to happy, healthy consumers? Thank you (Comment Number: APHIS-2007-0044-5350-1)

Response: In regard to the effect of GT alfalfa on organic markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.6. In regard to the effects of GT alfalfa on bees, the DEIS, appendix O describes the many studies that have examined GT crops in relationship to bees, and none provided evidence that could link the CP4 EPSPS enzyme or GT-alfalfa, including its pollen and nectar, to impairment of bees and bee colonies or colony collapse disorder. In regard to the effects of deregulation of FT alfalfa on alfalfa seed markets, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0.

Comment Excerpt Text:
No on GE!
As a Chemist and concerned citizen I affirm that it is vitally important that pesticide use be more tightly regulated over deregulating genetically engineered crops that are tolerant of pesticides.

There are a myriad of reasons for not approving genetically engineered alfalfa and below I will enumerate three of the most pressing reasons.

First: pesticides are dangerous to people. Pesticides including phosphate containing ones like glyphosate (Round Up) will accumulate in peoples fat deposits. Glyphosate is classified as Class III toxin by the EPA yet incredibly it is still in wide use. Pesticides cannot be removed or flushed from these deposits and will cause cellular damage including possibly cancer. These phosphates are also passed from mother to fetus and nursing children via blood and breast milk (EPA 2005).

Second: Genetically engineered crops are a complete unknown, the long term repercussions of GE plant use are largely untested. The tests that are being done are very short-term. We need a paradigm shift: instead of the "use-now-and-see-what-happens" approach of the past (i.e. DDT, thalidomide, leaded paint/ gasoline, Agent Orange etc) we need a more proactive approach. Such crops like this new alfalfa are already banned in much of Europe because they believe that GE crops should be considered dangerous until proven otherwise. Let's follow suit.

Third: As we saw with the "round up ready" soy and canola there is a danger that a small handful of companies (namely Monsanto) who create these "super crops" could monopolize the food production by forcing all competitors and farmers who don't use their seed out of business, Percy Schmeiser and more than 90 other farmers had been prosecuted by Monsanto in and before 2005.

In short GE crops such as this new alfalfa are (directly or indirectly) dangerous not only to human health but also the capitalist system in which we live.
(Comment Number: APHIS-2007-0044-5429-1)

Response: In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for issue 5.2. **In regard to human health, s**ee the response to comment APHIS-2007-0044-11034-2 for issue 6.1 and the response to comment APHIS-2007-0044-0352-1 for issue 6.3. In regard to potential lawsuits from Monsanto, see the response to comment APHIS-2007-0044-6376-1 in issue 5.1.

Comment Excerpt Text:
I am writing to oppose the deregulation of GE alfalfa. If GE corn is any indication of what can happen with pollination and cross-pollination, then we are in for a terrible disaster. As a farmer that grows sweet corn, I now have to spend time determining when to plant my corn so that it cannot be pollinated by GE field corn. If I decide to grow organic alfalfa in the future, how can you guarantee that it will not be cross-pollinated? That is what you claimed with corn, soy, and cotton and now look where we are. I shouldn'thave to monitor when I plant my corn nor any other future crop condemned to the same future (Comment Number: APHIS-2007-0044-5462-1)

Response: APHIS acknowledges the comment . For a discussion of gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
Common comments I get from RR growers are; “it’s safer, cheaper, easier to grow and we get paid more for it, when will we get it back?” It is uncommon for alfalfa fields to be cut with more than 10% bloom. Cutting hay that is flowering reduces quality and is undesirable for grower and buyer both. This simple cultural practice significantly reduces the potential for pollen transfer. RR alfalfa technology works for hay growers, hay consumers and the public at large. When making your final determination please disregard the emotion surrounding the use of this technology and consider the science and the experience of alfalfa growers currently using it.
(Comment Number: APHIS-2007-0044-5502-1)

Response: APHIS acknowledges the comment and the evaluation of hay management of GE alfalfa discussed in appendix V of the DEIS supports the comment. Regarding the management of alfalfa hay fields and practices to harvest fields before 10 percent bloom, see response to comment APHIS-2007-0044-10263-7 for issue 3.1.

Comment Excerpt Text:

NAFA has been very proactive in its effort to foster coexistence among growers of biotech, conventional, and organic alfalfa. In October of 2007, NAFA hosted Peaceful Coexistence: Creating a Strategy for Harmony Among GM, Organic, and Conventional Alfalfa Producers. The intent of this meeting was to create a strategy which would lead to harmonious coexistence among producers of all types of alfalfa, GM, organic, and conventional. The product of this meeting was the development of a number of NAFA adopted coexistence documents including: Best Management Practices for Roundup Ready Alfalfa Seed Production; Coexistence for Alfalfa Hay Export Markets; Coexistence for Alfalfa Seed Export Markets; and Coexistence for Organic Alfalfa Seed and Hay Markets, all of which are available for review on NAFAs website (www.alfalfa.org).
In accordance with the Best Management Practices (BMP) for Roundup Ready Alfalfa Seed Production developed as a result of the Coexistence meeting and adopted by NAFA in 2008, a team of state certification agency managers conducted a review of trait stewardship to determine if the NAFA BMP can work on a commercial scale (this review did not represent the Association of Official Seed Certifying Agencies).
A summary of the review indicated that the NAFA BMP seem to be working on a commercial scale. Should RRA be deregulated, it is recommended that the third party review process be continued. In the future, this review may lead to the ability to certify a GMO sensitive market protocol. (Comment Number: APHIS-2007-0044-5515-1)

Response: APHIS acknowledges the comment. Section IV.B.3 and appendix V, sections 2.5, 4.11-4.13, and 5.0 of the DEIS includes a discussion of the NAFA best management practices regarding coexistence of GT alfalfa and other alfalfa farming.

Comment Excerpt Text:
As the Farm Manager of a large dairy farm operation in the middle of the USA, I am submitting my commits in favor of USDA and APHIS deregulating Glyphosate Tolerant alfalfa. The operation I manage totals well over 10,000 acres with some 3,000 acres in alfalfa production, some planted to Roundup Ready alfalfa when it was deregulated the first time. Production from all the alfalfa acres goes directly to our large dairy herd where the milk is identity preserved and used in premium milk, ice cream, cheese and other dairy products.

This farm operation utilizes many different technologies in our corn silage production including Roundup, Herculex, BT, Triple Stack, and Smart Stack genetic modified products along with the Roundup Ready Alfalfa. The safety of these technologies as it pertains to environmental safety, food safety, livestock feed safety, and economic benefit are proven every day by the total integrated use from planting the seed to the consumption of the products this farm produces. We involve these various technologies because of the economic and stewardship values they offer to our operation, and have proven to ourselves as well as to our neighbors that these technologies co-exist with non gm crops. Concern has been expressed about a farmers right to choose. I assert that my right to choose a thoroughly tested, properly deregulated technology in Glyphosate Tolerant alfalfa, has been deprived for nearly 3 years while going through an EIS process that substantiates and validates the previous deregulation decision. My right to choose proven safe genetic modified technologies dramatically impacts the profitability of this operation. The

inability to choose proven safe and properly deregulated RRA has impacted this farms profitability in a significant negative fashion.

With the Roundup Ready alfalfa technology, we have seen several benefits that can not be matched by conventional technology. RRA yields are equal to non GE alfalfa, but our dairy operation demands high quality, weed free alfalfa production from our acres. Roundup Ready alfalfa allows us to achieve this with the use of Glyphosate which is safer for my workers to use and safer to the environment as well as being a much more economical treatment that performs to our expectations. In addition to weed free alfalfa, there is less weed encroachment into neighboring fields as we better control weed problems. As we get into the mid summer months, many weed species become less controllable with other herbicides, and many of these herbicides are much harsher to the environment and less desirable for our farm laborers to work with. The value of the weed free alfalfa we produce is easily worth $ 50.00 per ton over less desirable alfalfa, and can amount to several hundreds of dollars per acre annually. We are at a distinctive economical disadvantage by not having the RRA technology available for our use these past 3 years.

The use of properly deregulated technologies in our operation allows us to be better stewards of the land, environment, and safety of our workers. Please deregulate Glyphosate Tolerant alfalfa as quickly as possible. (Comment Number: APHIS-2007-0044-5518-1)

Response: APHIS acknowledges the comment, and the evaluation of GE alfalfa discussed in the DEIS and FEIS support the comment.

Comment Excerpt Text:
13. At Otter Creek Organic Farm alone, if we could no longer feed our herd with our top quality alfalfa, the cost of losing just 5 lbs/day/cow of milk production, would be over $100,000 a year. That is only on one farm and there are more than 400 organic dairy farms in Wisconsin alone, and does not include the losses incurred on our livestock operation. The loss of unadulterated organic, quality alfalfa would be a huge economic loss to farmers. The direct impact on just the organic dairies in Wisconsin alone would be at least $14,000,000 per year. (Comment Number: APHIS-2007-0044-5978-2)

Response: In regard to the effect of GT alfalfa on organic markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Besides the organic farmers, the biological farmers would suffer the same potential economic loss from milk on herd health. In addition, conventional farmers choosing no-till farming methods would no longer be able to take out alfalfa with the use of Roundup and then no-till corn into the field, because if only 10% of their alfalfa seed were contaminated with Roundup Ready, they would be forced to use additional herbicides and /or till (plow) the field to eliminate the carry-over. Not only would the cost be greatly increased, it would create an increased potential for soil erosion, especially on our hilly Midwestern dairy farms. This scenario affects

most of the dairy farms in the U.S. making this a major management and economic cost. In my experience, two-thirds of conventional dairy farms would be negatively affected by the introduction of "Roundup Ready" and would face higher management costs (extra chemical applications and tractor runs), lower crop yield, and the potential for losing government subsidiesmoney for conservation practices when dealing with contaminated alfalfa fields. A conservative average of the cost to conventional dairy farms would be $10,000 per farm, which does not include the potential for lower milk yield. I believe there are over 30,000 individual dairies in the Midwest region, which would translate to $200,000,000 in lost revenue each year for those farmers. (Comment Number: APHIS-2007-0044-5978-3)

Response: APHIS acknowledges the comment. In regard to the potential for mixing of GE alfalfa seeds in seed stocks and the coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to the potential for increased soil erosion due to stand removal and stand removal practices for GT alfalfa, see the response to comment APHIS-2007-0044-11037-28 for issue 7.1. Appendix H of the DEIS discusses the CRP program. The additional details provided by the comment have been added to the FEIS.
In regard to seed stock adventitious presence, see response to comment APHIS-2007-0044-9936-7 for issue 3.3.
In regard to adventitious presence and the effects on stand removal, Ap. G.2.24 and G.3.2 of the DEIS discuss the need for alternative herbicides and mechanical removal of GT alfalfa. Additional discussion detailing how alternative herbicides or mechanical removal would be required should adventitious presence of GT alfalfa occur in conventional no-till farming see appendix J, section J.2.5.12, of the FEIS

Comment Excerpt Text:
There are extra chemical and/or tillage costs associated with its use. This is especially true when corn follows alfalfa in the rotation, and there is a need to completely kill out the stand so the alfalfa won't compete with the corn and lower yields. Additional tillage to kill out a stand presents erosion problems. In addition, digestibility and possible feed effects on cow health has not been studied, and this area could be a major additional economic burden. (Comment Number: APHIS-2007-0044-5978-4)

Response: In regard to stand removal practices for GT alfalfa, see the response to comment APHIS-2007-0044-11037-28 for issue 7.1.

Comment Excerpt Text:
Dear Madam or Sir at the USDA:
I am a researcher at the University of Minnesota who works with farmers across the state. I have significant reservations about the approval of Glyphosate-tolerant alfalfa, and I urge you not to approve a nonregulated status for this trait-specific crop.
The proliferation of glyphosate-tolerant crops are creating or exacerbating problems for American farmers; I oppose the deregulation of Glyphosate-tolerant alfalfa for three reasons:

1. First, and most obviously, glyphosate-tolerant crops are encouraging the widespread application of glyphosate, which is being demonstrated to have broader negative effects on the terrestrial and aquatic ecosystems within which agriculture is situated -- and upon which it depends -- than previously thought.
2. Second, glyphosate-tolerant crops have been demonstrated to lead to glyphosate-tolerant weeds, requiring the use of more and more problematic herbicides.
3. Third, glyphosate-tolerant crop seeds are further entrenching annual monoculture agriculture -- at a time when significant commitment needs to be made to developing a much more multifunctional agriculture that keeps continuous cover on much larger areas of agricultural land, stabilizes and enriches soils, and that meets more ecological goals than just the production of single crops.
Monsanto's interest in glyphosate-tolerant crops is, unfortunately, opposed to the interests of the common good, particularly for rural America. Although glyphosate-tolerant crops increase Monsanto's control of both seed markets and herbicide markets, as the current anti-trust proceedings are demonstrating, this state of affairs costs much more for all involved than the benefits to Monsanto warrant. (Comment Number: APHIS-2007-0044-5990-1)

Response: APHIS acknowledges the comment. In regard to the effects of glyphosate application on terrestrial and aquatic ecosystems, section IV.G.1 of the DEIS describes the environmental safety of glyphosate and degradation of glyphosate in the soil. Additionally, the use of glyphosate can lead to greater adoption of no-till agriculture which can contribute to healthy soil. Glyphosate strongly binds to soil prior to degradation, preventing easy low-level presence of water unless soil erosion is high. However, with the adoption of no-till practices, soil erosion should be reduced. In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6. In regard to the effects of deregulation of GT alfalfa on alfalfa seed markets, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0. In regard to the effect of GE alfalfa on the prevalence of annual monoculture agriculture, as discussed in section III.A.2.b of the DEIS, GE and non-GE alfalfa is grown not as an annual crop but as a perennial crop for multiple years in a crop rotation system. Additionally, as described in section IV.F.1 of the DEIS, because alfalfa is a nitrogen fixing crop, crop rotations and soil health following the growing of alfalfa are improved.

Comment Excerpt Text:
I'm outraged that the USDA is allowing agri-business to slowily kill us all. What will it take for you to wake up to the poisoning that's occurring on our farmlands? Genetically-engineered corn, soybeans, and cotton now account for the majority of acres planted to these three crops. A model was developed that utilizes official USDA pesticide use data to estimate the differences in the average pounds of pesticides applied on GE crop acres, compared to acres planted to conventional, non-GE varieties. Compared to pesticide use in the absence of GE crops, farmers applied 318 million MORE pounds of pesticides over the last 13 years as a result of planting GE seeds.
GE crops are pushing pesticide use upward at a rapidly accelerating pace. In 2008, GE crop acres required over 26% MORE pounds of pesticides per acre than acres planted to conventional varieties. The report projects that this trend will continue as a result of the rapid spread of glyphosate-resistant weeds. (Comment Number: APHIS-2007-0044-6768-1)

Response: APHIS acknowledges the comment. Without access to the referenced report, APHIS cannot evaluate the validity of this specific statement regarding increased pesticide use as a result of GE-crops. In regard to changes in pesticide use due to GT alfalfa, see the response to comment APHIS-2007-0044-0402-1 for issue 6.3. In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for issue 3.6.

Comment Excerpt Text:
Only 17% of alfalfa in the U.S. is currently treated with herbicides. Herbicide use on herbicide-tolerant
crops has increased by over 130 million pounds since 1996. The National Center for Food and Agriculture
Policy estimates that in California alone, 200,000 more pounds of herbicides will be applied per year with
the introduction of RR alfalfa (Comment Number: APHIS-2007-0044-7122-2)

Response: In regard to changes in pesticide use due to GT alfalfa, see the response to comment APHIS-2007-0044-0402-1 for issue 6.3.

Comment Excerpt Text:
In its EIS, the USDA suggests that contamination is unlikely to occur because alfalfa is harvested before 10% of the plants reach full flower. The reality is, of course, much different because there is tremendous variability in the timing and extent of alfalfa harvests. Farmers cannot harvest hay in the rain, for example. Not only does wet weather adversely affect the timing of the hay cut, but it also encourages flowering in the plants. In addition, there is still going to be contamination resulting from the flowering of even 10% of the alfalfa field in any given situation. One cannot ignore the possibility of mechanical breakdown in harvesting and baling equipment, which can also create delays that allow flowering of the alfalfa to advance beyond desirable levels. (Comment Number: APHIS-2007-0044-8978-6)

Response: In regard to timing of alfalfa forage harvest, see the response to comment APHIS-2007-0044-10263-7 for issue 3.1.

Comment Excerpt Text:
The largest portion of alfalfa acres in the US are used to (99.6 percent) to produce forage. Forage harvest occurs before pollen production, pollen transfer and seed production. Over 75 percent of alfalfa forage is used on the same farm where it is grown. Only 1 percent of U.S. forage is organically grown. Stewardship practices allow for the successful coexistence of organic, conventional and Roundup Ready alfalfa, allowing each market segment to be served. (Comment Number: APHIS-2007-0044-9270-3)

Response: APHIS acknowledges the comment.

Comment Excerpt Text:
I am writing to oppose the release of genetically altered alfalfa into the environment and food chain.
My family farmed in Colorado for many years. We grew organic alfalfa. Alfalfa is a strong and sturdy crop as it; it is a very easy crop to grow and manage. It doesn't need to be "improved" by Monsanto.
Weeds in alfalfa can be managed by timely mowing. Mowing early is to the farmer's benefit, as the alfalfa leaves have more protein then and therefore sell for more. Spraying for weeds is just not necessary with this crop.
When the crop weakens with age, and gets weedy, it is time to rotate the crop anyway (i.e., plow the alfalfa under). The alfalfa will have fixed a lot of great nitrogen in the soil, which means a bumper crop for the next crop you plant in that spot.
The American farmer has nothing to gain from GE alfalfa. The only one to gain would be Monsanto, as the expense of the farmers and the consumers and at great danger to the environment. Once released, a GE plant can NEVER be withdrawn, even if large health or environmental dangers are later identified. Once the GE pollen is in the fields, it will always be in the environment.
Please do NOT take this irresponsible gamble with the American population and the American environment. (Comment Number: APHIS-2007-0044-9536-1)

Response: In regard to weed occurrence in non-GT alfalfa, see the response to comment APHIS-2007-0044-11037-10 for issue 7.2. Like other legume species, alfalfa cultivation can benefit soils by increasing available nitrogen. GE-alfalfa does not differ from conventional alfalfa in this property.

Comment Excerpt Text:
Weeds in pastures and hayfields have been a historical problem. At best, they give off-flavors to milk, at worse the weeds injure grazing cattle and may even be toxic. As one example, cattle who graze white snakeroot give toxic milk- a problem that has dogged farmers since pioneer days. One
famous casualty was Nancy Hanks Lincoln, mother of the president Lincoln, who died of such milk
poisoning on October 5, 1818. The point of this is to emphasize the historical need and importance
of controlling weeds in hay fields and pastures. The advent of transgenic alfalfa would make such
weed control easier, cheaper, and with a lower environmental impact than current herbicide regimes.
In the end, the amount of weeds in an alfalfa field would depend on how well the farmer manages
his/her stand. However, alfalfa stands have a limited life span, usually three to four years. Afterwards, the stand is plowed under. The point to all of this is that plowing under an alfalfa crop

and following it with another crop like corn will have a far a far greater impact on the potential food
supply for wildlife (endangered or otherwise) than switching from conventional weed control to glyphosate-based weed control. (Comment Number: APHIS-2007-0044-9801-3)

Response: In regard to the presence of weeds affecting alfalfa feed quality, see the response to comment APHIS-2007-0044-11037-13 for issue 7.2.

Comment Excerpt Text:
My name is Cannon Michael and I am the Vice President of Bowles Farming Company, Inc., a family
owned farming operation in Merced County, California. As a farmer who grows alfalfa for forage, I
support the deregulation of alfalfa engineered for tolerance to the herbicide glyphosate. The environmental impact statement prepared by the Animal and Plant Health Inspection Service in Docket No. APHIS-2007-0044 validates and ensures the safe production of glyphosate tolerant alfalfa. Bowles Farming Company, Inc. has been a producer of high quality alfalfa for decades and we
currently grow both conventional and glyphosate resistant varieties.
We planted our first field of glyphosate tolerant alfalfa in 2005 (13% of the hay we planted that year)
and planted three fields in 2006 (45% of our hay planted that year). Based on our positive experience
with the glyphosate resistant alfalfa, we planned to plant the majority of our alfalfa acreage to these
tolerant varieties in 2007. The court ruling in February of 2007 and subsequent re-regulation of glyphosate resistant varieties by APHIS prevented us from proceeding with our planting intentions in
2007.
I will provide actual data (production and cost) from our operation. It is my hope that you will focus
on factual information provided by growers such as myself and not be swayed by claims that are based
purely on speculation. We have a proven record of growing glyphosate resistant alfalfa and I am happy
to share our actual results. There are some people with an agenda to stop any genetically modified
crop, but they have no factual basis for their position. We do not grow any organic alfalfa or any alfalfa
for seed, so I am unable to provide any information regarding their production.
The initial difference between conventional and glyphosate tolerant alfalfa is the price of the seed. Our
seed price for conventional varieties averaged $2.95 per pound, while our glyphosate resistant variety
cost us $6.50 per pound. At a rate of 22 pounds per acre, the cost per acre for seed of our

conventional varieties was $64.90 and the cost per acre for the glyphosate tolerant variety was $143 per
acre. The higher seed cost of the transgenic variety is offset by the lower herbicide cost of the establishment spraying that occurs soon after germination.
The majority of our alfalfa is planted after a crop of barley, so there is a large amount of residual barley
seed that germinates at the same time as the alfalfa. On our conventional varieties, we spray Prism
(clethodim) soon after germination to control the volunteer barley. We spray at a rate of 16 oz per acre.
In 2007 the cost of the Prism and application to establish our new alfalfa fields was $20.45/acre. Once
the volunteer barley has been controlled, we then look to control the broadleaf weeds that are present.
We combine Raptor (ammonium salt of imazamox) at a rate of 6 oz/acre and Butyrac (2, 4-DB) at a rate of
40 oz per acre. In 2007 this application of Raptor and Butyrac cost us $40/acre. We had a total cost of
$60.45 per acre for the material and application of our establishment spraying for our new conventional
alfalfa fields.
The weed control provided by the applications of Prism, Raptor and Butyrac is very good for the spectrum of weeds in our area. The main problem we have seen is that the application of Raptor and
Butyrac is very hard on the young alfalfa and it takes over a week for it to recover from the effects of
these herbicides. Growth is minimal in the conventional fields during the recovery process and the
glyphosate tolerant alfalfa does not experience this since the application of glyphosate does not affect
the alfalfa.
For the glyphosate tolerant alfalfa we planted, we applied RoundUp WeatherMax (glyphosate) at a rate of
22 ounces per acre. The total cost for material and application of our establishment spraying for our
new glyphosate tolerant alfalfa fields was $12.47 per acre. This represents a savings of $47.98 per acre
compared to the conventional system. The glyphosate tolerant fields showed no negative response to
the application of the herbicide, while the conventional fields are stunted by the Raptor and Butyrac
application. I estimate that we had a resulting yield increase in the glyphosate tolerant alfalfa of ¼ to ½
tons in the first cutting.
One of the largest problems we have in our alfalfa stands are grasses (primarily nutsedge and water

grass). Usually by the second or third year, all our fields have some level of grass present along the
drain end of the field or in the higher traffic areas. In our conventional varieties, we apply Trilin 10-G
(trifluralin) at a rate of 20 pounds per acre in our first year fields and 40 lbs per acre in our 2nd through
5th year fields. All applications of Trilin 10-G occur after the first cutting of the alfalfa. In our first year
fields it cost us $20 per acre in material and application for the Trilin 10-G application. Our cost for
the 2nd through 5th year fields was $39.35 per acre for the material and application of the Trilin 10-G.
We apply trifluralin to 100% of our conventional acreage every year.
Glyphosate is an excellent grass herbicide and we followed our establishment spray in the tolerant fields
with a summer application to control any additional weeds. We often see water grass and nutsedge in
isolated parts of a field and with the glyphosate tolerant alfalfa, we can spot spray these areas very
effectively. In 2007 our remaining RoundUp applications in the tolerant fields cost us a total of $14.38
per acre. One field required no additional applications after the establishment spray and the other two
fields had one application at a rate of 44 ounces per acre and some spot spraying at 33 ounces per acre.
While the Trilin 10-G is effective, it works as a suppressive measure, and we still struggle with grass
problems in most of our fields. Trifluralin also has a fairly long residual life in the soil and we have
seen areas of damage in subsequent crops as result. It is hard to quantify the level of damage from this
residual, but it is evident. The glyphosate tolerant varieties give us a chance to break this cycle of
residual herbicide use.
Winter weed control is very important for the longevity of our alfalfa stands. For our conventional
varieties we have found that Direx (diuron), Velpar (hexazinone) and Gramoxone (paraquat dichloride) are
the most effective. For our 2nd year fields we apply Velpar at a rate of .75 pounds per acre. For our 3rd,
4th and 5th year fields we apply Direx at a rate of 19 to 38.4 ounces per acre along with Gramoxone at a
rate of 32 to 40 ounces per acre. The Velpar material and application cost was $22 per acre. The
Gramoxone and Direx application and material cost was $16.35 per acre.
While effective for winter weed control, we are always concerned when applying restricted use
chemicals such as paraquat. We have a closed mixing system and other safety measures in place, but not

using dangerous chemicals at all is by far the safest practice. We would also like to reduce our use of
diuron because of its potential to leach into the groundwater and move in field runoff. The glyphosate
tolerant varieties allow us to use only glyphosate to control weeds and its chemistry is much safer than
that of some of the herbicides we use in our conventional fields.
We remove our hay stands in their 5th year of production, usually after the 5th or 6th cutting. Prior to
removal we will spot spray the grass (in conventional fields) present in the field with 128 ounces per
acre of glyphosate. This practice helps eliminate some of the problem areas of grass for the subsequent
crop. This application and material cost us $27.26 per acre in 2007. Our glyphosate tolerant stands
may last an additional year, because they will not have any grass present in them and this will affect our
decision to remove the stand. We remove our stands by mechanical means (a heavy stubble disc), so
we are not concerned about not using glyphosate for stand removal. (Comment
Number: APHIS-2007-0044-9884-1)

Response: APHIS acknowledges the comment. Regarding cost differences between GT alfalfa and non-GT alfalfa, see the response to comment APHIS-2007-0044-0511-1 for issue 5.8.

Comment Excerpt Text:
APHIS recognizes that several GT crops are available on the commercial market, including GT corn, GT cotton, GT soy and GT sugarbeets. (EIS at 169). In fact, in 2009, approximately 115,000,000 acres of herbicide-tolerant crops were planted, mostly glyphosate-or glufosinate-tolerant corn, cotton or soybean. These crops are part of binary weed control technology that comprises the glyphosate-tolerant crop and direct application of glyphosate-based herbicide. In fact, glyphosate use increased more than six-fold between 1992 and 2002, to become the most used herbicide in the United States. (DEIS at 170).

If even half of all alfalfa acres are planted with GT alfalfa, 10.5 million acres of alfalfa will be converted to GT, comprising nearly 10% of the total GT acreage. (DEIS at 169). This conversion to GT alfalfa will exacerbate the known problems with the glyphosate-tolerant or Roundup Ready crop system. Alfalfa is a perennial crop that covers the ground uninterruptedly for the life of the stand, leaving little or no room for weeds to survive. Alfalfa also is a vigorous, dense plant, generally out competing weeds. Alfalfa's conversion to an herbicide-dependant crop system will promote glyphosate-resistant noxious weeds and alter the environmentally friendly farming and nutrient building qualities alfalfa is know for. (Comment Number: APHIS-2007-0044-9936-17)

Response: In regard to weed occurrence in non-GT alfalfa, see the response to comment APHIS-2007-0044-11037-10 for issue 7.2. In regard to increased use of glyphosate, see the response to comment APHIS-2007-0044-0402-1 for issue 6.3.

7.1 Issue 7.1 –Alfalfa Production and Farming Practices

Comment Excerpt Text:
The DEIS is incorrect in its assumption that current alfalfa production practices are already in place to protect against unintended presence of GE alfalfa and the USDA would be wrong to assume such practices could exist.
In fact, we are concerned that the DEIS articulates a significant level of misunderstanding of organic farming practice. In particular, the description of Alfalfa Farming Practices (page 71) details a methodology for alfalfa seeding and weed management that is not used by any organic alfalfa farmers we know of in Canada and the U.S.. This incorrect description shows a misunderstanding of organic farming practice generally. The great majority of alfalfa in Western Canada and the Great Plains region of the U.S. is seeded with a cover crop of cereal such as oats in order to suppress weeds. The cover crop germinates and is harvested in the first year, and the following spring the alfalfa will leaf out quickly and outcompete any weeds that might emerge. Alfalfa's great ability to out-compete weeds makes it a valuable "clean-up" crop that is actually used in crop rotations as a method to resolve several weed issues. Though the above is partially described in the DEIS on pages 70 and 73, it is not referenced in "2. Alfalfa Farming Practices a. Organic Farming."

Our knowledge of the biology of alfalfa and the realities of farming leads us to strongly challenge
the central conclusion of the DEIS that:
"If alfalfa farmers take these factors into consideration and employ measures to counter these factors, such measures should also help alfalfa farmers effectively reduce or prevent gene flow between neighboring alfalfa crops. Combined with the measures…that can be employed to decrease the probability of gene flow between alfalfa fields and crops, we do not believe that the potential for flow of genes and traits between alfalfa populations in the United States should amount to a significant impact on the human environment." (page 105)
In the following sections we further articulate some of the specific factors that will result in unmanageable GE contamination in alfalfa. (Comment Number: APHIS-2007-0044-10263-4)

Response: APHIS acknowledges the comment. However, the commenter does not provide any specific sources for their statement regarding the specific crop seeding and rotational practices of organic farming and thus APHIS cannot validate the accuracy of the comments. APHIS is responsible for ensuring that data and relevant studies included and analyzed in the DEIS are accurate and reasonable. The relevant studies used for the DEIS are based on accurate and reasonable science.
In regard to weed occurrence in non-GT alfalfa, see the response to comment APHIS-2007-0044-11037-10 for issue 7.2.
In regard to cover crops planted with alfalfa and use of alfalfa as a clean up crop, further discussion has been included in section III.E.2.a of the FEIS.

Comment Excerpt Text:
NCGA also believes the assertion by APHIS that organic farmers should be responsible for controlling the potential for gene flow from GE crops into their fields is misguided. APHIS' recommendations per Van Deynze et al. (2008) that, "growers who wish to avoid gene flow should pay attention to flowering habits (avoiding simultaneous flowering) and harvest schedules, and disallow or remove commercial beekeepers' hives" puts the burden of the responsibility for controlling GE organisms unfairly on organic and conventional producers. While organic producers certainly can take proactive approaches to try to prevent gene flow, it is difficult for growers to know the types of agriculture simultaneously occurring in many square miles near their fields. NCGA supports the idea put forth in the European Union that, "farmers who introduce the new production type should bear the responsibility of implementing the actions necessary to limit admixture" (CEC 2003). (Comment Number: APHIS-2007-0044-11018-10)

Response: In regard to the burden of control measures, see response to comment APHIS-2007-0044-11689-10 for issue 9.0 (paragraph 1 of the response). In regard to the ability of farmers to be aware of the types of agriculture proximal to their fields and of pinning maps, see the response to comment APHIS-2007-0044-6227-1 for issue 3.1.

Comment Excerpt Text:
Roundup Ready alfalfa system will increase use of toxic herbicides for removal of RR alfalfa stands

As even APHIS is forced to concede, introduction of Roundup Ready alfalfa will eliminate glyphosate as an option for alfalfa stand removal, and therefore increase the use of more toxic herbicides for this purpose. [Footnote 23: EIS at 121 (emphasis added): "In conventional alfalfa fields, glyphosate is often used to remove alfalfa after 3 to 8 years when it has become vulnerable to weeds and thinning. For stand removal, adoption of GT [alfalfa] would likely result in a shift from glyphosate to other herbicides due to the inability of glyphosate to remove stands of GT alfalfa."] Though APHIS makes this concession, it fails to give even a rough estimate of the increase in use of more toxic herbicides for stand removal. Below, we supply such a rough estimate.

As noted above, EPA estimates that 200,000 lbs. a.e. glyphosate are applied to alfalfa each year, on less than 2.5% of national alfalfa acreage. If one assumes 2% of 22.25 million acres receive glyphosate, that equals 0.45 million acres, or 450,000 acres. Since so little glyphosate or any other herbicide is needed for weed control in alfalfa, and as APHIS and its sources agree, glyphosate is "often used" for alfalfa stand removal, the majority of the glyphosate-treated alfalfa acreage is likely used for stand removal purposes. If one assumes 400,000 acres treated with glyphosate are for stand removal purposes, then replacement herbicides would be needed for this much acreage. Sources cited by APHIS (Mayerle 2002, Manitoba 2002) and one other (U of Wy 2006) give several possible herbicide regimes for stand removal without glyphosate:

Herbicide(s) (chemical name(s)) Rate (combined) Source

Curtail (clopyralid + 2,4-D) 0.8 liter/acre Mayerle (2002)
Curtail (clopyralid + 2,4-D) 1 liter/acre Manitoba (2002)
Curtail (clopyralid + 2,4-D) 40 oz/acre U of Wy (2006)
Banvel + 2,4-D (dicamba + 2,4-D) 0.9 liter/acre Manitoba (2002)
Tordon + 2,4-D (picloram + 2,4-D) 8 oz/acre U of Wy (2006)
2,4-D ester alone 1-2 qts/acre Endres (1999)
Banvel (dicamba) alone 0.5 liter/acre Manitoba (2002)

Below, we estimate how much additional other herbicides would be used if each regime were to completely replace glyphosate. This would approximate a scenario in which all alfalfa is RR alfalfa, and so should be regarded as upper-bound estimates. Obviously, growers will make different choices, so the overall increase will be an aggregrate of some portion of each of these totals (and others not listed).

If glyphosate were to be completely replaced by Curtail for alfalfa stand removal, this would result in roughly 1 liter per acre or an additional 400,000 liters of Curtail (a mixture of clopyralid and 2,4-D); replacement with dicamba + 2,4-D at 0.9 liter/acre = an additional 360,000 liters of dicamba + 2,4-D; an additional 100,000 quarts of picloram + 2,4-D; an additional 400,000 to 800,000 quarts of 2,4-D alone; or an additional 200,000 liters of dicamba. The latter two regimes are not as likely, as neither chemical alone gives very good weed control on its own. Mayerle (2002) explains that another chemical "kick" (treatment) is often required later on to achieve adequate control of alfalfa prior to next season's rotation crop, so these calculations likely underestimate the true impact of "losing" glyphosate for stand removal purposes.

One serious problem with increased use of several of these herbicides for stand removal is long-lasting residual effects that, in the case of picloram, can last for more than a year. Even very low levels of picloram residues on hay or straw can be hazardous. (Comment Number: APHIS-2007-0044-11037-28)

Response: APHIS acknowledges this comment. Regarding the commenter's concerns about increase use of glyphosate over more toxic and carcinogenic herbicides, see response to comments APHIS-2007-0044-0352-1in issue 6.3.
In regard to stand removal of GT alfalfa, as discussed in section 3.1.2 of appendix G of the DEIS, application of an herbicide (e.g., 2,4-D, dicamba (Banvel®), or clopyralid (Stinger®)) combined with tillage is effective for stand removal. In no-till systems 2,4-D and dicamba can be applied together. APHIS has updated the discussion of herbicide use during GT alfalfa stand removal in appendix J, section J 2.5.1, and appendix G.3G3.1.2 of the FEIS. APHIS has expanded the discussion of erosion due to tillage in appendix J, section J.3.2.3, of the FEIS.
In regard to 0.5 percent to 1 percent low-level presence affecting the use of glyphosate for conventional stand removal, a discussion of the low-level presence in conventional stand removal has been added to appendix J.
In regard to the potential for increased use of alternative herbicides for stand removal, section III.2 discusses research that has suggested that glyphosate is less harmful to the environment than many other herbicides and that the shift of herbicide use away from more toxic herbicides and to the use of glyphosate has resulted in a net lower environmental impact from herbicides. However, as described in section III.2.b of the DEIS, alternative herbicides would be required for

stand removal of GE alfalfa. An expanded section examining the potential for higher use of alternative herbicides has been included in appendix V 2.8 of the FEIS.

Comment Excerpt Text:
Roundup Ready alfalfa is one of several crops that have been genetically engineered to withstand direct application of glyphosate-based herbicides to kill nearby weeds. One cannot apply glyphosate in this way to most conventional crops without killing or badly injuring the plant. Thus, glyphosate use is generally limited to "pre-emergence" applications in conventional field crops, meaning before the seed has "emerged" or sprouted. The tolerance trait has made it possible to apply glyphosate "post-emergence" (directly to the growing plant), thus facilitating vastly increased, season-long use of glyphosate on major field crops. Because of this unique tolerance trait and the profound changes in weed control practices it made possible, Roundup Ready (RR) alfalfa (like other RR crops) can only be understood as one element of a binary weed control system that comprises the RR alfalfa plant and associated use of glyphosate. [Footnote 1: This concept is borrowed from Monsanto, which described its latest Roundup Ready soybean in these terms: "The utilization of Roundup agricultural herbicides plus Roundup Ready soybean, collectively referred to as the Roundup Ready soybean system…" From: "Petition for the Determination of Nonregulated Status for Roundup Ready2Yield™ Soybean MON 89788," submitted to USDA by Monsanto on June 27, 2006 (revised November 3, 2006), APHIS Docket No. APHIS-2006-0195, p. 4).] Following Monsanto, we henceforth refer to this weed control technology as the "Roundup Ready crop [e.g. alfalfa] system." (Comment Number: APHIS-2007-0044-11037-9)

Response: APHIS acknowledges the comment. The use of glyphosate on GT alfalfa is discussed in the DEIS.

Comment Excerpt Text:
The data I saw in the E.I.S. cited using 2 gals of leaf cutter bees/acre. In Montana most contract growers use 3-5 gals/acre which means less alfalfa flowerslbee forcing the bees to travel further to collect pollen increasing the risk ofpollen contamination from nearby RR fields. Shouldn't tests have been done using the industry standard numbers of bees? (Comment Number: APHIS-2007-0044-12219-1)

Response: In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for issue 3.1.

Comment Excerpt Text:
I am writing in support of bringing Roundup Ready Alfalfa back on the market mainly because when I plant Alfalfa in my sandy soils and I have to use preemergent herbicides to control my weeds and we have a wet year, my conventional alfalfa stands are killed because of seepage of underground water coming up. With Roundup Ready alfalfa, I won't have to use preemergent herbicides so I won't have to worry about killing my stands.

I also have problems with nutgrass in my alfalfa stands. With the current herbicide products avialable to me to use, I can't get good control of this weed which causes my hay quality to be downgraded and my stands die off prematurely, sometimes only 2 years. Having the ability to use the Roundup Ready technology, I will be able to control this weed in particularly plus the other weeds I have in my stands thus giving me higher quality hay and longetivity of my alfalfa stands. (Comment Number: APHIS-2007-0044-1235-1)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment.

Comment Excerpt Text:
Third, pages 132-133 of the EIS state that deregulation of Roundup Ready alfalfa, would not affect the supply of organic alfalfa hay and organic alfalfa seeds, and that the agency does not have data to demonstrate economic ramifications to organic producers regarding loss of markets and increased production costs for protecting the integrity of products from GE crop gene flow. This conclusion overlooks the costs that organic and non-GMO alfalfa producers will incur to prevent and monitor contamination, including leaving adequate buffers to prevent cross pollination (which may force the grower to take significant land area out of alfalfa production), as well as the direct costs of testing for, detecting, and eradicating GMO material. (Comment Number: APHIS-2007-0044-1687-3)

Response: The DEIS does analyze the impact on supply of any eventual increased costs to non-GT alfalfa producers in section 3.2.3 of appendix S. The analysis of the impacts on seed producers had been expanded in the FEIS. Regarding testing, see response to comment APHIS-2007-0044-0693-1 in issue 5.9.

Comment Excerpt Text:
I have planted Roundup Ready alfalfa. I just want to cover a few benefits tha I have seen. First, there is a huge yield increase the seedling year because roundup does no thurt the alfalfa. Second, most of my stands are so clean that I have not had to spray them again. Therefore I have used less chemical so it is actually better for the environment. In our area we have weeds attacking our fields that we can not find an answer for, but our roundup ready fields are clean. Roundup is one of the safest chemicals on the market and we are using less chemicals. I don't see any reason why it shouldn't be available. (Comment Number: APHIS-2007-0044-1749-1)

Response: APHIS acknowledges the comment. In regard to the yield of GT alfalfa see the response to comment APHIS-2007-0044-0933-14 for issue 3.7

Comment Excerpt Text:
GE alfalfa would significantly increase pesticide use, harming both human health and the environment. USDA admits that introduction of Roundup Ready alfalfa will increase Roundup use. Where is the evidence that the increase is not significant and that Roundup will replace other, more toxic herbicides? (Comment Number: APHIS-2007-0044-4347-4)

Response: See the response to comment APHIS-2007-0044-0402-1 for issue 6.3.

Comment Excerpt Text:
As an organic dairy farmer I would like to ask you to not allow Genetically Modified Alfalfa. Contamination is a constant battle for all seeds that we use and adding one more possibilllity will create a greater chance for contamination in the food chain. Most alfalfa is seeded with a companion crop like grass or oats. It would be of no benefit to have RR alfalfa from the standpoint that it would kill the other species that are generally seeded with alfalfa. I have heard the argument that this would help with waterway establishment. Real world experience will show that you need grass in waterways to hold soil, alfalfa does not hold waterways very well, so this argument is not a realistic basis. My family have been dairy farmers for several years. Stand establishment has never been an issue if done correctly. My family and my organic consumers appreciate your careful consideration on this issue. Thank you, Jason Wells (Comment Number: APHIS-2007-0044-5744-1)

Response: In regard to the establishment of waterways, appendix J. 3 of the DEIS details the compatibility of GT alfalfa with all current soil conservation practices including the use of grassed waterways. GT alfalfa cannot be used in waterways. Doing so would violate Monsanto's Technology Use Agreement. Additionally, in regard to the interseeding of annual grass species with GT alfalfa, APHIS concedes that interseeding with non-GE annual grass is not a likely management strategy in appendix J.5 1.2 of the DEIS
In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
The need for glyphosate-tolerant to be competetive in the market place is important for survival in my alfalfa operation. With three years of growing r.r. alfalfa I feel I can speak from first hand experience. The benefits have been considerable. IF the restrictions are lifted they would be even greater. Fuel savings and chemical reductions are only two of the benefits. The reinstatement for nonregulated status should be now. Thank you (Comment Number: APHIS-2007-0044-6224-2)

Response: APHIS acknowledges the comment.

Comment Excerpt Text:
Alfalfa is a perennial ... just how do you propose that the organic farmers control the timing of the bloom in the second year?
The onus of contamination should be on those who introduce the GE cultivars, not on those who continue to use existing seed genotypes. (Comment Number: APHIS-2007-0044-6451-1)

Response: In regard to the burden of control measures, see response to comment APHIS-2007-0044-11689-10 for issue 9.0 (paragraph 1 of the response). The timing of bloom in any given year of alfalfa production will be due to many environmental variables and farmers of conventional, organic, and GE alfalfa will harvest alfalfa according to production type and

adherence to contractual practices. As discussed in appendix V section 3.4.1, seed fields are often cut early in the spring to synchronize blooming within the field. For organic hay growers to prevent gene flow, fields should be harvested before seed sets. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
US farmers need to continue producing more from less acres. RR alfalfa can help them do that while minimizing the use of herbicides for weed control. It is also important with our contour strip farming that we have RR alfalfa so that farmers can contol weeds in the transition zone from strips of corn or beans to alfalfa. It has been my experience that these transitions zones (several feet between strips) are where the real troublesome weeds continue to thrive and herbicide resistance developes. (Comment Number: APHIS-2007-0044-6678-1)

Response: APHIS acknowledges the comment. Appendix J discusses the compatibility of GE-alfalfa with soil conservation practices including contour farming. The discussion in the DEIS supports the comment.

Comment Excerpt Text:
Impact to Farmers: As a farmer that markets "beyond organic" meat products (all pasture fed) directly to consumers, my business depends on consumer trust of my products. My customers do not want to eat meat that has been fed genetically modified feeds, regardless of whether the feed was intentionally modified or simply accidentally crossed with GEGT alfalfa. Even the possibility of a cross will harm my business, meaning that I will need to pay for expensive testing to prove that my pastures are not contaminated. Further, some legal precedents indicate that farmers whose crops are contaminated with GE traits are in violation of IP rights and may have to pay fees to the "inventor," an unacceptable impact. (Comment Number: APHIS-2007-0044-7249-2)

Response: In regard to fees to the inventor, see the response to comment APHIS-2007-0044-11753-1 for issue 2.0.
In regard to presence of GE products in organic products, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Market Structure

In the discussions regarding the issue of market structure, APHIS states that for various reasons, GT alfalfa deregulation could result in an increase in non-GT farm size. APHIS makes the following three points in support of its assertion:

If purchasing land to provide a separation distance between GT and non-GT alfalfa is the only mechanism used to minimize the presence of GT alfalfa in GT-sensitive alfalfa fields, these increased land costs could benefit larger non-GT alfalfa farmers.

To the extent that organic farming is more suitable for small farms than conventional farming (less economies of scale related to greater dependency on labor), a reduction in the demand for organic products could favor larger farmers.

However, land needs for GT-sensitive alfalfa forage growers may be reduced as there are other mechanisms available to minimize the presence of GT alfalfa in GT-sensitive alfalfa fields.

DEIS at xvii; see also DEIS at 144.

The average farm size has been increasing for a century; farm size has grown since the advent of improved mechanization, crop storage and transportation systems. This increase in farm size predates biotech crops, gene flow mitigation concerns and organic industry production trends. Based on the well-documented biological principles of hay to hay gene flow discussed in detail in Sections A and B, it is not feasible or foreseeable that farm size for hay production would increase as a direct or indirect result of GT alfalfa deregulation.

Organic farm size, just like traditional farm size, is increasing to improve economies of scale regardless of concerns about cross-pollination buffers with neighboring biotech crops. As discussed in Sections A and B, the key mitigation strategy for organic hay producers is simply to harvest on time (prior to ripe seed), independent of farm size.

FGI agrees with APHIS' statement that "…there are other mechanisms available to minimize the presence of GT alfalfa in GT-sensitive alfalfa fields", such as timing of harvest and planting seed choice. These other practices are highly effective, very practical and very likely to be implemented by farmers concerned about protecting their non-GT alfalfa crops. The overwhelming majority (> 99 percent) of alfalfa producers grow alfalfa hay, not seed. The barriers to effective gene flow in hay production settings are profound and the risk of gene flow into hay from neighboring fields is highly improbable under current farm size conditions [Footnote 1: Van Deynze, A.E., S. Fitzpatrick, B. Hammon, M.H. McCaslin, D.H. Putnam, L.R. Teuber and D.J. Undersander. 2008. Gene Flow in Alfalfa: Biology, Mitigation, and Potential Impact on Production. Special Publication 28. Council for Agricultural Science and Technology (CAST), Ames, Iowa. 30 pp. (cited at DEIS, App. Q at Q-88 and App. V at V-96).], [Footnote 6: NAFA. 2008. Coexistence for Alfalfa Hay Export Markets. NAFA Coexistence Document. Adopted June 2008. Available at http://www.alfalfa.org/pdf/CSExportHay.pdf (accessed Feb. 24, 2010).] and therefore such risk cannot be further reduced by increasing farm size. Increased farm size (i.e., increased buffer areas) would be illogical as it is without biological relevance with respect to effective gene flow mitigation.

Increasing isolation distance from GT alfalfa will be a key mitigation strategy for non-GT seed production, especially for seed destined for export markets. The new AOSCA program for facilitating successful seed production for GMO sensitive markets specifies the required isolation in this process-based certification (AOSCA, 2010) [Footnote 10: AOSCA. 2010. Chet Boruff,

Chief Executive Officer, Association of Official Seed Certifying Agencies, Public Comment on DEIS for GT Alfalfa.], [Footnote 11: Lowry, G. 2010. Stewardship initiatives to protect our non-GMO seed markets. Pages 27-33, in Proceedings for the 2010 Winter Seed School Conference of the Western Alfalfa Seed Growers Association. January 17-19, 2010, Las Vegas, Nevada.]. Spatial isolation of a given field is independent of farm size. Furthermore, individual alfalfa seed production fields or clusters of fields of the same variety are often less than 100 acres in total because the contracted seed field acreage is typically proportional to the quantity of seed needed for sales of a specific variety for the year.

Instead of the technology disproportionately benefiting larger farmers, it is more plausible that smaller sized farms may benefit more from GT alfalfa, because they will be able to efficiently and effectively improve weed control with more limited labor inputs. Large farms often hire pest control advisors or custom applicator services to assist with weed management, whereas many small or hobby farmers do not.

In sum, there will be no significant impact to farm size from the deregulation of GT alfalfa. (Comment Number: APHIS-2007-0044-7620-32)

Response: APHIS acknowledges the comment. In regard to the AOSCA programs, additional discussion has been included in section IV.H and appendix V 5.8 of the FEIS. In regard to impacts on farm size, see the response to comment APHIS-2007-0044-4913-7 for issue 5.1.

Comment Excerpt Text:
In 2007, alfalfa was grown on over 22 million acres in the U.S (USDA-NASS, 2007). In 2005, the first biotechnology-derived varieties were introduced containing the glyphosate-tolerance trait. Acreage planted with biotechnology-derived alfalfa peaked at approximately 200,000 acres in 2006, and future plantings were halted by court order effective March 30, 2007 (Geertson 2007). The vast majority of alfalfa currently grown for forage in the U.S. is devoted to conventional alfalfa. However, specialty alfalfa (primarily organic) is a growing industry and, during 2002 to 2005, certified organic alfalfa hay production increased by 17 percent per year (Table 1). Organic production still remains below one percent of total alfalfa acres.

Biotechnology-derived alfalfa may in the future displace conventional alfalfa, as has happened with other crops where varieties improved with biotechnology traits are available. If this occurs, specialty alfalfa producers operating in organic or “non-GMO” markets will need to ensure their compliance with established specialty production practices, such as isolation distances from biotechnology-derived crops (e.g., Organic Systems Plans) in order to maintain their specialty premiums. A discussion of those production strategies and other relevant information regarding alfalfa production is provided in the following sections.

Alfalfa Seed Standards. Similar to other crops, the alfalfa industry developed seed standards to assure the production of high quality seed. The standards have been in place for well over 20 years, and these high quality seeds of known genetic purity may serve as the source of either commodity or specialty alfalfa production. For the past 20 years, most of the U.S. alfalfa seed crop was produced by registered variety name (known seed source), within official state field

isolation inspection programs and under contract for a relatively small number of seed companies that develop or produce proprietary varieties. The majority of the U.S. alfalfa seed crop is of AOSCA registered proprietary cultivars that are intensively managed by contracted seed growers. Plantings are grown to optimize alfalfa seed yield and seed quality using sufficient field isolation, in-crop volunteer control and field history to minimize genetic off-types due to unintended gene flow between conventional cultivars (e.g., using AOSCA field isolation standards) (AOSCA 2003).

Alfalfa is an exclusively bee-pollinated crop, and considerable research has been conducted to understand the dynamics of pollen mediated gene flow (CAST, 2008). Much of this information was developed in anticipation of the introduction of the glyphosate-tolerance trait in alfalfa so that seed growers could make informed decisions regarding seed production practices needed to produce seed for certain markets. A detailed summary of this work is discussed in the document entitled "Impacts of Roundup Ready® Alfalfa on Production Practices and Marketing of Alfalfa Seed and Hay" (document NO. 04-AL-116U-6) previously submitted to USDA APHIS. Information presented in this document shows that production of specialty alfalfa with <1% biotechnology-derived material (considered off type) for U.S. markets easily can be accomplished using existing AOSCA isolation distances for breeder, foundation and certified classes of alfalfa seed. Greater isolation and cooperation will be required for seed producers who wish to export seed to markets where alfalfa with biotechnology traits is not approved. (Comment Number: APHIS-2007-0044-7620-42)

Response: APHIS acknowledges the comment, and the EIS analysis supports these statements.

Comment Excerpt Text:
I am Not a certified Organic Producer of either Organic alfalfa or Organic Beef, but if RR Alfalfa is de-regulated, I will loose that ability forever, RR Alfalfa will take away my Right to Farm. I do not want RR Alfalfa on my ranch or fed to my animals. (Comment Number: APHIS-2007-0044-8166-3)

Response: In regard to the low-level presence of non-GE or organic alfalfa with GT-alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Page 18. Document statement: "Grazing is sometimes used as an alternative to harvesting alfalfa. Grazing allows for high nutritional gains per animal, but the risks include animal losses due to gastro-intestinal bloating and difficulties in alfalfa stand maintenance if continuous grazing is present. Farmers may choose grazing for dormant-season alfalfa stubble, a substitute for early or late season cutting, and rotational grazing during the growing season (Orloff et al., 1997)".
My comment: There is no such thing as a "high nutritional gain per animal". Actually, the gains per animal or per acre are dependent on the stocking rate and the maturity of the crop. It is correct to say is that if grazed at a vegetative stage, alfalfa has potential to provide high gains per

animal but per acre production would like be less than if grazing were postponed till early flowering. For grazing of alfalfa, vegetative grazing is typically recommended. Also, it is important to note that for grazing alfalfa would most likely be planted with a perennial grass to reduce the incidence of bloat and that rotational grazing is preferred. Roundup would likely not be applied to grazed alfalfa.
Page 18. Little evidence exists to suggest that alfalfa is considered a weed.
Comment: It is important to remember that alfalfa is not a plant native to North America. It was imported by colonists and conquering peoples. In that sense, while some claim that alfalfa has "naturalized" in the U.S., all alfalfa should be considered to have potential to be an invasive plant in native plantings and rangelands. In total, there are nine introduced sources of alfalfa germplasm that are the foundation of our modern varieties. Generally speaking most alfalfas varieties that are marketed have similar vegetative appearance and but have variable flower colors including purple, yellow, white. Over 20 color variations exist (see http://www.naaic.org/Resources/colorguide/flowercolor.html (Comment Number: APHIS-2007-0044-9164-1)

Response: APHIS acknowledges the comment. Sections III.A.1.c and III.A.2.a of the FEIS have been revised to clarify the text based on the comment.

Comment Excerpt Text:
What we feel to be the key issue is this. Without the use and availabillity of glyphosate tollerant crops, different practices have to be used. With these different practices, there has to be practices used which are not
as favorable for every one involved with either growing the crops, or utilizing the crops. If we can not utilize glyphosate
resistant crops and glyphosate, we have to perform many more tillage trips across our ground, and then utilize many
more "pre emerge" herbicides (very expensive), and fuel for these tillage operations. We can beat the drum of these
issues forever, especailly the issue of "resistance". The issues no one can dispute, are the issues of effectivness and
the economic issues of glyphosate utilization. and to us, the most important issue of safety. This safety issue, pertains
to both the farmer-growers, as well as the consumer of the glyphosate resistant crops. (Comment Number: APHIS-2007-0044-9258-2)

Response: APHIS acknowledges the comment. APHIS agrees that different methods of production can have different costs associated with them.

Comment Excerpt Text:
The Federal District Court decision ordering preparation of this EIS found that USDA acted arbitrarily and capriciously in not evaluating "the extent of likely gene transmission from genetically engineered seed crops to non-engineered seed crops." The Court also found that

“APHIS failed to consider... that because of weather—which is beyond a farmer’s control--a farmer cannot always harvest his field at the most optimal time.

APHIS made no inquiry into how often farmers are actually able to harvest their forage crop before seeds mature and no inquiry into the likelihood of gene transmission when they cannot.” (Comment Number: APHIS-2007-0044-9882-18)

Response: In regard to timing of alfalfa forage harvest, see the response to comment APHIS-2007-0044-10263-7 for issue 3.1.

7.2 Issue 7.2 – Weeds in Alfalfa (including weed control)

Comment Excerpt Text:
I believe that the introduction of RR alfalfa will cause undo hardships upon alfalfa producers who are trying to grow non-gmo or organic alfalfa for what ever their reason. My company exports considerable animal food to foreign countrys that require the feed ingredients to be non-gmo, and if the vast majority of alfalfa that is common within the market place is gmo alfalfa, then it will become very difficult, to maybe impossible, to be in this market. We also have organic pellets that must have organic/non-gmo ingredients in them, and if there is the possibility of not being able to obtain an organic/non-gmo alfalfa, then this market is also ruined for us. In addition to all of this, it IS NOT very difficult to raise relatively weed free or weed controlled alfalfa, even if there is no RR alfalfa. (Comment Number: APHIS-2007-0044-0260-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to international markets, see the response to comment APHIS-2007-0044-3404-1 for issue 5.4.In regard to weed occurrence in non-GT alfalfa, see the response to comment APHIS-2007-0044-11037-10 for issue 7.2.

Comment Excerpt Text:
Thanks for the opportunity to comment on Roundup Ready alfalfa on behalf of forage producers in Tennessee and the mid-South. I conducted tolerance studies on alfalfa on our center and had an opportunity to see first hand the outstanding weed control and resulting impact on forage production. Alfalfa tolerance to glyphosate was excellent and forage quality was not different from that not treated with glyphosate.
Glyphosate provides broad-spectrum control of dicot and monocot weeds while alternative weed management practices require multiple applications of herbicides to achieve similar control. Also, there are weeds that will escape even the best alternative programs.
RR alfalfa with glyphosate herbicide offers the grower greater flexibility in application timing and weed management, not to mention better worker safety. Most likely, the RR alfalfa systems will afford growers a $5 to $10 per acre benefit over conventional weed control programs when all costs and benefits, including better yields, equal or better forage quality (because it is free of weeds) and greater stand longevity are considered.
I believe most our growers will not make more than a single application before each cutting, but most likely they will only average about 2 or 3 application of glyphosate per year, and after a

few years, weed seed bank should be greatly reduced. Growers still have the option to use other mode of action herbicides as needed to practice good weed resistance management.
Growers in this area should have the option to plant their choice of alfalfa varieties.. This should not have any impact on a grower that desire to grow conventional varieties since we are not a seed production area.
RR alfalfa would be a good choice for Tennessee and mid-South alfalfa growers without impacting their neighbors. Most of our alfalfa growers are dairy farmers and use the hay on their on farm. Others are hay producers that sell to their neighbors.
Thanks for the opportunity to comment.
Robert M. Hayes, PhD
Weed Scientist
University of Tennessee
(Comment Number: APHIS-2007-0044-0807-1)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment.

Comment Excerpt Text:
For some reason, APHIS consistently ignores pesticide usage data collected by its sister agency, USDA's National Agricultural Statistics Service (NASS). This is quite surprising and unacceptable, given the fact that NASS is universally acknowledged to provide the most accurate and reliable pesticide information available in the U.S. As we will see, APHIS couples its neglect of NASS data with unfortunate reliance on data one to two decades old, on dubious "simulation studies" conducted by organizations funded by the biotechnology industry, and by use of a variety of illegitimate methods of its own.

CFS relies on NASS data for several reasons. First, NASS utilizes transparent, rigorous procedures and statistically valid sampling methods to deliver highly accurate pesticide data. Second, NASS has regularly collected pesticide usage data on the major crops for which glyphosate-tolerant (GT) versions are predominant (soybeans, corn and cotton) over the entire period of GT crop adoption, offering a consistent set of data that facilitates accurate, year-to-year comparisons. Finally, NASS data and methodologies are freely and publicly available, which allows for open review and criticism of any analysis utilizing them.

NASS's Advisory Committee on Agricultural Statistics, comprised of experts from academia and industry, had this to say in 2006:

"NASS employs rigorous methods to ensure that statistically representative samples are achieved…." thus ensuring "a high level of data reliability and accuracy, which are the greatest advantage of NASS data." [Footnote 1: USDA NASS (2006). "Meeting of the Advisory Committee on Agriculture Statistics (ACAS): Summary and Recommendations," February 14-15, 2006, USDA NASS, Appendix III, at:
http://www.nass.usda.gov/About_NASS/Advisory_Committee_on_Agriculture_Statistics/advisory-es021406.pdf.]

NASS data are also extensively used by the U.S. Environmental Protection Agency, state pesticide officials, pesticide firms and independent analysts.

The same NASS Advisory Committee quoted above found fault with alternative, private sector pesticide data, finding it non-transparent and potentially based on faulty sampling techniques (e.g. overly small sample sizes). With reference to Doane, the major private-sector provider of pesticide usage information, the Advisory Committee found that:

"The proprietary agreements entered into by Doane subscribers extend well beyond prohibitions on data disclosure, to embargo revelation of the sampling and analytical procedures used to generate their data. Thus, it may be that a large number of the area wide estimates included in the Doane system are based on individual or statistically unrepresentative observations." [Footnote 2: USDA NASS (2006), op. cit., Appendix III.]

In other words, NASS is regarded by experts in the field as the authoritative source for pesticide usage information in American agriculture, while private sector companies may at times supply faulty pesticide data because of illegitimate (and secretive) techniques whose validity cannot be confirmed. (Comment Number: APHIS-2007-0044-11037-1)

Response: In regard to the impact of RR alfalfa on herbicide use, see the response to comment APHIS-2007-0044-6240-2 for issue 6.0. In regard to NASS data, see the response to comment APHIS-2007-0044-9936-35 for issue 2.0.

Comment Excerpt Text:
Alfalfa farmers generally do not use herbicides on alfalfa, or only to a very limited extent. According to USDA's National Agricultural Statistics Service (NASS), universally acknowledged as the gold standard for pesticide usage information, just 7% of alfalfa hay acreage was treated with herbicides of any sort in 1998, while overall herbicide use on alfalfa was 1.468 million lbs. [Footnote 2: USDA NASS (1999). "Agricultural Chemical Usage: 1998 Field Crops Summary," USDA's National Agricultural Statistics Service, May 1999, pp. 9-10. On page 9, see U.S. figure under the Percent column for percent of national alfalfa acreage treated with herbicides. On p. 10, see the entry ("*" = less than one percent) for glyphosate. 1998 is the last year in which NASS surveyed alfalfa farmers for their pesticide usage practices. APHIS did not consult these NASS data, universally regarded as the highest quality data on national pesticide use, in the EIS. For more on NASS data as the gold standard for pesticide usage information, see Appendix 1.] Thus, just 1 of 14 acres of alfalfa hay was treated with weed-killing chemicals, while 13 of 14 acres were grown without them. EPA reports that 465 million lbs. of herbicides were applied agriculturally in 1998, so alfalfa's share of total herbicide use was just 0.32% (1.468/465). Given the fact that alfalfa ranks 4th in U.S. crop acreage (23.6 million acres in 1998), this is a remarkably small amount of herbicide. Please refer to Appendix 1 for discussion of the quality of these data sources on pesticide use versus those APHIS relies on in the EIS.

This paucity of herbicide use makes alfalfa unique among major field crops in mainstream American agriculture. Unlike alfalfa, the great majority of acreage of other major crops is

heavily treated with chemical herbicides. Ever year, over 90%, and usually over 95%, of corn, soybeans and cotton receive herbicides; these three crops received the bulk of the 465 million lbs. of herbicides that were applied in 1998.

Alfalfa is grown practically without herbicides because it is a perennial plant that grows vigorously in dense stands that crowd out weeds. As a perennial plant, it is grown for 3-5 years or sometimes up to 10 years without the yearly plowing or chemical burndown that is typical of annual crops like corn and soybeans. In an annual cropping system, weeds start off each year in a "cropless" field, with full access to the light, moisture and nutrients they need to thrive. Weeds that sprout early, with a head start on the crop plant, are thus much more problematic, while later-sprouting weeds are often shaded out and "outcompeted" by the crop plants. In contrast, a perennial like alfalfa survives the winter, and its thick stands give weeds little or no opportunity to compete for the life of the stand. For alfalfa, harvest is not a year-end prelude to death and dessication, as it is for annual crops, but rather a periodic mowing, which when conducted properly reinvigorates the stand. This is not to say that alfalfa is never infested with weeds, just that they are relatively insignificant in comparison weed competition in other (annual) crops. Unfortunately, APHIS gives the false impression throughout the EIS that alfalfa is an herbicide-intensive crop like corn or soybeans. This false impression sets up an equally false "need" for a pesticide-based weed control technology like Roundup Ready alfalfa. This false presumption of extensive herbicide use on conventional alfalfa also sets up thoroughly unrealistic and overblown estimates of the extent to which the RR alfalfa system will "displace" herbicides used on conventional alfalfa. (Comment Number: APHIS-2007-0044-11037-10)

Response: As discussed in section III.E.5 of the DEIS, weed pressures vary by climate and region. While some areas might be favorable for alfalfa stand establishment without the use of herbicides, it may be much more difficult in others. Weeds and their control have a major impact on the management practices in alfalfa seed and forage production. Weed control measures vary by farm within a region as much as among regions. The plant species that are considered weeds in alfalfa production are also affected by the different climates in which alfalfa is grown; thus, different weeds can be expected to vary in their importance in the different alfalfa growing regions.
In regard to the impact of GT alfalfa on herbicide use, see the response to comment APHIS-2007-0044-6240-2 for issue 6.0.

Comment Excerpt Text:
1) When weeds do infest alfalfa, it is primarily in the first year of stand establishment, and in particular the first harvest of the first year. By the end of the first year, weed biomass drops off considerably as the vigorously growing alfalfa outcompetes weeds. Weed growth is also diminished as successive mowing operations (typically, 4 times a year) weaken weeds, further diminishing their ability to compete or reproduce. Typically, weeds become even more insignificant in subsequent years, even in stands of alfalfa hay that receive no herbicides. (Comment Number: APHIS-2007-0044-11037-11)

Response: In regard to weed occurrence in non-GT alfalfa, see the response to comment APHIS-2007-0044-11037-10 for issue 7.2.

Comment Excerpt Text:
3) Most weeds are not a problem even when they are ubiquitous, as in the first several harvests of the first year of stand establishment. Studies of the nutrient composition of common alfalfa weeds have shown many of them to be nutritionally equivalent (i.e. protein and mineral content), or nearly so, to alfalfa, and so perfectly good fodder for dairy cattle and other livestock. (Comment Number: APHIS-2007-0044-11037-13)

Response: Although some species of weeds may not negatively affect the forage value of an alfalfa harvest, other weeds do. As discussed in section IV.5 of the DEIS, some weeds decrease the nutritional quality of alfalfa hay because they have lower protein content or contain toxins. Other weeds irritate the mouth and throat of livestock or are unpalatable to livestock, resulting in less feeding, see appendix G. As discussed in appendix V 2.1.2 of the FEIS, APHIS discusses how hay is graded. Weed content can lower the hay grade and thus reduce the price the farmer receives for the hay.
Other commenters (e.g., APHIS-2007-0044-0374-1 and APHIS-2007-0044-0346-1 for issue 7.2 and APHIS-2007-0044-9801-3 for issue 7.0) indicate that they have problems with weeds that reduce feed quality.

Comment Excerpt Text:
Our other major source of pesticide usage data – the US Environmental Protection Agency – is also ignored by APHIS. EPA recently began its "registration review" of glyphosate – the first since 1993, and in this context has developed the latest estimates for agricultural use of glyphosate by crop, including alfalfa. EPA's figures are contained in the EPA document "Screening Level Estimates of Agricultural Uses of the Case Glyphosate," November 26, 2008. The USDA and the EPA data referred to in these comments are included in the supporting materials.

APHIS offers no serious quantitative assessment of the likely impact of introducing GT alfalfa on pesticide use. "No calculations or speculation on GT alfalfa's specific impact on herbicide usage have been published…."[Footnote 3: EIS at 170. repeated almost verbatim at N-17.] This is a startling deficiency, given the fact that GT alfalfa is engineered explicitly to alter herbicide usage practices; and that pesticide use is generally acknowledged to have adverse impacts on human health, the environment and farmer welfare; and that there is a real need to promote integrated pest (including weed) management to reduce the use of pesticides and the negative impacts to which they give rise. Instead, APHIS continually repeats the mantra that Roundup Ready alfalfa will or may reduce the use of non-glyphosate herbicides, but gives no quantitative analysis to back up these assertions. (Comment Number: APHIS-2007-0044-11037-2)

Response: In regard to the impact of GT alfalfa on herbicide use, see the response to comment APHIS-2007-0044-6240-2 for issue 6.0.

Comment Excerpt Text:
2) Cocktail of seven herbicides recommended to control GR Palmer amaranth

Arsenic-based herbicides are not sufficient to control GR Palmer amaranth, however. In fact, leading weed scientists in Georgia, where GR Palmer amaranth is worst, have recommended an herbicide regime comprising 7 different chemicals as needed to control this noxious weed, as follows:

a) Pre-emergence: fomesafen, pyrithiobac, and pendimethalin
b) Post-emergence: glyphosate and metolachlor
c) Lay-by directed application: MSMA (monosodium methaneaersonic acid) and diuron.
[Footnote 11: Webster, T.M. & L.M. Sosnoskie (2010). "Loss of glyphosate efficacy: a changing weed spectrum in Georgia cotton," Weed Science 58: 73-79.]

MSMA is one of the arsenic-based herbicides to which EPA has given a new lease on life to battle the noxious GR Palmer amaranth. (Comment Number: APHIS-2007-0044-11037-23)

Response: APHIS acknowledges the comment and acknowledges that there are glyphosate resistant weeds. The use of glyphosate in any agricultural system could contribute to glyphosate resistant weeds. However, as detailed in section IV.5 of the DEIS, the application rate and frequency of glyphosate use in growing GT-alfalfa influences the potential for resistant weed development. In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for issue 3.6.
In regard to the impact of GT alfalfa on herbicide use, see the response to comment APHIS-2007-0044-6240-2 for issue 6.0.

Comment Excerpt Text:
One source that APHIS does cite repeatedly deserves examination. This is a white paper – not peer-reviewed, not published in any journal – called "The Importance of Pesticides and Other Pest Management Practices in U.S. Alfalfa Production," published for USDA's The National Agricultural Pesticide Impact Assessment Program (NAPIAP) in 1999. [Footnote 4: Hower, A.A., J.K. Harper and R. Gordon Harvey (1999). "The Importance of Pesticides and Other Pest Management Practices in U.S. Alfalfa Production," prepared for The National Agricultural Pesticide Impact Assessment Program, USDA, NAPIAP Document No. 2-CA-99.] While this white paper has certain useful information, it has several disadvantages that make it less reliable than USDA NASS data. First, the NAPIAP is based on data from 1988 to 1992, while USDA NASS surveyed pesticide use on alfalfa in 1998, so the latter data are more recent. Second, the NAPIAP white paper is not based on real pesticide usage data collected from alfalfa farmers themselves. Rather, it is based on responses to questionnaires mailed to unnamed "state specialists," who were asked to supply opinions about pesticide use and other weed control methods, problematic weeds and weed control costs in alfalfa farming for an "average year" in the period from 1988 to 1992 (the questionnaires were mailed out in December 1993). [Footnote 5: Ibid at 7.] Not only are state specialists less reliable sources of information about pesticide usage practices than the farmers who actually purchase and apply those pesticides, the fact that these specialists were asked to supply opinions on these matters for "an average year" over a period stretching back six years must have made real demands on their memory; and calls into question the accuracy and reliability of the extremely nuanced data supplied in the course of the paper's 65 tables. Finally, we are a bit suspicious of the objectivity of a study that insists, in its

very title, on the “importance” of pesticides in a crop in which farmers demonstrably find so little use for them. (Comment Number: APHIS-2007-0044-11037-3)

Response:
In regard to the impact of GT alfalfa on herbicide use, see the response to comment APHIS-2007-0044-6240-2-2 for issue 6.0. In regard to weed occurrence in non-GT alfalfa, see the response to comment APHIS-2007-0044-11037-10 for issue 7.2.

Comment Excerpt Text:
In contrast, companion cropping provides an economical and effective means to control weeds without the use of toxic chemicals, as described briefly above. First, as a perennial plant it covers the ground uninterruptedly for the life of the stand, leaving little or no open ground for weeds to get started. By contrast, annual crops that are harvested in the fall leave vast expanses of bare ground open where weeds can flourish the following spring; spring plowing brings buried weed seeds to the surface, exacerbating weed problems. [Footnote 34: Sullivan, P. (2003). “Principles of Sustainable Weed Management for Croplands,” Agronomy Systems Series, Appropriate Technology Transfer for Rural Areas, Sept. 2003. http://attra.ncat.org/attra-pub/PDF/weed.pdf.] In addition, alfalfa grows quite vigorously, in dense stands, outcompeting weeds for light, moisture and nutrients. Regular mowing ensures that any weeds present are continually cut before they can propagate.

Observers have long noted alfalfa’s ability to outcompete damaging weeds, such as Canadian thistle. [Footnote 35: Entz, M.H., P.D. Ominski, A. Schoofs, and N. Kenkel (1999). “Perennial and Annual Forage Crops for Weed Control,” University of Manitoba. http://www.umanitoba.ca/afs/Plant_Science/extension/ztill99.html.] In a study of field bindweed, Stahler remarks on alfalfa’s “inherent ability” to successfully compete with this injurious weed for sunlight and soil moisture. [Footnote 36: Stahler, L.M. (1948). “Shade and Soil Moisture as Factors in Competition Between Selected Crops and Field Bindweed, Convolvulus arvensis,” Journal of the American Society of Agronomy 40: 490-502.] Alfalfa is also recommended for use in crop rotations because of its ability to suppress damaging annual weeds like wild oats, green foxtail and wild mustard in subsequently grown cereal crops. [Footnote 37: Entz et al (1999), op. cit.]

Healthy alfalfa is only vulnerable to weeds in the early stages of growth – the first 30-60 days – because many weeds initially grow faster than alfalfa seedlings. The bulk of these weeds are taken together with the first mowing of alfalfa, which explains why weed biomass can comprise over 50% of the first harvest of untreated alfalfa. However, alfalfa’s vigorous growth leads rapidly to diminution of the weed community in its ranks, often by the end of the first year.

Even weedy alfalfa is usually perfectly acceptable as forage. In a study of the palatability and nutrient composition of 12 major alfalfa weeds included in the supporting materials, 6 were shown to be both palatable to livestock (sheep) and as nutritious as alfalfa.
In Appendix 5, CFS critiques APHIS’s assessment of the herbicide use impacts of past GT crops. (Comment Number: APHIS-2007-0044-11037-30)

Response: APHIS acknowledges the comment. As detailed in section IV.5 of the DEIS, weeds have many negative effects on alfalfa cultivation. In regard to weed occurrence in non-GT alfalfa, see the response to comment APHIS-2007-0044-11037-10 for issue 7.2. In regard to the presence of weeds affecting alfalfa feed quality, see the response to comment APHIS-2007-0044-11037-13 for issue 7.2.

Comment Excerpt Text:
Additional herbicides will rapidly become necessary to combat glyphosate-resistant weeds like kochia. Kansas State University recently confirmed glyphosate resistance in five populations of this damaging weed in corn and soybean fields of far western Kansas, with other populations suspected of resistance. [Footnote 1: Kansas State (2010). "Glyphosate-Resistant Kochia Confirmed in Kansas," Kansas State University press release, Feb. 26, 2010. http://www.ksre.ksu.edu/news/story/Kochia_confirmed022610.aspx, last visited 2/28/10.] This latest addition to the ranks of glyphosate-resistant weeds in the U.S. – the 10th species and 53rd "biotype" – is very disturbing for several reasons.

Kochia is an invasive, drought-resistant weed that has swept across the country since its introduction from Eurasia in the early 20th century. It is present in almost every state, but is a particularly problematic weed in small grain crops like wheat, as well as alfalfa and sugar beets, in the Northern Plains, Intermountain and Western states. No other GR weed population has yet emerged in these areas or crops. Kochia has been designated a class B noxious weed in Washington and Oregon states, and is banned as "potentially invasive" in Connecticut.

Kochia (without glyphosate resistance) is regarded as the 5th worst summer annual weed in established alfalfa stands, and the 6th and 7th worst in spring- and fall-seeded alfalfa stands, respectively. [Footnote 2: Hower, A.A., J.K. Harper and R. Gordon Harvey (1999). "The Importance of Pesticides and Other Pest Management Practices in U.S. Alfalfa Production," prepared for The National Agricultural Pesticide Impact Assessment Program, USDA, NAPIAP Document No. 2-CA-99, Tables 29-31.] Kochia is also "extremely troublesome" in sugar beets. [Footnote 3: Weatherspoon, D.M. & E.E. Schweizer (1969). "Competition between kochia and sugarbeet," Weed Science 17(4): 464-467.] GR populations of this weed could emerge in alfalfa and/or sugar beets in one or both of two ways.

Pre-existing GR kochia populations, such as those in western Kansas, could rapidly spread long distances to infest neighboring areas and states. This is because mature, seed-bearing kochia plants dry out, and are snapped off at the soil surface by wind action to disperse their seeds over very long distances as "tumbleweeds" during windstorms. [Footnote 4: Menalled, F.D. & R.G. Smith (2007). "Competitiveness of herbicide-resistant and herbicide-susceptible kochia (Kochia scoparia [L.] Schrad.) under contrasting management practices," Weed Biology and Management 7: 115-119.] Since each mature kochia plant can produce tens of thousands of seeds (by one account, up to 50,000 seeds), [Footnote 5: Whatcom Weeds (undated). Kochia. http://www.co.whatcom.wa.us/publicworks/pdf/weeds/kochia2.pdf, last visited 2/28/10.] GR kochia could spread rapidly and widely from western Kansas and other epicenters where they have evolved. [Footnote 6: Interestingly, the recent report by Kansas State University and Monsanto of GR kochia referred to above is dated 2007 (see item 11 at

http://www.weedscience.org/Summary/UspeciesMOA.asp?lstMOAID=12). The researchers apparently first discovered the putative GR kochia populations in 2007, but have not been able to confirm resistance (which requires growth over several generations to confirm heritability, a key criterion of true herbicide resistance) until late February 2010. This lag time (unusually long in this case) makes it more likely that other populations of GR kochia have already evolved, in Kansas or elsewhere, but have simply not been discovered or reported yet.]

GR kochia that in this way infests RR alfalfa, RR sugar beets or other RR crops would thus force these growers to utilize other more toxic herbicides rather just glyphosate, thus undermining the facile assumption upon which so much of APHIS's flawed EIS is based. GR kochia could also infest conventional cropland, such as wheat and alfalfa, and eliminate glyphosate, or greatly reduce its efficacy, for growers of these conventional crops. Glyphosate is much relied upon by growers of wheat, our third most widely grown crop., so its loss due to GR weeds would constrain wheat farmers to turn to more toxic herbicides. This, in turn, would increase the potential for more harmful pesticide residues in wheat-based foods.

New GR kochia populations could arise through independent evolution of GR biotypes. In this scenario, high selection pressure from frequent application of glyphosate is the key factor. Introduction of the RR alfalfa system would increase the already substantial selection pressure for GR weed evolution that is presently being exerted by existing RR crop systems, and which has already generated the western Kansas GR kochia populations.

Thus, RR alfalfa and RR sugar beet systems could play two distinct roles. In one scenario, they are the "victim" of GR weeds generated by other RR crop systems that develop independently of, but spread to infest, them. In a second scenario, they contribute substantially to the already high selection pressure exerted by current RR crop systems – selection pressure that has generated 53 GR weed populations infesting up to 11.4 million acres in the U.S. These newly evolved GR kochia populations would then become epicenters for infestation of other crops, whether RR or not, and areas.
Kochia is listed as a class B noxious or designated weed in Washington and Oregon, and is banned as potentially invasive in Connecticut. [Footnote 7: http://plants.usda.gov/java/profile?symbol=BASC5#synonym, last visited 2/28/10.] Whatcom County and King County, both in Washington State, urge residents to report any kochia they see, and King County weed experts state that kochia is economically damaging to alfalfa, among other crops.

Even before this glyphosate-resistant population, weed experts had rated kochia as one of the world's worst herbicide-resistant weeds, [Footnote 8: WSSA-HRAC (undated). "Most Important Herbicide-Resistant Species," Weed Science Society of America-Herbicide Resistance Action Committee, http://www.weedscience.org/WorstWeeds.GIF. WSSA is an organization of academic weed scientists, HRAC is a pesticide industry group. WSSA-HRAC maintain the www.weedscience.com website with information on herbicide-resistant weeds.] because 33 populations had been reported with resistance to one or two of three different herbicide families on a total of more than 1 million acres. [Footnote 9: http://www.weedscience.org/Case/Case.asp?ResistID=5470, last visited 2/28/10.] Many of these populations infest wheat in Montana and the Northern Plains states, and are already difficult to

control. Glyphosate use in wheat is substantial, and has grown over the past few decades, though at 9.8 million lbs. (2006) it pales in comparison to the amount of glyphosate applied to Roundup Ready soybeans and corn (Monsanto has developed RR wheat, but it has not been introduced yet due to widespread opposition from wheat traders, growers and consumers). GR kochia, and even more so kochia with resistance to glyphosate and one, two, or three other herbicide classes, would impose substantial weed control burdens and costs on wheat growers – wheat growers who played essentially no role in the genesis of GR kochia, which is attributable to RR soybean and corn systems. Appendix 3 shows an increasing number of GR weed biotypes that are also resistant to other herbicides. (Comment Number: APHIS-2007-0044-11037-31)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, and avoidance and management of glyphosate resistant weeds, see the response for comment APHIS-2007-0044-9936-19 for issue 3.6.
APHIS acknowledges that glyphosate use can result in the evolution of glyphosate resistant weeds. However, glyphosate resistant weeds are most likely to become prevalent under conditions that consistently exert the same selection pressures favoring glyphosate resistance. Several techniques are available to effectively rotate the selection pressures on weeds. These approaches can minimize shifts to glyphosate resistant weeds as well as reduce the emergence of new glyphosate resistant weeds. For example, as discussed in section III.E.3 of the DEIS, alfalfa can be rotated to grass crops (corn and cereal crops) or broadleaf crops. In addition, as mentioned in section 4.2 of appendix G of the DEIS, Van Deynze et al. (2004) recommend that the best way to prevent weed shifts is to avoid using the same herbicide year after year, rotate herbicides and crops, and include nonherbicide strategies to control weeds. Further information regarding glyphosate resistant Kochia has been included in appendix G of the FEIS.
In regard to the impact of GT alfalfa on herbicide use, see the response to comment APHIS-2007-0044-6240-2 for issue 6.0.

Comment Excerpt Text:
USDA NASS Agricultural Chemical Usage reports are not based on opinions of specialists, who in our experience are often biased to favor more input-intensive practices, but rather on detailed surveys of individual farmers chosen so as to form a statistically representative picture of the pesticide usage practices of farmers in their state or region. The surveys are conducted by trained enumerators, and the results are carefully assessed as to their reliability. In 1998, USDA NASS collected 755 usable reports of pesticide usage from alfalfa hay farmers in 48 states across the country (p. 6), with appropriate weighting of numbers surveyed from each region according to its relative importance in alfalfa production: Western region (274); North Central region (317); Northeast (62); and South (102). The survey procedure and reliability assessment are explained on pages 125-26. The major result was that just 7% of alfalfa hay acres were treated with herbicides:

"Alfalfa Hay: Growers applied herbicides to 7 percent of their acres across the United States." (p. 3)

In contrast, according to the opinions of the unnamed state specialists consulted by questionnaire by Hower et al (1999): "an average of only 16.6% of the alfalfa hay acreage was treated with

herbicides…"[Footnote 6: Hower et al, op. cit., p. 59.] – over twice as much as the 7% determined by NASS. APHIS mistakenly cites Hower et al (1999) as stating that 22% of alfalfa hay acreage was treated with herbicides[Footnote 7: EIS at 67-68. APHIS wrongly cites Hower et al as stating that "16.6% of total fields; 22 percent of acreage" of hay fields were treated with herbicides. Hower et al (1999) say nothing about "total field," but rather refer explicitly to 16.6% of hay acreage as being treated with herbicides, as quoted above.] – thus arriving at a figure more than three times as high as the NASS figure. This is by no means an insignificant error (or misrepresentation) on APHIS's part. It makes herbicide use appear to be more than three times more prevalent than it actually is, which as we will see fits a pattern of pervasive bias throughout the EIS. APHIS's intent is to make alfalfa seem to be a much more herbicide-intensive crop than it really is, in order to make it seem that the huge increase in glyphosate use with RR alfalfa would be offset by significant decreases in the use of other herbicides. As we shall see, this is not the case.

APHIS also refers to Wilke (1998) [Footnote 8: EIS at 61 and N-18.] as the source of the latest available estimate for the percentage of alfalfa hay acres treated with herbicides – 17% -- which is incorrect. Wilke (1998) quotes one of the co-authors of the Howe et al (1999) study we referred to above, R. Gordon Harvey, who is referring to the 16.6% figure found in that study for the "average year" between 1988 ad 1992. As we noted above, USDA NASS's 1998 figure of 7% of hay acreage treated with herbicides is 6-10 years more recent, as well as being more accurate and reliable. (Comment Number: APHIS-2007-0044-11037-4)

Response: In regard to the impact of GT alfalfa on herbicide use, see the response to comment APHIS-2007-0044-6240-2 for issue 6.0.

Comment Excerpt Text:
The EPA estimates that 200,000 lbs. a.e. glyphosate are applied to alfalfa nationwide. [Footnote 1: EPA (2008), op. cit. a.e. = acid equivalents, which represents the weight of glyphosate acid itself, excluding the weight of the salt that commercial formulations of glyphosate normally come with.] Two recent studies on glyphosate use and weed control with RR alfalfa funded in part by Monsanto are used below to estimate the likely increase in glyphosate use with introduction and varying degrees of adoption of RR alfalfa. These studies are included in the supporting material; McCordick et al (2008) is cited in the EIS.

McCordick et al (2008) conducted field studies in Michigan in 2004 and 2005 to compare the effects of different establishment and weed control methods on glyphosate-tolerant alfalfa production. Four glyphosate treatments of 0.8 kg a.e./hectare (= 0.71 lbs./acre) were applied over the course of the season, once roughly 5 weeks after seeding, then 7-10 days after each of three harvests. The total glyphosate applied for the season was thus 3.2 kg a.e./ha (= 2.86 lbs./acre). [Footnote 2: 1 kg = 2.2046 lbs.; 1 hectare = 2.4711 acres. Multiplication of the kg/ha figures by 0.8922 gives lbs./acre.] In the second study, Wilson and Burgener (2009) tested RR alfalfa for three years from 2005 to 2007 in Nebraska, using a number of different glyphosate application regimes involving one or two applications of 0.75, 1.12 or 1.50 lbs. a.e./acre glyphosate at different alfalfa growth stages. Seasonal application rates of glyphosate thus ranged from (1 x 0.75) to (2 x 1.50) = 0.75 to 3.0 lbs. a.e./acre/year. In both studies, glyphosate was compared to

other weed control regimes (discussed further below). Finally, the theoretical, legally permissible, upper limit of glyphosate use on RR alfalfa (based on the current maximum label rate) is also modeled.

Below, we discuss nationwide use of glyphosate use with several of the RR alfalfa system glyphosate regimens noted above, under each of three different adoption scenarios: 20%, 50% or 80% of total alfalfa acreage = Roundup Ready alfalfa. The figure we use for total alfalfa acreage (22.25 million acres) was derived by averaging the acreage of alfalfa harvested over the past decade (2000 to 2009), as reported by USDA NASS.

Glyphosate use varies quite widely under the different scenarios. At the low end, a single application per year of roughly half the maximum, single application label rate would mean 3.3, 8.3 or 13.3 million lbs. of glyphosate applied to RR alfalfa at 20%, 50% or 80% adoption rates, respectively. Relative to current annual nationwide use of glyphosate on alfalfa of 200,000 lbs. a.e. (= 0.2 million lbs), these scenarios yield 16-fold, 41-fold or 66-fold increases in glyphosate use, respectively.

At the high end, the maximal seasonal rate applied by Wilson and Burgener (2009) of 3.0 lbs. a.e./acre/year (2 application of 1.5 lbs./acre) would mean 13.3 million, 33.4 million or 53.4 million lbs. glyphosate a.e. applied at 20%, 50% or 80% RR alfalfa adoption, respectively. In this scenario, glyphosate use would increase by 66 times over current levels with just 20% of alfalfa acreage converted to the Roundup Ready alfalfa system. Glyphosate use would increase 167-fold or 267-fold over current levels in the 50% or 80% adoption scenarios.

Finally, given the current maximum label rates for use of glyphosate on RR alfalfa, it would be legally permissible to apply 26.5, 66.3 or 106.1 million lbs. a.e. of glyphosate to RR alfalfa, if adopted at the 20%, 50% or 80% level, respectively – yielding 130 to 530 times as much glyphosate as is currently applied to alfalfa. It is unlikely that this much glyphosate would ever be applied to Roundup Ready alfalfa, however; we report these figures merely to delineate the theoretical, legally permissible limits to glyphosate use in the Roundup Ready alfalfa system. [Footnote 3: With conventional alfalfa, the maximal single application rate of 1.55 lbs. a.e./acre is also the seasonal maximum, since only one application per year is permitted (at least for alfalfa that will be grazed or fed as forage). See Monsanto UltraMAX II label (2004), p. 11.]

In general, the amount of glyphosate applied with use of the RR alfalfa system will increase over time, with evolution of glyphosate-resistant weeds and weed shifts to more glyphosate-tolerant species. (Comment Number: APHIS-2007-0044-11037-5)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6.
In regard to the impact of GT alfalfa on herbicide use, see the response to comment APHIS-2007-0044-6240-2 for issue 6.00.

Comment Excerpt Text:
To what extent would the 16- to several hundred-fold increase in glyphosate use with the RR alfalfa system displace use of other “more toxic,” “more environmentally harmful,” herbicides,

as APHIS claims ad nauseum, without any serious quantitative analysis, throughout the EIS? The NASS and EPA alfalfa pesticide usage data that APHIS somehow neglected to consult provide the answer. Overall herbicide use on alfalfa in 1998 was 1.468 million lbs.; [Footnote 4: USDA NASS (1999), op. cit., p. 9. See figure in row "U.S." and column "1,000 Lbs" under "Herbicide."] if one subtracts the 0.2 million lbs. of glyphosate, that leaves roughly 1.3 million lbs. of non-glyphosate herbicides applied to alfalfa. Even the low-end scenario of glyphosate use with RR alfalfa was 3.3 million lbs., with more likely scenarios roughly ten times higher (see below). The idea of replacing just over a million lbs. of non-glyphosate herbicides with 10 to 20 to 30 million or more lbs. of glyphosate-based formulations makes sense only to those who understand nothing about this pesticide's toxicity, its numerous harmful effects on the interests of agriculture, human health and the environment.

The scenarios above give a very wide range of possible glyphosate use with the RR alfalfa system. How much glyphosate would actually be used? No definitive answer is possible, yet it was clearly incumbent on APHIS to carefully analyze this matter rather than merely throwing out a casual upper-bound estimate. (Comment Number: APHIS-2007-0044-11037-6)

Response: APHIS acknowledges the comment. Using an estimate of the difference in total herbicide use change measured as pounds, however, is not an accurate comparison regarding the potential toxicity of herbicides as toxicity and weight are not proportional. In regard to the impact of GT alfalfa on herbicide use, see the response to comment APHIS-2007-0044-6240-2 for issue 6.0.

Comment Excerpt Text:
An important factor that must be considered is that one substantial application of glyphosate is "built-in" to the RR alfalfa system – that is, necessary even in the event that a farmer doesn't have weed problems and otherwise wouldn't apply Roundup. According to the Monsanto label for several Roundup products:

"….up to 10% of the [RR alfalfa] seedlings may not contain a Roundup Ready gene and will not survive the first application of this product. To eliminate the undesirable effects of stand gaps created by this loss of plants, a single application of at least 22 fluid ounces per acre of this product should be applied at or before the 4-trifoliate growth stage." [Footnote 5: Roundup WeatherMAX label (2007), Section 12.1, Roundup Ready Alfalfa, p. 14. Virtually identical wording is found in the Honcho label (2007), Section 12.1, Roundup Ready alfalfa, p. 14.]

The recommended application rate for this purpose is 22 to 44 fluid ounces of Roundup WeatherMax, or 1 to 2 quarts of Honcho, both equivalent to a dose of 0.75 to 1.5 lbs. glyphosate a.e./acre. Thus, a farmer who wishes to avoid stand gaps in his/her RR alfalfa (which provide opportunities for weeds to invade the alfalfa stand, defeating the weed control purpose of the RR system) must make a quite early application of Roundup whether weeds are present or not. Reference to the scenarios in Table 1 shows that this "built-in" application by itself ensures that the RR alfalfa system will require from 3.3 to 13.3 million lbs. (if 0.75 lbs./acre are used) or from 6.6 to 26.6 million lbs. (if 1.5 lbs./acre) are used, depending on the RR alfalfa adoption rate.

For some growers, this application of glyphosate that is required to remedy defects in the RR alfalfa technology will do double duty for adequate, season-long weed control, at least in the short term. However, most growers will make at least one and in some cases several additional applications of glyphosate. This is because, generally speaking, somewhat later applications when the alfalfa seedlings are bigger provide more effective weed control than early treatments. Of the treatments tested by Wilson & Burgener (2009), the one that provided the best weed control was two applications of glyphosate (2 x 1.5 lbs. a.e./acre), one each at the four- and 16-trifoliate alfalfa growth stages. The second best treatment involved two treatments (2 x 1.12 lbs. a.e./acre) at the two- and eight-trifoliate stages. [Footnote 6: Wilson & Burgener (2009), Table 2. Note that the corresponding treatments in the paper, in kg/ha, are 2 x 1.25 and 2 x 1.68. We have converted units to lbs./acre, as in Table 1 of these comments.] Improved weed control with a second, later application is attributable to "catching" more weeds that have had the time to sprout since the earlier treatment. [Footnote 7: Many growers of other RR crops attempt to make do with one late or very late application of glyphosate, to both "catch" more weeds and economize. This popular practice greatly enhances the risk of glyphosate-resistant weed evolution.] The common use of a second application of glyphosate by RR alfalfa growers would correspond to the scenarios in Table 1 that project from 10 to over 50 million lbs. of glyphosate, depending on the adoption rate. Once again, this substantial amount of glyphosate could displace no more than just over 1 million lbs. of non-glyphosate herbicides. (Comment Number: APHIS-2007-0044-11037-7)

Response: In regard to the impact of GT alfalfa on herbicide use, see the response to comment APHIS-2007-0044-6240-2 for issue 6.0.

Comment Excerpt Text:
Up to this point, the analysis has been based on two key assumptions: 1) That glyphosate at the recommended rates provides effective weed control; and 2) That the RR alfalfa system does not require supplementation with non-glyphosate herbicides. In the short term, these assumptions are probably justified. However, they quickly lose credibility when one considers medium to longer-term prospects.

In the medium to longer-term time frame, as little as 3-10 years, RR alfalfa growers will find that they need to apply two to three times as much glyphosate per acre per year as they did initially, and resort to other herbicides as well, in response to growing glyphosate-resistance in weed populations. This has been the experience of RR soybean and RR cotton growers. [Footnote 8: Benbrook, C. (2009). "Impacts of Genetically Engineered Crops on Pesticide Use: The First Thirteen Years," The Organic Center, Nov. 2009.], as discussed further in _____, and it is remarkable that APHIS completely ignores this experience, and assumes, completely without argument, that only glyphosate will be used for weed control in established stands of RR alfalfa. [Footnote 9: APHIS does concede the need for non-glyphosate herbicides for "stand removal," which we address elsewhere. However, CFS found no mention, much less analysis, of the use of non-glyphosate herbicides in established RR alfalfa stands.] (Comment Number: APHIS-2007-0044-11037-8)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate use, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6.

In regard to the impact of GT alfalfa on herbicide use, see the response to comment APHIS-2007-0044-6240-2 for issue 6.0. The discussion on weed management has been updated in appendix G of the FEIS.

Comment Excerpt Text:
Glyphosate-resistant alfalfa varieties could provide farmers with another viable option to manage weed species that reduce the quality and longevity of alfalfa stands. The draft EIS for glyphosate-resistant alfalfa provides several comments related to the probability for glyphosate-resistant weeds to be selected in this particular system. The following comments are provided for consideration.
The rapid and widespread adoption of glyphosate-resistant soybean varieties across most of the Midwest during the past decade was accompanied by a concomitant decrease in utilization of other weed management tools and practices. Weed scientists across much of the United States have devoted great effort toward educational programs describing how selection for herbicide-resistant weeds occurs and steps that farmers can implement to reduce the intensity of selection. Yet despite these efforts, intense selection for glyphosate-resistant biotypes occurred across millions of acres for several years, and ultimately glyphosate-resistant biotypes of several summer annual weed species were discovered. The effectiveness of glyphosate-only weed control programs in Midwestern corn and soybean production will continue to diminish into the foreseeable future. It appears that farmers in many areas of the Midwest are now implementing a more integrated weed management program across more acres than occurred a short decade ago. While I agree that selection for glyphosate-resistant weed biotypes in glyphosate-resistant alfalfa production systems is less likely than in glyphosate-resistant corn or soybean production systems, the probability of selection is not zero. Perhaps the challenges of glyphosate-resistant weeds in alfalfa could be lessened by developing education and stewardship programs for alfalfa producers early in the commercial life of glyphosate-resistant alfalfa varieties. Many of the lessons learned in selection of glyphosate-resistant weeds in other cropping systems could form the foundation of educational programs targeted to those involved in the production and protection of glyphosate-resistant alfalfa so as to preserve the effectiveness of this technology and perhaps greatly reduce the intensity of selection of glyphosate-resistant weeds. Many key concepts germane to these types of educational programs have already been developed at many land-grant universities and could easily be modified to alfalfa production systems. It seems likely that the organizations involved in developing this technology would support these programs so as to lengthen the effective lifespan of their commercialized technology. (Comment Number: APHIS-2007-0044-5220-1)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment.

In regard to avoiding shifts to glyphosate resistant weeds and management of glyphosate resistant weeds, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6.

In regard to education and stewardship programs for alfalfa producers to reduce the prevalence of glyphosate resistant weed shift/emergence see appendix V of the FEIS.

7.3 Issue 7.3 – Crop Rotation in Alfalfa

Comment Excerpt Text:
GE alfalfa would compromise organic soil management
There is no replacement crop for the unique perennial alfalfa. If organic farmers are forced to abandon alfalfa as a crop due to GE contamination, with no equivalent perennial crop that has the
soil building characteristics of alfalfa, the environmental benefits of alfalfa will be lost. Alfalfa is used in organic systems not only as a commercial crop (hay for feed, seed, and sprouting seed for human consumption) but is also used to build soil quality. Its ability to fix atmospheric nitrogen allows organic farmers to build soil fertility without animal manure and to build soil fertility in accordance with organic standards that prohibit the use of purchased petrochemical-derived fertilizers. Because alfalfa has deep, fibrous roots it improves soil texture by adding organic matter, an important carbon sink. Alfalfa is often used to protect or improve soils on marginal lands and highly erode-able land. Alfalfa can be used to make heavy clay soils more porous, and to make light sandy soils better able to retain moisture. It has a role in making soils more resilient in the face of both drought and flooding, increasing concerns as the climate changes. (Comment Number: APHIS-2007-0044-10263-10)

Response: In regard to gene flow due to alternative use of crop products, see the response to comment APHIS-2007-0044-6769-5 for issue 3.4.

Comment Excerpt Text:
My other concern is that long lasting materials that I currently have avialable prevents me from rotating my crops because of plantback restrictions that I wont have problems with the use of Glyphosate. (Comment Number: APHIS-2007-0044-1238-1)

Response: APHIS acknowledges the comment. In regard to stand removal practices for GT alfalfa, see the response to comment APHIS-2007-0044-11037-28 for issue 7.1.

7.4 Issue 7.4 – Regional Differences in Production Practices

Comment Excerpt Text:
Northern Colorado raises a significant amount of alfalfa, and many farms devoted to that production do use pesticides. GM alfalfa will require a greater pesticide use, and I am strongly opposed to the spread of such toxicity. GM contimanination has also already affected many small organic farms in this area of my state.
I am outraged to read that the USDA does not believe the public consumer cares about GM contamination. We consumers do care.
Furthermore, I buy alfalfa as a horse feed. And I would rather pay a higher price for regular alfalfa than for GM alfalfa even if it costs less! (Comment Number: APHIS-2007-0044-1578-3)

Response: In regard to increases in pesticide use, see the response to comment APHIS-2007-0044-0402-1 for issue 6.3. In regard to impacts on organic farming, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the comment on consumer demand for products free of genetically engineered material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
I was particularly disappointed to see that USDA did not recognize that there are regional and geographic specific risk differences in the release of RR alfalfa. Even in my very own community, there are different types of soils, terrain and thus varied farming practices to best meet the needs the environment dictates. (Comment Number: APHIS-2007-0044-1840-3)

Response: Different regions of the United States are better suited and utilized for alfalfa seed versus hay production. Regional differences are discussed in sections III and III.E.1.b of the FEIS.

Comment Excerpt Text:
Differentiation between Seed and Forage Production Methods and Markets:
While APHIS states that "in a regional analysis of production practices of alfalfa, no significant differences were detected at a regional level" (p 15) - please clarify and acknowledge that APHIS has understood the differences that you found in specialization between seed-producing areas and non-seed producing areas, and the differences between export areas (which are sensitive to GT alfalfa) and non-export areas. These are very real differences. When considering these issues, it is important to differentiate between alfalfa hay production, which occupies about 21 million acres and seed production which is less than 1% of this amount, and specifically located in a handful of western states. Organic hay production is also less than 1% of production, and less regionally specific. Export hay is more than double this percentage, and generally concentrated in selected western states. The seed- and hay-producing sectors are two very different systems with different biological and market risks, and must be evaluated differently from one another. The authors should make sure that the EIS correctly attributes clarifies the risks of each system. (Comment Number: APHIS-2007-0044-4913-4)

Response: APHIS acknowledges the comment. In considering additional alternatives, the unclear portion of the DEIS (p. 15) has been replaced. For a clear discussion of the regional differences associated with hay or seed production for alfalfa see section III.E of the FEIS.

Comment Excerpt Text:
I was particularly disappointed to see that USDA did not recognize that there are regional and geographic specific risk differences in the release of RR alfalfa. Even in my very own community, there are different types of soils, terrain and thus varied farming practices to best meet the needs the environment dictates. (Comment Number: APHIS-2007-0044-6811-4)

Response: Regional differences are discussed in section III.E.5 of the DEIS. Different regions of the United States are better suited and utilized for alfalfa seed versus hay production. See the response to comment APHIS-2007-0044-11741-4 for issue 1.0.

Comment Excerpt Text:
In sum, there is ample support demonstrating that the full deregulation of RRA will not eliminate non-GE alfalfa. Growers will continue to have a choice regarding what type of alfalfa they wish to plant, as is the case in other thriving crop markets, such as corn and soybean, in which organic and GE have coexisted, and thrived, for years. See, e.g., Comment Appendix 2 at 14-16 (discussing crops that have deregulated GE varieties but for which organic markets continue to exist). Tellingly, data suggest that the states with the greatest concentration of organic soybean and corn crops, for instance, often have above-average penetration of biotechnology-derived crops. For example, the leading organic corn-growing states are Iowa, Minnesota, and Wisconsin. Of these, Iowa and Minnesota have above-average penetration of biotechnology-derived crop plantings (32 percent and 36 percent, respectively, of total corn plantings relative to the U.S. average of 26 percent in 2001). Id. at 17. This level of coexistence has continued over time. In 2008, Iowa, Minnesota and Wisconsin again farmed the highest acreages of organic field corn. [Footnote 10: See USDA, 2008 Organic Survey, Table 7: Organic Field Crops Harvested from Certified and Exempt Organic Farms, available at http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/Organics/organics_1_07.pdf.] Also in 2008, 84 percent of Iowa's corn and 88 percent of Minnesota's corn was biotechnology-derived, while the national average penetration of biotechnology-derived corn planting had risen to 80 percent. [Footnote 11: See USDA National Agricultural Statistics Survey, Acreage, available at http://usda.mannlib.cornell.edu/usda/current/Acre/Acre-06-30-2009.pdf] See also Comment Appendix 1, Section B (discussing continued availability of non-GE alfalfa seed). (Comment Number: APHIS-2007-0044-7620-10)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment.

Comment Excerpt Text:
Additionally, the idea that "harvesting before the ripe seed stage is possible in all but the most extreme circumstances," is disingenuous. The EIS contends that alfalfa is "typically" harvested before 10% of flower. While it is true that the prime protein level of alfalfa hay is at 10% blossom, weather conditions, haying practices and erosion controls allow that a significant number of blossoms to come to full bloom. In many areas across our region, climate does not allow for multiple harvests of alfalfa hay and full growth is often necessary for sustaining an alfalfa stand. This "typical" scenario has one more major flaw for farmers who grow alfalfa for seed. In order to combine alfalfa seed, the plant must go to full bloom. Therefore, this analysis of cutting alfalfa at 10% blossom is atypical at best.

The EIS did not examine whether, how, and at what cost to farmers Roundup Ready alfalfa can be kept separate from conventional, organic, and other alfalfas and hays containing alfalfa. USDA cannot assume that there is a "typical" scenario in alfalfa production and that any one-size-fits-all model can be used to control GM contamination. In North Dakota, for example, there

are a number of different methods and purposes for growing and utilizing alfalfa. It is clear that preventing contamination under any of these situations cannot be achieved through the faulty assumptions given in this EIS. (Comment Number: APHIS-2007-0044-9882-5)
Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. In regard to timing of alfalfa forage harvest, see the response to comment APHIS-2007-0044-10263-7 for issue 3.1.

Comment Excerpt Text:
Following are four different scenarios from the state of North Dakota. Each farmer raises alfalfa for different reasons and under very different conditions, demonstrating that the one-size-fits all approach to avoiding contamination is impossible in one state, let alone the whole nation.

DeJon Bakken, a rancher from Adams County, utilizes his alfalfa crop as hay for his own herd and grazing. He begins haying the alfalfa as close to 10% bloom as possible, however, by the time the entire crop is hayed, much of it is much past the ideal protein and bloom levels. In the southwest corner of North Dakota it is rare to get a second cutting of hay, so Bakken leaves the growth to use as range grazing. In this scenario, the regrowth is at 100% bloom before he is able to move the bales off the pasture, utilize his prairie grass and move the cattle to graze the alfalfa. This practice not only leaves late summer and fall grazing for livestock, but also adds cover to the field to help in catching snow for spring moisture and cover for wildlife throughout the winter.

Duane Boehm is an organic farmer in Stark County, who farms only 60 miles north of Bakken, but has a very different operation. He markets organic crops and uses alfalfa as part of his crop rotation. Boehm is surrounded by an interstate highway, railroad and miles of county road as well as private farm and ranch land. Boehm recognizes that he has no control over seed that is spread through these transportation systems. In addition, Boehm combines his own alfalfa seed which requires the field to grow to full maturity. In an organic system, if genetic material finds its way on to his farm knowingly or unknowingly he will loose his certification. GM contamination of his alfalfa would be a major financial hit to Boehm's family and the consumers he has worked with for over 20 years. To add insult to injury, Boehm recognizes that GM alfalfa is already in his area and knows of eight locations within 20 miles of his farm where Roundup Ready Alfalfa was grown.

Blaine Schmaltz a farmer from Rugby in Central North Dakota has already seen the ramifications GM alfalfa has on his organic market. As a Certified Organic seed supplier of alfalfa and alfalfa hay, he supplies feed to Certified Organic dairies and supplies organic sprouting seed to foreign markets. Schmaltz has already been affected financially by the initial release of Roundup Ready alfalfa. He had a large order of alfalfa sprouting seed for overseas shipment cancelled in the spring of 2006 over fear of contamination of the sprouts. Since that time, Schmaltz has not been able to secure that customer's confidence since GM alfalfa was released in the United States. Under certified organic rotation requirements most alfalfa seed stands have to be replaced every 3 to 4 years. Schmaltz will have to test and attempt to find GM free seed stocks. This will prove to be very costly for both the farmer and the seed company. The lack of natural barriers to control seed pollination contamination will result in the loss of seed

availability, which, in turn results in loss of seed companies and consolidation, creating an economic loss to the entire food system.

Todd Leake, a conventional farmer from Emerado in northeast North Dakota, grows his alfalfa primarily as a soil nutrient and organic matter builder in his rotation. In this region of the state, alfalfa is planted on the field margins for conditioning in salt affected soils to add organic matter and nitrogen, some of it is hayed and some of it is not hayed. This is a common method of dealing with salt affected soils.

In his operation, Leake commonly hays two cuttings of alfalfa each year and leaves the third cutting to go to full bloom. Because alfalfa is used in a crop rotation, conventional farmers then spray the alfalfa field to "burn down" the existing plants and grow a new crop the next year. If alfalfa is contaminated with Roundup Ready traits, Leake will have to use a less effective broadleaf contact herbicide such as MCPA-Ester or Amine formulation, or 2,4-D Ester or Amine formulation. Contact herbicides are much less effective than glyphosates against mature alfalfa for stand removal and certainly cultivation is not adequate for Leake's conventional operation. (Comment Number: APHIS-2007-0044-9882-6)

Response: The general points from these anecdotal stories have been captured in appendices Q and V in the FEIS.

Comment Excerpt Text:
Lastly, there are several states – including all of the Pacific Northwest states where alfalfa seed production centers – that have "grower district" statutes that enable growers to voluntarily manage economic impacts on their own terms, to good effect. For example, Washington and Idaho address commingling of other related plants in the genus brassica (canola for food oil uses and rapeseed for industrial oil uses). Wash. Admin. Code § 16-570-010; Idaho Admin. Code r. 02.06.13.050.
In the corn belt, Missouri has the Grower District Authorization Act, Chapter 261, R.S. MO available at http://www.senate.mo.gov/04info/pdf-bill/intro/sb886.pdf. To USSEC's knowledge, the Missouri Grower District Authorization Act (effective date, August 28, 2004) has not been used to date; it nevertheless demonstrates the power of states across the US to manage economic impacts without federal intervention. (Comment Number: APHIS-2007-0044-9968-14)

Response: APHIS acknowledges the comment. Differences in state laws and the ability for states to regulate the economic impacts of specific types of farming are outside the scope of this EIS. In regard to geographical restrictions, see the response to comment APHIS-2007-0044-11741-4 for issue 1.0.

7.5 Issue 7.5 – Seed Production Practices

Comment Excerpt Text:
The second consideration relates to the highly concentrated nature of the seed market. Experience in corn, soybeans and cotton demonstrates that farmers have ever fewer choices of high-quality conventional seed, as the biotechnology-pesticide companies buy up independent

seed firms, preferentially offer higher-priced GM seed, and rapidly eliminate more affordable conventional varieties from their seed catalogs, and exert pressure on their licensees to do the same. This dynamic is exacerbated by the decline in public sector (land-grant university) breeding programs, which were once a major source of affordable seed to American farmers. As a result, farmers are often unable to find high-quality conventional seeds, and are constrained to purchase GM seeds with traits, such as the Roundup Ready trait, that they do not want. Once a farmer has purchased Roundup Ready seeds, the significant premium (double the price of conventional seed in the case of alfalfa) incentivizes use of the trait through application of Roundup. (Comment Number: APHIS-2007-0044-11037-15)

Response: In regard to agricultural approaches supported by APHIS, see the response to comment APHIS-2007-0044-11753-1 for issue 2.0. In regard to replacement of seed choices, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0.

Comment Excerpt Text:
I am against the approval of Glyphosate-Tolerant Alfalfa. This is because I am an Organic Farmer and do produce and save our own seed at times. Pollen being carried by bees is a problem with alfalfa that I can not guard against and I don't see that the seed companies would be able to either. Also alfalfa is a hard seed that if conventional farmers happen to plow down GM alfafa seed, it could be plowed back up in their rotation to be a weed and go to seed or to cause not planned contamination. Alfalfa is an easy crop to seed for farmers with management abilities, so what is the need to risk our seed stock contamination with a GM alfalfa? There is a lot more at risk than there is to gain. (Comment Number: APHIS-2007-0044-6556-1)

Response: In regard to the low-level presence of non-GE or organic alfalfa with GT-alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for issue 3.1. In regard to hard seed in alfalfa, see the response to comment APHIS-2007-0044-10157-4 for issue 3.2.

8.0 Issue 8 – Physical Environment

Comment Excerpt Text:
? Glyphosate resistant alfalfa protects the environment and reduces the amount and toxicity of pesticides used. I have spent 20 years of my life conducting and evaluating agricultural research in the public sector. There is no convincing research to support any threat to human health or the environment with the labeling of glyphosate resistant alfalfa. In fact a much more compelling case can be made for reductions in environmental quality and increased risks to and human health if glyphosate resistant alfalfa is not allowed in the market place.
IMPROVED ENVIRONMENTAL QUALITY
? Improved environmental characteristics of alfalfa and/or glyphosate compared with alternative crops or herbicides, including:
? No/low mobility in soil
? Non-persistence in soil
? No run-off
? Compatible with no-till, reduced-till and long-rotation crop systems
? Does not contaminate (leach) into ground water wells (drinking water)
? Replaces alternative herbicides where leaching issues may exist
? In addition to the United States, regulatory agencies from other countries (including Canada, Japan, and South Korea) have confirmed the environmental safety of Roundup Ready alfalfa as well as food and feed safety.
IMPROVED WORKER SAFETY
? Improved worker handling safety (vs. alternative materials currently used), including minimized handling of herbicides and reduced farm worker exposure
(Comment Number: APHIS-2007-0044-0683-1)

Response: APHIS acknowledges the comment. In general the DEIS supports the commenters conclusions. Section III.D.2.b of the DEIS states that the 20 other herbicides used on alfalfa were, in general, more persistent than glyphosate and were characterized with higher mobility in soils, making them more apt to continually contaminate surrounding water systems. Section IV.G.1 of the DEIS states that deregulated GT alfalfa would benefit the environment through soil conservation practices of conservation tillage and no tillage, which might increase because of reduced cost of these practices and the effectiveness of glyphosate in killing weeds alone, without the need for tillage. However, it should be noted that stand takeout may require herbicide use combined with tillage to remove 100% of the GT alflafa. Section III.F.3.b and elsewhere in the DEIS states that due to glyphosate's and AMPA's (glyphosate's primary degradation product) strong adsorptive characteristics, they are not likely to leach into groundwater from soil, and compared to most herbicides, leaching is very limited. Section IV.D.4 of the DEIS states that although most countries lack any regulation at all, Japan, Saudi Arabia, and South Korea, main alfalfa export markets all have approval processes for GT product and labeling requirements. Saudi Arabia does not allow imports of genetically engineered seeds. Refer to the response to comment APHIS-2007-0044-0278-1 for issue 6.0 which describe the regulatory agencies that evaluate the potential risks GT alfalfa or other genetically engineered products. Regarding the commenter's observation that using GT alfalfa will lead to improved worker safety, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0. DEIS

section III.D.2.a.(1) and appendix M further describe that workers are not at risk of adverse health effects associated with acute or chronic dermal exposure to glyphosate.

Comment Excerpt Text:
THE ROLE CLIMATE PLAYS
First let's look at the anatomy of the climactic conditions which influenced the cropping systems in the area where mycotoxin levels are reported most severe. To do this we're going to look at the source of our weather -- the sun. This is important because there are significant implications in doing so for what can be expected in 2010. Just like Rome wasn't built in a day, neither are our planet's growing conditions established in isolation of long-term impact of the sun's energy arriving to Earth.
A visit to any number of websites will reveal a trend in solar flare activity which has been in place for several years. Website such as
http://www.ngdc.noaa.gov/stp/SOLAR/ftpsunspotnumber.html is a huge source of accurate data. Much more is available from unbiased observers of sun spot activity. The observers with real numbers all agree that the solar energy reaching our planet has been declining for nearly 8 years. The ocean temperatures have been following suit as would be expected. If you read the stories from independent, apolitical sources, which never appear on the front page or make the six-o'clock news, you will discover much to your relief, that you can trust your observations that the weather is getting colder, not warmer. The fact is that the last time solar flares or sunspots were as rare as they were in 2009 was in 1912. The worse part of that information is that there were even fewer flares the next year, 1913. That was a good year, for somebody, right?
What the sun's behavior meant in 2009 for northern temperate zones of the planet all over the world was cooler and wetter soils than normal. In the US it has meant nearly a 100% increase in the cost of drying corn on some farms. In China, where the government keeps very close official records, the dryer fuel bill was up by 30%.
(Comment Number: APHIS-2007-0044-10170-2)

Response: APHIS acknowledges the comment. Sections III.G.2 and IV.G.2 of the DEIS describe how deregulating GT tolerant alfalfa and greater use of glyphosate as a post-emergence herbicide will lead to an increase in no-till farming, thereby reducing tractor use on farms. This will reduce the inputs of carbon dioxide and other greenhouse gases from alfalfa farming. These greenhouse gases contribute to global climate change. This analysis has been updated in the FEIS.

Comment Excerpt Text:
As a farmer and a steward of the land, I would like to use Round-up Ready alfalfa to establish waterways in my corn and soybean fields. Recent extreme rains have created wash areas that were never there before. As a no-tiller, I need to establish waterways to control this erosion and being able to spray right over the waterway with the same chemical that I am using on the rest of the field would allow me to place waterways where it would be too inconvienient otherwise. The use of RR alfalfa for conservation will open up many avenues to improve conservation efforts across the country
(Comment Number: APHIS-2007-0044-2752-1)

Response: APHIS acknowledges the positive comment regarding use of RR alfalfa. Roundup formulations with surfactants designed for use on GT alfalfa, however, might be toxic to amphibians and other aquatic life and are not intended for spray over ponds or streams (see response to comment APHIS-2007-0044-7268-2 for issue 4.1.2). In addition, the TUG requires certain management practices that might not be compatible for the suggested use.

Comment Excerpt Text:
In addition, the Agency should provide a full assessment of how this GE organism could behave in the varied environments that it could be used. The Affected Environment chapter does not list or describe the varied environments within which this GE organism could be used; therefore, the Agency does not adequately assess in the Environmental Consequences chapter the potential impacts of this GE organism within those varied environments. Therefore, I request the Affected Environment chapter list and describe all potential environments within which the GE organism could be used and that the Environmental Consequences chapter provide rigorous analysis, using best available science, as to how this GE organism could behave in these varied environments.
(Comment Number: APHIS-2007-0044-4258-2)

Response: Section IV.I.4.b of the DEIS describes that the analysis could not evaluate site-specific impacts due to the speculative nature of when, where, and for what duration GT alfalfa can be cultivated. Regional and cumulative effects, however, were considered in a broader context, such as are listed in section IV.I.4.c of the DEIS. Additional regional considerations related to climate change and herbicide use are addressed in section IV.G of the FEIS.

Comment Excerpt Text:
I am against the spread of GMOs and oppose the lifting of the ban on GMO alfalfa. There is too much evidence that genetically modified organisms have a subtle yet deleterious effect on the environment.
(Comment Number: APHIS-2007-0044-7236-1)

Response: APHIS acknowledges the comment. Because specific sources were not provided by the commenter, APHIS cannot validate the accuracy of comments regarding the subtle yet deleterious effects of GT alfalfa and other GMOs on the environment. Sections III and IV of the DEIS analyze several potential environmental effects that GT alfalfa and increased glyphosate use could have on the environment.

8.1 Issue 8.1 – Impacts on Soils

Comment Excerpt Text:
This is a great advancement in the farming industry and benefits everyone who uses it. We should be able to take full advantage of new products that allow us to better our land and our crops. Roundup ready alfalfa is huge gain for the farming community not to mention the fact that alfalfa is one of the best soil conservation crops that can be planted in my area
(Comment Number: APHIS-2007-0044-0301-1)

Response: APHIS acknowledges the comment. Many of the conclusions expressed by the commenter are reflected in the FEIS.

Comment Excerpt Text:
The USDA's Environmental Impact Statement on "Roundup-ready" Alfalfa needs to bear in mind five points:
1. GE crops are likely to pollinate neighboring fields. This has concrete consequences for neighboring farmers trying to achieve organic status.
2. GE crops that encourage spraying with herbicides support a mode of farming that destroys topsoil architecture and organisms. Many organisms, plants and fungi are required to create new topsoil out of organic matter. These organisms are decreased through heavy use of herbicides, insecticides and synthetic fertilizers. The productivity of topsoil is therefore lost over time.
3. GE crop contamination can decrease viability of neighboring farms for export to countries that do not accept GE crops.
4. Environmental and health impacts of Roundup have received very few research dollars in terms of overall contamination of river and groundwater systems and their impact on long-term health conditions. Allowing these crops to become widespread without a real understanding of their impacts is very risky.
5. Monsanto has consistently tried to use patent law to deny researchers the opportunity to study their products for adverse effects.
Thank you
(Comment Number: APHIS-2007-0044-0375-1)

Response: APHIS acknowledges the comment. Section IV.G.1 of the DEIS describes that although many microorganisms produce aromatic amino acids through the same pathway that glyphosate inhibits in plants, there is little empirical evidence that glyphosate application results in negative impacts on soil microbes. The DEIS also cites field studies that have shown an increase in microbial activity following glyphosate application. Regarding the environmental and health impacts of glyphosate, including chronic or long-term studies, refer to the response to comment APHIS-2007-0044-3548-1 for issue 6.0. Regarding the comment that glyphosate will lead to low-level presence in river and groundwater, Section IV.3.a of the DEIS describes how glyphosate is a strongly adsorbing herbicide that will not readily leach into groundwater. Erosion of glyphosate into surface water will be further reduced through the use of GT alfalfa through an increased reliance on conservation tillage and no tillage practices. These practices also result in less tilling of the soil that can expose sediment to water and wind, which can lead to increased soil erosion and result in increased surface water pollution. Furthermore, applying glyphosate to resistant alfalfa fields might lead to an overall decrease in the amount and number of other more toxic herbicides used on alfalfa. See the response to comment APHIS-2007-0044-6240-2 for issue 6.0 for more on the use profiles of glyphosate and other herbicides.

Comment Excerpt Text:
As a biochemist by education, I find it appalling that GMOs are being pushed into our fields and foods here in the United States. Evidently, no one checks on the German farmers who have

found their lands sterile after using seeds from Monsanto and they are not the only country. If such organism can sterilize soil, what can it also do to the inner workings of the human body. We eat the meat and drink the milk from animals who are feed alfalfa. This must be stopped before it cause a complete breakdown in the safety of our food chain
(Comment Number: APHIS-2007-0044-0385-1)

Response: APHIS disagrees with this comment. There has been no credible scientific evidence presented thus far to support commenter's claim that GT crops will sterilize soil. Additionally , GT crops have been used within the United States for years without adverse damage to soil and farming practices. Appendices P and Q of the DEIS analyze the health risk of the CP4 EPSPS protein (the unique component) in GT alfalfa lines. These sections conclude that GT alfalfa lines (J101/J163) and the food/feed derived from them are not materially different in safety, composition, or any other relevant parameter from alfalfa now grown, marketed and consumed.

Comment Excerpt Text:
I am hoping that this will be approved because it will give us one more option to controll erosion and weeds on our highly eroded soils
(Comment Number: APHIS-2007-0044-0554-1)

Response: APHIS acknowledges the comment. Not only will glyphosate help control weeds, planting GT alfalfa nearby other GT crops can provide additional benefits to reduce erosion in areas such as waterways. Appendix J of the DEIS details the various soil conservation measures that are compatible with GT alfalfa.

Comment Excerpt Text:
Dear Sirs
I wish to comment about Roundup Ready Alfalfa. As a crop advisor in Notheast Nebraska RR Alfalfa would be a very useful tool to use when putting CRP back in to production. It would eliminate the need for tillage. Currently our prodecers are plowing this highly erodible land to control the perrenial grasses. Plowing destoys 20 years of building up these soils. If RR alfalfa were available these fields could be returned to production without tillage, saving valuble top soil. I feel RR alfalfa would be best recomendation to our producers if it was available.
Thank You
Randy Jensen
(Comment Number: APHIS-2007-0044-0616-1)

Response: In regard to the commenter's point about putting conservative reserve program (CRP) land back into production, Sections III.F.1 and IV.G.1 of the DEIS supports this by noting that GT alfalfa would improve soil quality by increasing soil organic matter that helps l bind nutrients and prevents loss to runoff, erosion, and leaching. Alfalfa, however, is probably more likely to be used in a mixed grass system on CRP, and so it is unclear how often pure alfalfa stands would be planted. In addition the management requirements of CRP lands in most states are inconsistent with the management requirements in the Monsanto TUG. So it would be unlikely to be adopted for this use.

Comment Excerpt Text:
Since we now recognize the function of the glyphosate in signaling pathogen proliferation, try to perform burn-down operations with a different chemical. In Israel the label for glyphosate products suggests waiting two weeks before planting wheat. The reason is to afford the soil an opportunity to recover from the flush of pathogens before exposing the sprouting crop to attack. Another opportunity to protect young plants is to start with seed coatings which are beneficial microorganisms. Instead of using a fungicide which is not selective, cover the seed with actively growing microbes which will battle for control of the pathogens and stimulate plant immunity. Lastly, provide the germinating seed and beneficial microbes with adequate nutrition. This could logically include high quality phosphate and micro-nutrients. This is especially important since the research has shown that the glyphosate is actively chelating or clamping metals preventing them from being available to microbes and hence the plants for balanced production of amino acid and enzyme production for the production of glucose. The glyphosate's ability to do this is now documented to last as long as ten years in the soil.
The selection of these nutritional inputs is critical to their success. Many mineral nutrients which are available are rendered ineffective because they are easily chelated by the glyphosate. So the source materials must be already chelated but readily available to the microbes. IDS chelation used in Presto Gold is such a source.
Part of the nutrition which could prove very valuable to plant survival is seaweed. It will in most cases contain a broad-spectrum of amino acids and vitamins. This will bypass the interference which glyphosate creates in the production of amino acids by complexing micro and macro-nutrients such as calcium in the production of microbes and the amino acids which they PRODUCE AND SUPPLY to the growing crop.
The addition of a calcium source may also prove effective in minimizing the impact of residual glyphosate. Another option to consider would be using calcium chelating agents such as glutaric acid. It contains no calcium so it can mixed with phosphate fertilizers. It increases the supply of calcium to the microbes which are competing with the glyphosate for it.
(Comment Number: APHIS-2007-0044-10170-4)

Response: APHIS acknowledges the comment and the suggestions for improving the utilization of GT alfalfa. Appendix U, section 3.1 of the DEIS, however, describes that despite some changes in population levels of soil pathogens, there was no evidence of a decrease in the alfalfa crop as a yield. Appendix U, section 3.0 describes that there was no biologically meaningful differences in micronutrient concentration between GT alfalfa and the range observed with conventional alfalfa. Section III.F.1of the DEIS discusses the impact of glyphosate exposure on soil, including that the primary mechanism of glyphosate degradation in soil is through mineralizing bacteria. The updated FEIS includes the relevant data and analyses of glyphosate's chelation properties and its impact on soil minerals

See response to comment APHIS-2007-0044-10170-4 for issue 11.8 for additional responses concerning this topic..

Comment Excerpt Text:
Soy and Corn Root Disease

(Means, et al; Europ. J. Agronomy 31 (2009) 153–161)
The application of Prudent Presto Gold with glyphosate protects the plant from the pathogen attack which is going to follow the glyphosate application to the G-T traited plants. This same flush of pathogens is what kills the weed sprayed with glyphosate and impacts any other plant which is subsequently planted in the soil following the glyphosate application.
(Comment Number: APHIS-2007-0044-10170-5)

Response: APHIS acknowledges the comment. Note, however, that appendix U of the DEIS states that although some preliminary studies show that some changes in population levels of pathogens can occur after glyphosate treatment, there is no evidence of changes in the incidence of disease in crops. For additional discussion, see the response to comment APHIS-2007-0044-10170-4 for issue 8.1. APHIS is including the cited research in the FEIS to the extent relevant.

Comment Excerpt Text:
GE alfalfa would compromise organic soil management
There is no replacement crop for the unique perennial alfalfa. If organic farmers are forced to abandon alfalfa as a crop due to GE contamination, with no equivalent perennial crop that has the
soil building characteristics of alfalfa, the environmental benefits of alfalfa will be lost.
Alfalfa is used in organic systems not only as a commercial crop (hay for feed, seed, and sprouting seed for human consumption) but is also used to build soil quality. Its ability to fix atmospheric nitrogen allows organic farmers to build soil fertility without animal manure and to build soil fertility in accordance with organic standards that prohibit the use of purchased petrochemical-derived fertilizers. Because alfalfa has deep, fibrous roots it improves soil texture by adding organic matter, an important carbon sink. Alfalfa is often used to protect or improve soils on marginal lands and highly erode-able land. Alfalfa can be used to make heavy clay soils more porous, and to make light sandy soils better able to retain moisture. It has a role in making soils more resilient in the face of both drought and flooding, increasing concerns as the climate changes.
(Comment Number: APHIS-2007-0044-10263-10)

Response: APHIS acknowledges the comment. The DEIS supports many of the commenter's points regarding the importance of alfalfa in erosion control and how in combination with conservation tillage practices there might be reductions in greenhouse gas emissions. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). Regarding other impacts on organic production, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6 (on organic certification and consumer preferences) and APHIS-2007-0044-9882-1 for issue 5.0 (on organic markets).

See response to comment APHIS-2007-0044-10263-10 for issue 7.3 for additional responses on this topic.

Comment Excerpt Text:

I am opposed to the release of glyphosate-tolerant alfalfa. The negative effect of glyphosate on soil microbal populations is a major concern. Traditional methods to establish alfalfa are quite adequate for consistent stands.
Thank you for the opportunity to comment
(Comment Number: APHIS-2007-0044-5333-1)

Response: Sections III.G.1, IV.F.1, and elsewhere in the DEIS analyze the impact of glyphosate and its primary metabolite AMPA on soil. These sections conclude that there is little evidence to support that glyphosate application will result in a negative impact on soil microbes, and in fact field studies have shown an increase in microbial activity. Appendix Q of the DEIS states that there is no significant difference between GT alfalfa and conventional alfalfa in relation to fungal diseases. For more detail on this topic, see the response to comment APHIS-2007-0044-10170-4 for issue 8.1.

Comment Excerpt Text:
First of all, I am not against the use of genetic engineering to alter the plant for production and quality benefits. I am against the insertion of the Round-up Ready gene into alfalfa and the deregulation of Round up Ready alfalfa. The main reason for this is the effects that glyphosate is having on the microbial populations in the soil and the unknown long term affects on production agriculture. The changes of the microbial populations could possibly lead to changes in mineralization of nutrients in the soil. Glyphosate applications are also increasing plant deficiencies in transitional metal micronutrients in the plant such as manganese, zinc, and iron. My occupation is a crop consulting agronomist who supplies services on 12-15000 acres per year. My statements are based on research that I have read or heard of from Dr. Huber and Dr. Kremer
(Comment Number: APHIS-2007-0044-6959-1)

Response: APHIS acknowledges the comment. Sections III.G.1, IV.F.,1 in the DEIS analyze the impact of glyphosate and its main metabolite AMPA on soil. These sections conclude that there is little evidence to support the contention that glyphosate application will result in a negative impact on soil microbes. On the contrary, field studies have shown an increase in microbial activity. Furthermore, appendix Q of the DEIS states that there is no significant difference between GT alfalfa/alfalfa in relation to soil composition. The research noted by the commenter, however, has been examined and incorporated into the FEIS to the extent possible. For additional discussion, refer to the response to comment APHIS-2007-0044-10170-4 for issue 8.1.

Comment Excerpt Text:
There has been NO long term testing of reactions to the soil contaminated with GMO material. Allowing GMO's to mix with the soil may have unforseen consequences in the growing cycle of all plants. Leave this alone before you mess up our food. There is no procedure to "reset" the soil to before being messed with conditions. Don't experiment with our future when you don't know how to go back to what it was before you contaminated it
(Comment Number: APHIS-2007-0044-9577-1)

Response: APHIS acknowledges the comment. For a description of the testing that has been conducted, refer to the response to comment APHIS-2007-0044-10170-4 for issue 8.1.

Comment Excerpt Text:
I recently watched a movie called Dirt, in which I saw/heard in no uncertain terms what chemicals are doing to our soil, to our water, to our bodies, and to our atmosphere. I realize that they can be great assets or a great liabilities - I want to be sure that the companies, the governments, and the people they serve are aware of all of the outcomes we can expect from the use, overuse, and misuse of these chemicals. Let's have meaningful dialogs and examine the long-term benefits and drawbacks to the decisions we are making now, and decide what shape we want to leave the world for our children and grand children.
We need to honor the stewardship assignment we have been left by our forefathers and our consciences and make wise/wiser decisions for our future here on our beloved Earth.
(Comment Number: APHIS-2007-0044-9701-1)

Response: For a detailed analysis of the effects of GT alfalfa and glyphosate on soil, human health, and other endpoints, see section IV of the EIS. For more information about oversight and the regulatory authorities involved, see the first section of response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
I've been an agricultural editor my entire career, first as Managing Editor of Farm Journal, then co-founder of Professional Farmers of America. I've watched in amazement that government has largely ignored the impact which glyphosate has upon soil microbiology -- shifting the spectrum of organisms toward fungal diseases. Glyphosate and its breakdown components are persistent in soil, and when translocated deep into soil by alfalfa roots, those toxins will persist.
(Comment Number: APHIS-2007-0044-9834-1)

Response: APHIS acknowledges the comment. Sections III.G.1, IV.F.1, and elsewhere in the DEIS analyze the impact of glyphosate and its primary metabolite AMPA on soil. These sections concluded that there is little evidence to support the contention that glyphosate application will result in a negative impact on soil microbes. On the contrary, field studies have shown an increase in microbial activity. Furthermore, appendix Q of the DEIS states that there is no significant difference between GT alfalfa and conventional alfalfa in relation to fungal diseases. For additional discussion, refer to the response to comment APHIS-2007-0044-10170-4 for issue 8.1. Given these and other comments and data, however, the FEIS has been updated accordingly to better address the debate that exists regarding this issue.

8.2 Issue 8.2 – Impacts on Climate and Air Quality

Comment Excerpt Text:
APHIS includes several sections in the alfalfa EIS which document the benefits of no-till agriculture which will potentially increase as a result of GE alfalfa and other GE crops. Namely,

APHIS states that conservation tillage and no till will improve soil quality, reduce erosion and leaching. Further, APHIS claims that no-till will improve global warming related emissions. NCGA does not believe that there is a preponderance of evidence to suggest that such claims are true. In fact, recent research suggests that no-till agriculture may result in a net increase in global warming gases since it may increase nitrous oxide emissions.

Tillage systems are defined according to the amount of soil disturbance and crop residue left on the surface of the field. No-till, or zero-tillage, involves no mechanical weed control prior to planting; rather weeds are controlled for by the use of chemical herbicides (Day et al. 1999). No-till agriculture has also been implicated in using increased levels of nitrogen fertilizers and elevated or more potent chemical herbicides (Heimlich and Ogg 1982; Bull et al. 1993; Sullivan 2003; Lupwayi 2009). Additional studies have also noted that no-till may increase chemical herbicide and pesticide run-off, a potential environmental consequence that should be considered (Baker and Johnson 1978; Gaynor et al. 1995; Smith et al. 1995; Warnemuende et al. 2007). Further research has also concluded that farmers using no-till were more likely to use more than one type of herbicide (Bull et al. 1993), particularly because multiple applications of glyphosate produces resistant weeds, which could cause farmers to turn to more harmful pesticides (Lupwayi et al. 2009).

While no-till agriculture has been widely promoted as a climate change solution, recent research is suggesting that it may not be able to reduce overall greenhouse gas emissions. Evidence also suggests that no-till agriculture may not actually sequester more carbon than conventional tillage systems. Many scientists have found no significant difference between soil carbon in no-till soils and conventional-till (Angers et al. 2007; Salinas-Garic et al. 1997; Doran 1980; Dick 1983; Bergstrom et al. 2001). As well, some research has found that no-till only affects the distribution of carbon in the soil, rather than increasing the actual amount sequestered (Angers et al. 1997; Potter et al 1998; Wanniarachchi et al. 1999). A review of tillage research found that no-till was particularly ineffective at storing carbon in the Corn Belt area of the United States and the Prairies (Manley et al. 2005).

Additional studies have indicated that no-till soils actually result in sometimes significantly greater amounts of nitrous oxide emissions compared to conventional- till soils. Numerous studies have demonstrated that cumulative ammonia production is significantly higher in no-till than in conventional-till (Al Al-Kanani and MacKenzie 1992; Rochette 2008; Mkhabela et al. 2008; Bacon and Freney 1989). Research also shows that no-till soils result in elevated nitrous oxide emissions for a variety of reasons including elevated moisture levels (Linn and Doran 1984; MacKenzie et al. 1998; Smith and Conen 2004; Grant et al. 2004; Lee et al. 2006; Mosier et al. 2006; Steinbach and Alvarez 2006; Liu et al. 2007; Ball et al. 2008; Beheydt et al. 2008; Halvorson et al. 2008; Mkhabela et al. 2008;Almarez 2009; Ussiri et al. 2009).

As a result of inconclusive results in no-till soils, numerous scientists have begun to question the promotion of no-till as a climate change mitigation tool. Failure to consider net greenhouse gas emissions in conjunction with potential carbon sequestered may lead to the promotion of no-till with unjustified mitigation potential (Six et al. 2004; Smith and Conen 2004). In their comprehensive review Six et al. (2004) concluded that newly converted no-till systems will continue to increase net greenhouse gas emissions in all types of climates for ten years;

significant reductions in net greenhouse gases were only observed in humid climates after ten years or more in practice. In some cases, particularly in wet climates or moist/irrigated soils, adoption of no-till in such "hotspots" could potentially offset any mitigation potential and even increase net greenhouse gas emissions over time to significant levels above conventional till emissions (Smith and Conen 2004; Grant et al. 2004; Li et al. 2005; Gregorich et al. 2006; Lee et al. 2006; Steinbach and Alvarez 2006; Oorts et al. 2007; Rochette 2008; Rochette et al. 2008; Almarez et al., 2009; Tan et al 2009). While no-till can offer numerous environmental benefits including decreased soil erosion (Schahczenski and Hill 2009; Fuglie 1999), it is also associated with numerous potential environmental hazards that APHIS should strongly consider as it is likely to be heavily associated with any deregulated GE crop.
(Comment Number: APHIS-2007-0044-11018-16)

Response: APHIS acknowledges the comment. Section IV.G.1 of the DEIS discusses the impact of no-till farming with GT alfalfa and concludes that no-tillage farming practices would improve soil quality by increasing soil organic matter that helps soil bind nutrients and prevents runoff, erosion, and leaching. Additionally no-till farming with GT alfalfa would benefit potential minor effects on biological/chemical properties because it leads to enhanced organic carbon and plant residues on the surface. Furthermore, section IV.G.1 of the DEIS goes on to state that GT alfalfa does not alter the symbiotic association with the nitrogen-fixing bacterium Sinorhizobium meliloti and does not negatively affect availability of nitrogen in soils. Available evidence is conflicting and thus inconclusive about whether or not nitrous oxide emissions are increased in no-till farming practice. More studies are needed. Therefore, the FEIS has been updated to weigh available evidence on carbon sequestration in no-till farming. The FEIS appendix J, expands the assessment of glyphosate use changes that might follow deregulation of GT alfalfa. The FEIS also includes an expanded discussion of possible glyphosate movement off-site by soil erosion and water runoff in section IV.G.3 and IV.C.3 and appendix N, section 3. See also response to comment APHIS-2007-0044-10170-4 for issue 8.1, impacts on soils, and the response to comment APHIS-2007-0044-10966-11 for issue 7.1, alfalfa production and farming practices. An expanded discussion of trends in herbicide application rates in the United States is provided in the FEIS, as discussed in the response to comment APHIS-2007-0044-6240-2 for issue 6.0

Comment Excerpt Text:
The RR alfalfa planted here are requiring less herbicide and pesticide treatment than other alfalfa here. This benefits air quality as there will be no tillage for an extra two to three years over non RR alfalfa.
(Comment Number: APHIS-2007-0044-6238-1)

Response: APHIS acknowledges the comment. Conservation tillage benefits not only surface water quality, but also air quality through reduced particulates and greenhouse gas emissions from decreased tractor use, etc. (see sections III.F.2 and IV.G.2 of the DEIS). Discussion of these issues have been updated where relevant in the FEIS.

Comment Excerpt Text:

APHIS' discussion on the cumulative impact of glyphosate-tolerant crop systems on global warming relies on unsupported presumptions. First, APHIS again inaccurately presumes that glyphosate use on GT alfalfa will replace more toxic herbicides: "[G]lyphosate is less toxic that other herbicides, and would be used instead of more environmentally harmful herbicides in GT alfalfa, it is likely that the increased use of glyphosate in GT alfalfa would have little cumulative effect on amphibians" and that the "cumulative effect of glyphosate use [will] likely be minimal." (DEIS at 181). APHIS' continued reliance on erroneous information undermines and negates the analysis on global climate change. If the agency begins with this inaccurate presumption, as it has several times in the DEIS, the arguments that stem from this presumption are also flawed.

Additionally, APHIS assumes that farmers and producers will follow label restrictions for glyphosate use and that this adherence to application guidelines will somehow protect fish populations from the toxic effects of herbicides in snowmelt. (DEIS at 181-82). APHIS provides no support for the contention that the label restrictions will prevent environmental damage from the ever increasing use of glyphosate on glyphosate-tolerant crop systems. APHIS must properly examine the risks of increased glyphosate use on global warming.
(Comment Number: APHIS-2007-0044-9936-22)

Response: APHIS acknowledges the comment. Regarding use profiles for glyphosate and other herbicides, an expanded analysis of trends in the United States is provided in the FEIS, as discussed in the response to comment APHIS-2007-0044-6240-2 for issue 6.0. In regard to the commenter's concerns over air and water quality, refer to the response to comments APHIS-2007-0044-6238-1 for issue 8.2 and APHIS-2007-0044-0375-1 for issue 8.1. Sections III.F.2 and IV.G.2 of the DEIS analyze the effect of glyphosate use on climate and air quality. These sections state that glyphosate has low volatility and has not been reported as an atmospheric contaminant. Additionally the use of glyphosate will lead to an increase in no-till farming, which can lead to a decrease in tractor use (emissions are environmentally damaging), which in turn will improve air quality and climate. The DEIS also examined the possibility that global warming might increase stresses on fish populations by reducing the volume of the spring snow melts, which could result in increased concentrations of chemicals in runoff from agricultural fields in general, including glyphosate runoff from GT alfalfa fields (see DEIS section IV.I.5.b). Given the uncertainty and additional data provided by commenters, these analyses have been updated in the FEIS, as also described in the response to comment APHIS-2007-0044-11018-16 for issue 6.0.

Regarding the effects of glyphosate and the assumption of adherence to label directions, EPA has analyzed these effects and designed labels accordingly. EPA also monitors label use through enforcement and other actions. No information has been obtained to indicate any significant noncompliance with glyphosate label use.

8.3 Issue 8.3 – Impacts on Water and Water Use

Comment Excerpt Text:
as an industry we need to have the roundup oeady alfalfa back for use as soon as possible.This technology has many use including waterway protection buffer strip use for clean water in

stream and rivers and for the dairy industry that needs top quality feed for the animals free of weed and grass to produce the most milk for comsumption at a time when this industry has seen lower price for milk and alot of growers leaving the industry because of finicial inpacts.I have been in the ag field for 30 years and have seen the reduction of chemical use because of the roundup technology with no harm to the enviroment or humans
(Comment Number: APHIS-2007-0044-0280-1)

Response: APHIS acknowledges the comment. In regard to the comment that GT alfalfa is compatible with waterways and will result in a reduction of chemical use, refer to the responses to comments APHIS-2007-0044-0375-1 for issue 8.1 and APHIS-2007-0044-6238-1 for issue 8.2.

Comment Excerpt Text:
I oppose any change that would result in the degregulation and or approval of GMO alfalfa. Alfalfa is one of the highest-protein green hay foods for ruminant animals (cows, goats, and sheep) and is also an ingredient in rabbit pet food and can be included in poultry feed as well. If deregulated, GMO alfalfa would quickly work its way into the American diet through meat and dairy. Such deregulation would also devastate the organic dairy industry, and damage organic meat producers. American consumers would be left in the dark, essentially unable to know whether they're consuming producs that were raised on GMO alfalfa.
In the broader sense, Round-Up Ready crops are incredibly damaging to water supplies. Ample evidence shows that agricultural runoff has resulted in tremendous damage to our waterways. The very premise of a crop that permits farmers to inundate it with pesticide with no apparent effect on the crop itself simply invites farmers to overuse the pesticide, leading to increased agricultural runoff and groundwater pollution beyond that which we already suffer from
(Comment Number: APHIS-2007-0044-0677-1)

Response: APHIS acknowledges the comment. In regard to the comment that GT alfalfa will damage water supplies, refer to the responses to comments APHIS-2007-0044-0375-1 for issue 8.1 and APHIS-2007-0044-6238-1 for issue 8.2. Deregulating GT alfalfa might result in a reduction of the use of alternative more toxic herbicides; please refer to the response to comment APHIS-2007-0044-6240-2 for issue 6.0 for more information on this issue. In regard to the impact on organic dairy and meat producers, see response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Monsanto's expanding monopolies from seed to water
Dr. Vandana Shiva
Aug.13,1999
http://www.converge.org.nz/pma/a130899a.htm
Over the past few years, Monsanto, a chemical company, has positioned itself as an agricultural company through control over seed the first link in the food chain. Monsanto now wants to control water, the very basis of life.

In 1996, Monsanto bought the biotechnology assets of Agracetus, a subsidiary of W.R. GRACE, for $150 million and Calagene, a California based plant biotechnology company for $340 million. In 1997, Monsanto acquired Holden seeds, the Brazilian seed company Sementes Agrocerus and Asgrow. In 1998, Monsanto purchased Cargill's seed operations for $1.4 billion. It bought Delta and Pine land for $1.82 billion and Dekalb for $2.3 billion. It bought Unilever's European wheat breeding business for $525 million. In India Monsanto has bought Mahyco, Maharashtra Hybrid Company, E.I.D. Parry and Rallis. Mr.Jack Kennedy of Monsanto has stated "We propose to penetrate the Indian Agricultural sector in a big way. MAHYCO is a good vehicle." According to Robert Farley of Monsanto "what you are seeing is not just a consolidation of seed companies, it is really a consolidation of the entire food chain. Since water is an central to food production as seed is, and without water life is not possible. Monsanto is now trying to establish its control over water. During 1999 Monsanto plans to launch a new water business, starting with India and Mexico since both these countries are facing water shortages.
(Comment Number: APHIS-2007-0044-0933-24)

Response: APHIS acknowledges the comment. With regard to market concentration in alfalfa seed markets, see response to comment APHIS-2007-0044-2225-3 for issue 5.0.

Comment Excerpt Text:
It's time to stop contamination of organic crops. To allow Round-Up Ready Alfalfa disenfranchises the important and growing organic farming industry and will also more deeply scar our impaired water resources. Because alfalfa is fed to dairy cows and other livestock, contamination puts organic dairy and meat at risk, too!
Genetically engineered "RoundUp Ready" crops allow for rampant use of pesticides that end up in ground and surface waters, and make their way to the Gulf of Mexico and expand the giant toxic algal bloom that is of great concern to many countries because it effects coastal resources and national economies. These extra poisons in the name of higher crop sales are further nails in the coffin. There is much death--to humans, fauna, and flora--that is the inevitable result of America's growing toxic soup.
I am an environmental journalist and I've interviewed experts and written about the Gulf algal bloom (http://www.wef.org/publications/page_wet.aspx?id=2816page=news), the sources of which were recently mapped bu USGS--with great confidence--to Midwest agricultural zones. I've also written about Roundup Ready crops (http://www.salemnews.com/pulif/local_story_204232933.html?keyword=secondarystory).
(Comment Number: APHIS-2007-0044-4247-1)

Response: APHIS acknowledges the comment. Section IV.3.a of the DEIS describes that increased soil erosion, which GT alfalfa can help to prevent, can result in greater algal blooms by allowing eroded sediments to bind more phosphorous and then runoff into surface waters. Therefore, GT alfalfa can lead to a decrease in phosphorous pollution that can lead to the toxic algal blooms the commenter refers to. In regard to the impact on organic markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
However. we [EPA] suggest that clarification be provided to the Surface Water discussion on page 90 regarding the statement that glyphosate and its metabolite aminomethyphosphonate can be removed through standard water purification and disinfection processes such as ozonation and chlorination. EPA recommends that this discussion be expanded to include impacts glyphosate and aminomethyphosphonate may have to drinking water quality in areas where the level of treatment of drinking water does not include olonation and chlorination.
(Comment Number: APHIS-2007-0044-6298-2)

Response: APHIS acknowledges the comment. In section III.F.3 of the DEIS, disinfectants, ozination and chlorination, are given as examples of agents (not exclusive agents) that can mitigate glyphosate concentration in water. The FEIS further discusses other treatment options and the impacts on drinking water quality with and without treatment. Furthermore, section III.F.3 of the DEIS states that groundwater and surface water low-level presence of glyphosate is limited because of glyphosate's tendency to adhere to variable-charged soil minerals and because of microbial degradation in soils. These effects also are discussed further in the FEIS.

9.0 Issue 9 – Mitigation Measures

Comment Excerpt Text:
Growers need the ability to adopt new technologies that enable them to address changing global market situations and remain competitive. As in all biological systems, 100% purity (or 0% impurities) of any constituent is very difficult to achieve and may not be possible economically. This is especially true for field-scale agriculture. In regards to GE alfalfa, sufficient scientific data are available to design strategies to mitigate gene flow from GE to conventional alfalfa hay and seed production. Regular testing will be needed, however, to monitor the effectiveness of these strategies, and adjustments should be made if and when appropriate. Increased isolation distances in seed productionincluding production in non-GE seed production zonesuse of border areas, crop rotation, use of certified seed, careful selection of the introduced pollinator, and routine elimination of neighboring feral alfalfa plants are tools that can be applied to decrease further the risk of gene flow in the production of seed for GE-sensitive markets. (Comment Number: APHIS-2007-0044-0266-3)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). Testing is discussed in appendix V of the FEIS.

Comment Excerpt Text:
My research and experience with the EIS process as well as GMOs lead me to conclude that this EIS is
fundamentally flawed in that it is based on assumptions that are incorrect.
The Executive Summary (xiii) states: "USDA asserts that all methods of agricultural production (conventional, organic, or the use of genetically engineered varieties) can provide benefits to the environment, consumers, and farm income, and they can and should 'coexist'."
For the three methods to meaningfully "coexist" they need to be in rough parity in terms of their research, extension, and other funding support. Clearly, conventional and genetically engineered varieties receive well over 90% of such funding. Also, there is the assumption that each is willing to
follow practices that do not undercut the basic elements of the other. The history of firms promoting
genetically engineering crops has been for them to use their patent monopolies to build oligopolies and
to use unfair practices to reduce and displace any competition. Thus, in any assessments of their requests, special attention should be paid to past and potential future abuses. Some of these practices
are now being reviewed by the Justice Department's hearings into Competition Issues in the Agricultural Industry. Similar reviews should have been included in this EIS.
In particular, there should be an examination of how new monopolistic technologies such as genetic
modification and current patent and trade regimes create very strong national and international incentives for developing oligopolies and monopolies.

An example of abuse that I observed first hand was when I was in Australia on sabbatical leave. My
host was on the Australian New Zealand Food Authority which was then preparing regulations which
would have required that the shipping, processing, and distribution streams of GMO seeds and plants
be kept separate from non-GMO streams - a basic element for any genuine ‘co-existence. Before these
regulations could be issued, Monsanto - evidently pursuing a ‘facts on the ground’ strategy - imported
cargo shiploads of GMO seeds - which then became unregulated - despite appeals not to do so.
In terms of monopolistic technologies based on patents and associated proprietary products, firms
promoting GMO seeds have sought to “own” all the benefits, but to reject any responsibility for any
direct “impacts” and liabilities that result. Monsanto has consistently sought to avoid any liability for
genetic drift from its crops and has sought to minimize any set back restrictions that they or growers
would be required to have.
Given that genetic drift of GMOs undermines one of the core legal requirements of organic producers,
the EIS should have required significant set backs as well as the establishment of a fund to
compensate any growers whose suffers economic loss or loss of organic certification due to genetic drift from its
GMO alfalfa.
The USDA should make every effort to level the playing field between organic production and the
other dominant forms.
This is especially the case since neither conventional nor genetically modified production forms - which
are very energy intensive, highly polluting, and have significant public health costs are sustainable now,
much less in the near future when energy and resource costs will dramatically increase.
The second source of unsustainability of the dominate production modes lies in global warming - where
dominant forms emit high levels of carbon dioxide, nitrogen, and methane emissions. Having served on
the Michigan Climate Action Council’s Technical Working Group on Agriculture, Forestry, and Waste,
I was impressed that after forestry, organic farm production is the second highest biological way to
capture and sequester carbon. Through their application of chemical fertilizers, the dominant
production modes kill key soil micro-organisms that enable soils to capture carbon. Clearly, we need

to dramatically expand the organic acreage under cultivation as part of our national effort to try to
minimize the disruptions, disease, and destruction that will come from global warming if we do not.
To summarize:
*If the USDA and the EIS really believe in “co-existence” between the three modes of production, both should recognize and address the disparities of support and promotion that exist between the two dominant forms of production and organic production and take measures which move
organic production towards parity with the two dominant modes.
*USDA and the EIS should assess the impacts of concentration, especially as they apply to the genetically engineered sector and seek to reduce and/or compensate for their impacts and economic
distortions of the market.
*In terms of sustainability USDA and the EIS should recognize and incorporate all the various externalities (pollution, greenhouse gas emissions, and public health costs) of the three modes of production in their assessments and rework their recommendations accordingly.
*In specific regard to GMO alfalfa, the EIS should recommend that the major GMO firms establish a fund to reimburse organic farmers who suffer economic and/or certification loss from genetic
drift. Such a fund should apply to genetic drift from all GMO crops that cause economic loss to adjacent growers.
*Given the significant superiority of organic production in terms of carbon capture and sequestration, USDA and the EIS should recognize and promote a major expansion of organic acreage
and production. (Comment Number: APHIS-2007-0044-10782-1)

Response: Fair competition and business practices are enforced through United States anti-trust laws and institutions and are beyond the scope of this EIS. Promoting the expansion of organic acreage and production is also outside the scope of the EIS. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for issue 5.2. Regarding a fund to reimburse organic farmers for eventual losses, see the response to comment APHIS-2007-0044-6376-1 in issue 5.1., where APHIS explains that the issue of liability for unintentional presence of GE content in non-GE crops is one to yet to be resolved by courts and case law.

Comment Excerpt Text:
At several points in the EIS, responsibility for containing gene flow and dealing with unintentional contamination of non-GE crops is placed not on the cultivator of the GE crop but rather their neighbors who choose non-GE crops. It is inconceivable that one party would desire or willingly choose to be responsible for the environmental and economic damages stemming from the choices made by another party. It only makes sense for the party that takes a certain action be responsible for the consequences of that action. Furthermore, the party at risk of

damage should be the first to be consulted and not the last as is the case with GE alfalfa. (Comment Number: APHIS-2007-0044-11018-19)

Response: In regard to the burden of control measures, see the response to comment APHIS-2007-0044-11689-10 for issue 9.0 (paragraph 1 of the response).

Comment Excerpt Text:
USDA does not provide adequate protections from GE seed contamination. Therefore, approving GE alfalfa based on the DEIS would set a dangerous precedent that would undermine the integrity of the organic seed supply for all crops for which there are GE counterparts. Moreover, the entire burden for protecting the integrity of organic products rests on the shoulders of organic and non-GE farmers whose practices not only have been the mainstay of U.S. agriculture but also have successfully fed our nation and contributed to the global food supply for centuries. Since the current regulatory framework for GE crops fails to prevent contamination or to duly assign liability to technology owners, and since it does not require segregation of GE and non-GE crops it, by default, puts our entire food system at the mercy of this new and experimental GE technology. Thus, contrary to USDA claims of supporting "co¬existence," the EIS allows GE to trump rather than to "co-exist" with proven agricultural technologies that continue to feed the world.

USDA argues that non-GE farmers simply need to change their planting and harvesting practices to "avoid simultaneous flowering" with the GE alfalfa planted in a neighbor's field. This is an unreasonable expectation, particularly since it allows and supports the supplanting of existing agricultural technologies with the novel GE technology. Farmers plant their crops to best take advantage of local conditions and, therefore, forcing non-GE farmers to alter their planting and management practices in response to nearby GE alfalfa is an unreasonable expectation and that is likely to cause undue economic hardship. Furthermore, because alfalfa is a perennial crop that is typically replanted only every 3 to 5 years, neighbors may plant GE alfalfa in years following the planting of nearby non-GE alfalfa, removing the viability of planning to prevent GE contamination for organic and other non-GE farmers.

The DEIS puts the burden on existing non-GE and organic farmers to "disallow or remove commercial beekeepers' hives" anywhere near their alfalfa field. [Footnote 15 DEIS at p. 102.] This is an unreasonable expectation, particularly since the burden for preventing contamination should rest with the growers and owners of this novel GE variety, and not with those who have been planting conventional and organic varieties for centuries. USDA has completely ignored farmers' desire – and right – to grow GE-free seed and raise GE-free agricultural products. This proposed, required practice also does not account for the pollination from native bee species or feral honey bees, which may be responsible for considerable GE contamination.

USDA dismisses the potential for GE alfalfa to cross-pollinate with feral alfalfa or for GE alfalfa volunteers to escape and establish feral populations. [Footnote 16 DEIS at p. 98-99.] In both cases, this feral GE alfalfa can serve as a bridge for transferring the RR trait back to conventional or organic alfalfa years later. The agency states that if such feral RR alfalfa does arise, it can be controlled with non¬glyphosate herbicide, a tool that is unlikely to be available to organic

farmers whose desire and ability to use herbicides is strictly limited in the Organic Rule. This USDA recommendation also ignores the common existence of feral alfalfa on sites outside the control of farmers — such as roadsides — where it is unclear that such actions would be taken and who would be responsible.

If GE alfalfa is approved, the burden of protecting organic seeds would rest with the organic seed producer, according to the DEIS. There is no mandatory regulation, inspection or enforcement of Monsanto's so called "best practices" for growers and patent holders of GE alfalfa seeds. USDA dismisses any cause for concern about GE seed contamination [Footnote 17 Id. at 133.] without presenting any concrete evidence to support the claim. To the contrary, USDA specifically states that it does not have economic data or related information to demonstrate the full range of economic ramifications to organic producers from market losses and increased production costs for protecting the integrity of organic crops and seeds from GE gene flow. [Footnote 18 Id. at 132.] (Comment Number: APHIS-2007-0044-11689-10)
Response: In regard to the burden of control measures the National Organic Program Final Rule states:

It has always been the responsibility of organic operations to manage potential contact of organic products with other substances not approved for use in organic production systems, whether from the nonorganic portion of a split operation or from neighboring farms. The organic system plan must outline steps that an organic operation will take to avoid this kind of unintentional contact. (NOP final Rule 7 CFR part 205; Federal Register Volume 65 page 80556)

In the proposal, we stated that conducting residue tests was considered a cost of doing business for certifying agents. Our position has not changed. Certifying agents can factor residue testing costs into certification fees. (NOP final Rule 7 CFR part 205; Federal Register Volume 65 page 80631)

It is not our intent to mandate residue testing of all inputs and ingredients used in the production of organic agricultural products. Neither is it our intent for certifying agents to abuse residue testing responsibility by conducting residue tests of certified organic operations without reason to believe that the agricultural input or product intended to be sold as organic has come into contact with prohibited substances. Our intent is to make it clear that certifying agents have the authority to test any agricultural input used or agricultural product intended to be sold as organically produced when there is reason to believe that the agricultural input or product has come into contact with a prohibited substance.
(NOP final Rule 7 CFR part 205; Federal Register Volume 65 page 80633)

In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for issue 3.1. In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. In regard to the economic ramifications of GT alfalfa on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the cost for testing of GT alfalfa, see the response to comment APHIS-2007-0044-0693-1for issue 5.9.

Comment Excerpt Text:
USDA dismisses the potential for GE alfalfa to cross-pollinate with feral alfalfa or for GE alfalfa volunteers to escape and establish feral populations. [Footnote 7 DEIS at p. 98-99.] In both cases, this feral GE alfalfa can serve as a bridge for transferring the RR trait back to conventional or organic alfalfa years later. The agency states that if such feral RR alfalfa does arise, it can be controlled with non-glyphosate herbicide, a tool that is unlikely to be available to organic farmers whose desire and ability to use herbicides is strictly limited in the Organic Rule.

The burden of protecting organic seeds rests with the organic seed producer. There is no mandatory regulation, inspection or enforcement of Monsanto's so called "best practices" for growers and patent holders of GE alfalfa seeds. USDA dismisses any cause for concern about GE seed contamination [Footnote 8 Id. at 133.] in the absence of any concrete evidence to support the claim. To the contrary, USDA specifically states that it does not have economic data or related information to demonstrate the full range of economic ramifications to organic producers due to market losses and increased production costs for protecting the integrity of organic crops and seeds from GE gene flow. [Footnote 9 Id. at 132.] (Comment Number: APHIS-2007-0044-11788-7)

Response: In regard to gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. In regard to the burden of control measures, see response to comment APHIS-2007-0044-11689-10 for issue 9.0 (paragraph 1 of the response).

Comment Excerpt Text:
Many seed and plant experts, not associated with Monsanto, say that in a few short years, all alfalfa seed will contain considerable GE contamination. This is what has happened with canola seed, as an example. Should the USDA proceed with introducing alfalfa, as suggested in the EIS, there will soon be no organic seed available from the US. Then the patent holders can, if they wish, push all non-GE seed growers out of business the same way they have hurt soybean seed savers; Monsanto will end up having a monopoly on all alfalfa seed grown in the US. Organic producers will have two choices: switch to other legumes or buy organic seed from foreign sources. (Comment Number: APHIS-2007-0044-1976-6)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
In regards to GE alfalfa, which affects the entire nation's food chain, and I quote from the most recent Puget Consumer Co-op newsletter, the USDA "declares there is no evidence that organic consumers care about GE contamination. The USDA also admitted that an economic analysis shows GE alfalfa will hurt the organic industry and small farmers - but it fails to analyze or suggest any possible protections for organic." Please do your job and protect this small industry, making a hard decision is the best decision and the RIGHT decision. (Comment Number: APHIS-2007-0044-6354-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
As a conscientious and increasingly concerned consumer, I am commenting to convey my adamant opposition to the approval of GM alfalfa. If it could be grown in a self- contained area without risk of invading other crops, particularly organic alfalfa, that would possibly be acceptable. (Comment Number: APHIS-2007-0044-6375-1)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Glyphosate-resistant alfalfa represents a major advancement as a weed management tool for growers. Developed and managed correctly, it provides the opportunity to economically and effectively manage very difficult-to-control species in a manner that allows improved quality and productivity, while at the same time improves environmental conservation.
I am the President of the Weed Science Society of America, a professional organization dedicated to science-based research and education on weed management. As such, WSSA has expended considerable effort in developing information that is being used for comprehensive educational programs on herbicide resistance management.
An aspect that must be more effectively recognized is the role that education of the end-users will play in minimizing and mitigating glyphosate resistance. This education must be targeted for growers, retailers, distributors, crop consultants, and extension agents. All of these play critical roles in the decision-making process and, if done correctly, educational efforts can play a pivotal role in stewardship of this technology. Appropriate educational efforts have been shown in our research to be a key factor in slowing or eliminating the selection pressure for herbicide resistance in weeds. This should be an important factor (that is not currently included) in the analysis for alfalfa, and in the future for other glyphosate-tolerant crops. We have clear indications that stakeholders are adopting herbicide resistance best management practices when they are properly educated on both their need and specific practices that are tools for their specific situations.
Glyphosate resistance in other crops has developed as a result of intensive selection pressure placed on the agronomic system. However, the weed science community has learned invaluable lessons, and is now developing and implementing education and outreach programs to appropriately remedy this issue. (Comment Number: APHIS-2007-0044-7686-1)

Response: APHIS acknowledges the comment. The FEIS (section IV H and I, and appendix G and J) discusses mitigation measures for managing the development of glyphosate resistant weeds and weed shifts in GT alfalfa.

Comment Excerpt Text:
We believe that consideration on the following stewardship practices can help reduce the adventitious presence of GM traits in non-GM alfalfa.

Minimizing pollen mediated gene flow
i) Seed production fields: Because feral alfalfa plants growing in road verges and other unmanaged areas can facilitate GM trait movement, management of these populations is necessary. The current isolation distances are designed to achieve variety purity (within limits) but not necessarily genetic purity (or the prevention of GM trait entry). As such, and given the evidence of long distance pollen mediated gene flow in alfalfa, the commercial production of GM alfalfa will require non-GM alfalfa growers to greatly increase these isolation distances if they want to assure GM-free seed sources. Frequent testing of seed sources will also be required to provide assurance of the effectiveness of isolation approaches.
ii) Hay production fields: Hay fields are required to be managed properly and cut regularly before flowering. However, bad weather conditions can delay haying operations, resulting in flowering within hay crops and opportunities for pollen mediated gene flow and GM trait escape. This may mean that producers who have neighbors growing GM alfalfa may also need to consider isolation distances in relation to the hay fields.
b) Minimizing seed mediated gene flow
Seeding, spraying and harvesting equipment must be cleaned prior to and after use in any GM alfalfa fields. Alfalfa seed (especially GM alfalfa seed) should be transported in spill proof containers to avoid seed escape and reduce the establishment of feral GM alfalfa populations in road verges. The effective control of feral alfalfa populations can also help to prevent predator (e.g. deer, birds) mediated seed movement.
c) Sustained stewardship practices
Producers who wish to maintain crops GM-free will need to make conscientious efforts to do so and need an understanding of the routes and mechanisms of GM trait movement. Establishing region-wide stewardship practices will be necessary to reduce the potential for gene flow between GM and non-GM alfalfa. Co-operative efforts from GM growers would greatly facilitate the coexistence of GM and non-GM crops, with the neighbourly declaration of GM crop cultivation by GM crop growers being particularly helpful. Currently such cooperation is voluntary. In addition, all alfalfa growers (both GM and non-GM) should work to identify and control feral alfalfa populations both on their farm sites and along roadsides. Special collaborative programs with municipalities, including weed supervisors would be required in order to facilitate the management of these populations. Further, individual growers may want to monitor volunteer alfalfa plants from previous GM alfalfa fields to ensure that populations from one stand do not persist to flower in subsequent stands. To be very effective, these protocols need to be addressed through appropriate regulations.
We request that the above said factors may be considered for regulatory approvals on RR alfalfa.
(Comment Number: APHIS-2007-0044-8841-2)

Response: APHIS acknowledges the comment and has considered the effectiveness of the commented measures in preparation of the DEIS and FEIS. In addition, APHIS has included an expanded section in the FEIS in regard to additional restrictions and isolation procedures for GE alfalfa. See the response to comment APHIS-2007-0044-11741-4 for issue 1.0.

In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. In regard to gene flow due to unintentional mixing and distribution of seed, see the response to comment APHIS-2007-0044-10263-5 for issue 3.2. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I am no expert in any of this matters....my petition to you is only to be most careful as to accept growing any of our food under circumstances that have not been properly researched and confirmed. I know you will take measurements to protect the quality of our lives including yous and your family's. (Comment Number: APHIS-2007-0044-9726-1)

Response: In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for issue 5.2.

9.1 Issue 9.1 – Stewardship programs and Best Practices

Comment Excerpt Text:
Biotechnology-based breeding methods safely enhance and extend a crops yield potential, feed value, adaptation, pest tolerance, environmental benefits, crop management and utilization options, as other biotech crops have demonstrated.
The overwhelming majority of alfalfa acres 99.6 percent produce only forage, which means farmers harvest their fields before alfalfa plants accept or produce pollen. More than 75 percent of alfalfa forage is used on the same farm where it is grown. Only 1 percent of U.S. forage is organically grown. Stewardship practices allow for the successful coexistence of organic, conventional and Roundup Ready alfalfa, allowing each market segment to be served.
A national alfalfa industry consensus plan for seed and hay industry coexistence and stewardship was adopted in June 2008 under the auspices of the National Alfalfa and Forage Alliance (NAFA). Coexistence plans for seed production and other markets are comprehensive and science-based. The NAFA best practices have been validated in two years of commercial seed production.
I urge the USDA to consider biotechnologys long history of success and allow alfalfa growers to join other American farmers in the benefits and new opportunities offered by biotechnology. (Comment Number: APHIS-2007-0044-0292-1)

Response: The 2008 NAFA BMPs have been added to appendix V of the FEIS.

Comment Excerpt Text:
USDA officials must rewrite their federal district court-ordered draft EIS to reflect the inherent right of farmers to grow the types of crop cultivars they wish to grow and the right of a fast growing and considerable fraction of the American people to buy organic standard products in order to protect their health and to assist family farmers and rural communities in their struggle against growing corporatist dominance of American agriculture. The EIS must be rewritten to reflect the dispersion of RR alfalfa genetic material that will occur if release is again allowed and the significant economic losses that various classes of agricultural producers will suffer. And the rewritten EIS must acknowledge that release of RR, glyphosate-tolerant alfalfa will be a clear threat to the progress towards sustainability made by American agriculture through no-tillage and through crop rotational use of our best legume, alfalfa, all of which is supported by our best herbicide, glyphosate.

Corporate-specified “best practices” or use of “isolation distances” during the period of legal release of RR alfalfa did not prevent rapid dispersion and genetic contamination from occurring, nor could such “practices” do so. Inclusion of such “safeguards” in any proposed new deregulation of RR alfalfa is unworkable and their inclusion would appear to be for possible PR purposes. Any proposed regulatory action short of full denial of release of GE RR alfalfa appears to be violative of the spirit and intent of the NEP Act, and would constitute a grave nonperformance of the duty of USDA officials to protect the best interests and 14th Amendment-supported rights of American farmers and American consumers, and the well being of the environment which this Nation shares with the rest of the world. (Comment Number: APHIS-2007-0044-10138-10)

Response: According to the National Environmental Policy Act (NEPA), it is the responsibility of the federal agency undertaking the proposed action to analyze the proposed action, alternatives to the proposed action, and their impact on the human environment. The Council on Environmental Quality (CEQ) regulations (40 CFR parts 1500–1508) defines required environmental documents such as the EIS to be developed by the agency undertaking the action. APHIS is responsible for basing the environmental impact analysis, as presented in the DEIS, on accurate data and relevant studies.

Based on public comments on the DEIS, an additional alternative has been added to the FEIS that was not considered in detail in the DEIS. This alternatives is intended to more fully examine the potential impacts on non-GE farmers. Imposing a testing requirement was not analyzed in detail. Full descriptions of the added alternative and alternatives rejected from further consideration are included in chapter 2 of the FEIS. In addition, chapter 4 of the FEIS has been updated per these new alternatives. Regarding tillage, see the response to comment APHIS-2007-0044-10138-4 for issue 11.01 and the response to comment APHIS-2007-0044-10138-7 for issue 11.4.

Comment Excerpt Text:
The DEIS discusses the role of stewardship plans in decreasing the probability of gene flow, however stewardship agreements do not help to prevent unintended transgene flow among fields of non-adopting farmers. Furthermore, we warn against reliance on stewardship agreements as issues of imperfect compliance can arise. For example, an industry study in Canada found that 20% of corn growers were not following stewardship requirements relating to Bt corn refuge management. [Footnote vii: Canadian Corn Pest Coalition, Bt Corn IRM Compliance Study Report, 2005.] Serious and widespread compliance issues were also found in Canadian government audits of Bt potato refuge. [Footnote viii: Laidlaw Stuart, “Genetically Modified Spuds Cleared: Inspectors had blasted ‘extremely
poor’ field trials,” Toronto Star, January 23, 2001.]
The mandatory stewardship plans outlined by Monsanto and Forage Genetics International are unrealistic and inadequate: Plants can't read, can't be sued, fined or put in jail, thus neither the U.S. government nor Monsanto and Forage Genetics International have the ability to control GE alfalfa plants once they are released into the environment.
Additionally, organic farmers will not be able to minimize cross-fertilization despite the measures

described in the DEIS, even if they can find non-contaminated alfalfa seed. The measures described are not reasonable. For example, the heavy burden of trying to stop the unintended presence of GE alfalfa by avoiding simultaneous flowering to neighboring GE alfalfa is unrealistic.
Attempts to change harvesting and planting schedules based on neighbors' schedules would be extremely difficult to manage especially if alfalfa is to be cut up to 3 times in one season. Similarly
unrealistic is the measure to remove beehives surrounding alfalfa fields prior to blooming. The honeybee forage distance of over 6 miles exposes the difficulty, and even futility, of this exercise.
These difficulties combined with the predictable failures of isolation distances and buffer zones contradict the DEIS conclusion that measures to reduce the likelihood of gene flow will be effective. (Comment Number: APHIS-2007-0044-10263-3)

Response APHIS acknowledges the comment. In regard to the BMP of pinning maps, see the response to comment APHIS-2007-0044-6227-1 for issue 3.1. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). APHIS has added discussion of best management practices that have been peer reviewed, such as the NAFA BMPs that were published after release of the DEIS. This discussion was added to appendix V of the FEIS.

Comment Excerpt Text:
USDA claims that "best practice" requirements contained in Monsanto's seed contracts are sufficient to prevent GE contamination and the EIS asserts that there is no evidence to the contrary. This is simply not true. The Agency itself acknowledges that GE contamination may occur and it includes studies that show how honey bees can cross-pollinate at distances over 6 miles. Alkali bees cross-pollinate at 4-5 miles. [Footnote 8 United States Department of Agriculture. Glyphosate-Tolerant Alfalfa Events J101 and J163: Request for Nonregulated Status. Draft Environmental Impact Statement—November 2009, p. 95.] All of those distances are much further than those included in Monsanto's "best practices." (Comment Number: APHIS-2007-0044-11689-6)

Response: In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for issue 3.1. The FEIS includes an additional alternative that is analyzed in detail. It uses isolation and geographic restrictions to allow for the production of seed for GE sensitive markets. For more information on this alternative see chapter II of the FEIS.. In addition information on AOSCA's Alfalfa Seed Stewardship Program -10 which sets a seed standard for nondetection is discussed in appendix V of the FEIS.

Comment Excerpt Text:
APHIS fails to take into account studies demonstrating the failure of the isolation distances and similar provisions proposed by Monsanto/FGI, and accepted by the agency, to prevent contamination from exceeding levels accepted by seed purity accrediting agencies

In summary, the stewardship proposal accepted by APHIS is not supported with adequate data. Based on existing data, theory, and experience, gene flow levels may significantly exceed the 0.5 percent level. As a result, APHIS should not approve GT alfalfa under the existing stewardship plan. (Comment Number: APHIS-2007-0044-12026-6)

Response:. APHIS has updated the FEIS to include further information regarding the effectiveness of isolation distances at maintaining gene flow below a 0.5 percent threshold. An additional alternative is being considered in the FEIS, see the response to comment APHIS-2007-0044-11741-4 for issue 1.0. This alternative sets up a stewardship program which segregates GT alfalfa seed production and conventional alfalfa seed production.

Comment Excerpt Text:
There are numerous shortcomings in the analysis of gene flow by APHIS and Monsanto/FGI. Because of these flaws, it is impossible to accurately predict gene flow and contamination percentages. The nature of these shortcomings lead to the conclusion that gene flow may exceed 0.5 percent in some cases, and when iterative gene flow is considered, cumulative contamination levels could exceed 1 percent or more over time if farmers do not take potentially costly actions to reduce contamination.
The record of contamination from other engineered crops, even when special measures are taken to prevent it, does not lead to confidence regarding the proposed stewardship proposals. Measurement of contamination of seed certified to have minimal contamination from engineered genes—where isolation distances are used to prevent contamination—shows that significant contamination is very difficult to minimize. Studies of major commodity crops in the United States and Canada revealed that contamination, often above 0.5 percent, was commonplace in certified non-engineered seed. [Footnote 20: Mellon, M and Rissler, R. 2004. Gone to seed: Transgenic contaminants in the traditional food supply.
UCS Publication, Cambridge, MA; and Friesen et al 2003 op. cit.]
APHIS should therefore recognize that the current stewardship proposals are not adequately supported and cannot assure contamination below 0.5 percent. Much more needs to be done both to determine whether the proposed stewardship proposal would in fact result in the projected level of gene flow, and if not, what measures would be needed to protect non-GT alfalfa farmers. (Comment Number: APHIS-2007-0044-12026-8)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
Coexistence for Hay Growers. Referencing the APHIS statement “Given proper adherence to FGI Best Management Practices and Monsanto’s MTA, the risk of cross-fertilization is well below FGI’s goal of less than 0.5 percent (unintended or unplanned presence of GT alfalfa).” This statement misstates (over estimates) the risk of gene flow in hay crops which is (as previously described) 99% of the situations that farmers actually face. Again, hay and seed production need to be examined differently, because in one case (seed) gene flow is maximized, whereas in the other case (hay), gene flow is greatly minimized by a series of environmental

barriers, particularly harvest schedules. The above APHIS statement pertains to the Best Management Practices for seed production, not the risks associated with production of non-GT hay for sensitive markets, or even conventional hay for conventional markets. APHIS should make sure that this is clear. Growers planting non-GE seeds for hay production will harvest non-GT hay crops; it is straightforward
For hay crops, coexistence of GE-sensitive and GE-adapting fields has been demonstrated. We have had farmers in our state who produce organic and GT alfalfa in close proximity, even in neighboring fields or on the same farm, and are able to make it work. The steps needed to produce hay for sensitive markets are clear: 1) purchase seed which has been tested and determined to be negative for the GT-gene (these are simple tests, and not costly, and can be born by the seed company), 2) harvest the hay prior to ripe seed stage, 3) determine distances to neighboring fields that might be GT (distance is the greatest controller of gene flow), 4) Control feral alfalfa in ditches (there are conventional methods available to do this), 5) If neighboring fields are GT and nearby, take steps to minimize probability of simultaneous flowering (e.g., stagger harvests), and do not place bees nearby, 6) Harvest and remove hay (that's what hay farmers do), 7) Identify and label hay destined for GE-sensitive markets (organic producers must do this anyway). 8) Lastly, and importantly, producers of non-GE alfalfa can test their hay to assure their buyers that the hay produced does not contain the RR gene. These test strips are cheap ($1 each), and we have conducted research which shows them reliable at detecting the GT gene. These series of steps have been previously described (see Putnam, 2007). While these might be an irritant to some organic or export growers, they are not onerous and no different in magnitude than steps growers of organic or other types of hay that must take to provide quality-assurance steps to their customers. "GE-free" producers may also receive a premium price. (Comment Number: APHIS-2007-0044-4913-9)

Response: APHIS acknowledges the comment. The FEIS describes these management practices in appendix V of the FEIS.

Comment Excerpt Text:
Although, NAFA, as an organization, does not endorse or promote any brand specific products, the deregulation or Roundup Ready Alfalfa gives our members one thing they do want – choice. The deregulation of Roundup Ready Alfalfa offers alfalfa producers greater choice in the marketplace and the opportunity to incorporate diverse production systems into their farming operation.
To that end, the NAFA board of directors adopted the following resolution in support of the use and availability of biotechnological products: "The National Alfalfa and Forage Alliance (NAFA)
strongly supports the availability and continued use of biotechnology in agriculture. These advances will allow American farmers to effectively compete in the world market and will enable American farmers to supply abundant, safe, high quality food, fiber and renewable fuel desired by global consumers. NAFA acknowledges and respects different markets and methodologies of food, fiber and renewable fuel production. We believe that science based stewardship management practices allow for the coexistence of these different markets and methodologies in production agriculture. NAFA believes collaborative efforts among all stakeholders are required to develop methodologies that enable coexistence."

NAFA has been very proactive in its effort to foster coexistence among growers of biotech, conventional, and organic alfalfa. In October of 2007, NAFA hosted Peaceful Coexistence: Creating a Strategy for Harmony Among GM, Organic, and Conventional Alfalfa Producers. The intent of this meeting was to create a strategy which would lead to harmonious coexistence among producers of all types of alfalfa, GM, organic, and conventional. The product of this meeting was the development of a number of NAFA adopted coexistence documents including: Best Management Practices for Roundup Ready Alfalfa Seed Production; Coexistence for Alfalfa Hay Export Markets; Coexistence for Alfalfa Seed Export Markets; and Coexistence for Organic Alfalfa Seed and Hay Markets, all of which are available for review on NAFA's website (www.alfalfa.org).
In accordance with the Best Management Practices (BMP) for Roundup Ready Alfalfa Seed Production developed as a result of the Coexistence meeting and adopted by NAFA in 2008, a team of state certification agency managers conducted a review of trait stewardship to determine if the NAFA BMP can work on a commercial scale (this review did not represent the Association of Official Seed Certifying Agencies).
A summary of the review indicated that the NAFA BMP seem to be working on a commercial scale. Should RRA be deregulated, it is recommended that the third party review process be continued. In the future, this review may lead to the ability to certify a GMO sensitive market protocol.
NAFA has also been very active in notifying its members of the opportunity to comment on the draft EIS through its website and at the following meetings:
December 3– Western Hay Assn's Meeting held w/Western Alfalfa & Forage Conf., Reno, NV
Dec 9–Feb 19 – MFA Wisconsin Local Council Winter Meetings
January 13 – Washington State Hay Growers Association, Kennewick, WA
January 14 – Idaho Alfalfa & Clover Seed Commission, Caldwell, ID
January 19 – Western Alfalfa Seed Growers Association, Las Vegas, NV
January 26 – Midwest Forage Association in Wisconsin Dells, WI
February 2 – Mid-America Alfalfa Expo in Kearney, NE
February 3 – Wyoming Alfalfa Seed Council in Powell, WY
February 4 – Montana Alfalfa Seed Committee in Billings, MT
February 8-12 – MFA in Detroit Lakes/Cromwell/Avon/Lamberton/Rochester, MN
Thank you for the opportunity to comment on the proposed deregulation of Roundup Ready Alfalfa. (Comment Number: APHIS-2007-0044-7091-2)

Response: The suggested reference has been added to appendix V of the FEIS. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Stewardship and Mitigation

The labeling for Monsanto's glyphosate–based Roundup® brand agricultural herbicides includes weed management recommendations. These recommendations are designed to minimize the potential for the development of glyphosate–resistant weeds, are consistent with EPA's Pesticide Registration Notice 2001–05, and include practices well documented in the scientific literature as

being appropriate and effective to mitigate weed resistance. [Footnote 6: An example of current Roundup WeatherMAX product label available at: http://www.cdms.net/ldat/ld5UJ029.pdf]

As part of Monsanto's stewardship of Roundup agricultural herbicides and Roundup Ready crop systems, the company alone or in cooperation with University, consultants or other third–parity cooperators conducts a comprehensive investigation of all reported cases of potential weed resistance, including studies to assess the heritability of resistance, if indicated. Multiple studies conducted by Monsanto and university cooperators have demonstrated that one of the major factors contributing to the development of resistant weeds is poor weed control management practices. Such poor practices include application at rates below those indicated on the EPA–approved label for the weed species and sizes present, and over reliance on a particular herbicide for weed control (i.e., without use of other herbicides or cultural practices such as mechanical controls or tillage) (Beckie, 2006; Peterson et al., 2007).

To better understand the glyphosate application rate that will be most effective to prevent both weeds and resistance, Monsanto and other experts have undertaken significant research to identify the appropriate rate of glyphosate required for a particular weed at various growth stages under various agronomic and environmental conditions. The rates Monsanto has established are based on over 35 years of ongoing research.

This research has addressed weed control on a broad spectrum of weeds and under a wide range of conditions. Research has found that delaying herbicide application allows weeds to grow larger, requiring higher herbicide rates later to achieve weed control. Similarly, reducing recommended herbicide rates can result in less consistent weed control (Gubbiga et al., 2002), and the use of lower–than–recommended herbicide rates may result in the development of a resistant weed population (Neve, 2007). A key element of controlling both weeds and weed resistance, therefore, is using the correct rate of glyphosate at the right time for the target weed's species and size (i.e., using a lethal dose, which avoids the need for subsequent applications). This important strategy is well supported by field research studies at several universities (Jeschke and Stoltenberg, 2006; Stoltenberg, 2002; Wilson et al., 2006).

In an effort to provide growers with the tools needed to minimize the potential for glyphosate–resistant weeds that have been found, Monsanto will continue to investigate and offer appropriate residual and postemergence herbicide products that have a different mode of action from glyphosate. For example, the herbicide metolachlor (trade name PARRLAY™) is a residual herbicide that will help reduce infestations of annual grasses and pigweed which could, in turn, slow the selection and potential spread of glyphosate–resistant weeds in Roundup Ready Cotton and Roundup Ready Flex Cotton systems.

In addition to its continuing research efforts, Monsanto has put in place a weed–resistance management stewardship program for its glyphosate–resistant (Roundup Ready) crops. The weed resistance management recommendations made for these crops are consistent with the HRAC's guidelines for prevention and management of herbicide resistance (HRAC, 2008). HRAC recommends an integrated approach to weed resistance management, including crop management and cultural practices, along with herbicides.

Roundup Ready growers are contractually obligated to abide by Monsanto's weed–resistance management stewardship program under the terms of the Monsanto Technology/Stewardship Agreement ("MTA"). Growers must sign the MTA when purchasing Monsanto's glyphosate–resistant seed. The MTA requires a grower to read and follow the applicable provisions of the Monsanto Technology Use Guide [Footnote 7: www.monsanto.com/monsanto/ag_products/pdf/stewardship/2008tug.pdf] ("TUG"). All Roundup Ready growers are provided a copy of the Monsanto TUG, which describes requirements and best practices for the cultivation of Roundup Ready crops, among other Monsanto products, including weed–resistance management practices. The TUG requires growers to be aware of and proactively manage for glyphosate–resistant weeds in planning their weed control programs. These management practices include those weed–resistance management guidelines also found on Roundup agricultural herbicide labels. Monsanto's weed–resistance management guidelines are consistent and fully compliant with EPA PR Notice 2001–5 (See Appendix 1).

The weed–resistance management practices articulated in the TUG are communicated to growers through a variety of methods. These include:

• direct mailings to each grower purchasing a Roundup Ready seed product;

• a public website (http://www.weedresistancemanagement.com) containing recommendations and additional information;

• reports in farm media publications.

Monsanto's overall stewardship program is reinforced through collaborations with U.S. academics, who provide recommendations for appropriate stewardship of the use of Roundup agricultural herbicides with Roundup Ready crops, and by crop commodity groups, which have launched several weed–resistance educational modules available on their websites [Footnote 8: See, e.g., National Corn Growers Association, "Weed Resistance Management," learning module, available at http://209.98.199.114/ncga-wrm/.]. Additionally, Monsanto requires farmers to report any incidence of repeated nonperformance of Roundup agricultural herbicides on a particular weed to the company, the seed retailer or a county extension agent. Monsanto then investigates cases of unsatisfactory weed control to determine the cause. Where resistance is suspected or confirmed, Monsanto provides growers with recommendations for alternative control methods and, when necessary, carries out additional research. (Comment Number: APHIS-2007-0044-7620.4-11)

Response: The provided URL does not work. Appendices V and G of the FEIS have been updated based on the comments.

Comment Excerpt Text:
Measures to be used by RRA hay growers.

Any grower purchasing Monsanto's RRA seed for producing hay must sign a Monsanto Technology/Stewardship Agreement ("MTSA") and, in so doing, agree to be bound by terms outlined in the TUG. The TUG contains concise information about Monsanto's technology products and sets forth guidelines and requirements for using those products. The TUG is updated annually to reflect the most recent data and technical information about the efficacy of those requirements, which, for RRA, address issues such as gene flow. [Footnote 25: See Monsanto TUG: The Source for Monsanto's Portfolio of Technology Products, Stewardship Requirements and Guidelines for Use (2010), available at http://www.monsanto.com/monsanto/ag_products/pdf/stewardship/technology_use_guide.pdf.]

The TUG directs that RRA be managed for high quality forage production, including timely cutting, before 10 percent bloom, to promote high forage quality and prevent seed development. [Footnote 26: "Most alfalfa in the United States is managed to limit growth to the juvenile (vegetative [or pre-bloom]) state so that forage production (yield) and nutritional quality of the hay are optimized. Hay with open flowers or seed (later maturity) is of poor quality for feed and has low market value." Draft EIS at 19; id. at 109 (recommended cutting height is 3 inches, which removes all plant material). As a result, in addition to being bound by the terms in Monsanto's TUG, RRA growers have a clear financial incentive to ensure that their RRA fields are cut prior to 10 percent bloom. Having paid a premium for the RRA, growers can expect to obtain a return on that investment by participating in the market for high quality forage alfalfa. See, e.g., Draft EIS at 40-41, Ap. V-9 to -10 (discussing grades and prices of alfalfa, with the highest quality alfalfa cut at pre-bloom); id. at Ap. V-37 (noting example of one RRA grower in Nevada who reported a $190 per acre per year net benefit of the technology over the conventional system); see also Comment Appendix 1, Section A (discussing investment in GT alfalfa technology as incentive to follow growing requirements).] Additionally, the TUG outlines steps for controlling volunteer RRA, such as stand termination, clearing the field of any emerged or surviving alfalfa after stand takeout and before planting a subsequent rotational crop, using certain recommended rotational crops, and addressing any volunteer RRA in a timely manner. [Footnote 27: See Monsanto TUG: The Source for Monsanto's Portfolio of Technology Products, Stewardship Requirements and Guidelines for Use (2010), available at http://www.monsanto.com/monsanto/ag_products/pdf/stewardship/technology_use_guide.pdf.] Monsanto's TUG also prohibits RRA forage producers from growing RRA crops for seed production. See Draft EIS at Ap. V-69.

As with the best practices outlined above for gene flow from seed fields, testing supports the conclusion that the practices implemented by RRA hay growers will make the potential for gene flow very remote, even when an alfalfa seed field is within hundreds of feet. See, e.g., Draft EIS at Ap. V-83 (in a hay-to-seed test, even with delayed-stage cutting or poorly managed hay fields, observed rates of gene flow were "very low (0.2-0.3%) at 150-300 ft. and rarely detected (0.00 to 0.05%) at distances greater than 350 ft."); id. at Ap. V-98 to -100 (discussing Monsanto stewardship program for RRA and studies of gene flow from RRA hay fields, and noting that "forage producers who plant Roundup Ready Alfalfa seed will cut hay aggressively to manage for optimum forage quality and minimize the number of open flowers on the standing hay."); see also id. at Ap. V-99 (citing UC research, "The combination of frequent harvests, lack of significant flowering, lack of significant seed production, and the highly competitive and

allelopathic nature of alfalfa that prevents ready germination of alfalfa seeds in existing fields should prevent most if not all gene transfer.”).

Of course, the vast majority of alfalfa hay fields are not in the vicinity of any alfalfa seed production, and the potential for gene flow between two alfalfa hay fields is extremely remote. For gene flow to occur into non-GE hay fields, alfalfa seeds must ripen in the non-GE hay field four or more weeks subsequent to its flowers having been pollinated by bees that have traveled from a synchronously-flowering GE plant. As noted above, cross-pollination is effectively and routinely carried out only by certain bee species under certain conditions, so particular pollinator bees must be abundant and active in the overly mature hay field. The alfalfa then must set ripe fruit and drop seed into a safe seed bed in order to successfully transfer genes into secondary plants within the non-GT field (i.e., pollination of one plant’s flowers by a second plant’s pollen cannot make that plant ‘become’ GE). This full development process would take place over the course of 8 to 10 weeks, given that alfalfa requires at least four weeks of appropriate environmental conditions (temperature, sunlight, nutrients, and water) before forming reproductively mature floral buds, and an additional 4 to 6 weeks after that to form mature seeds after pollination. Given that alfalfa hay is generally harvested at one-month intervals or before first flower to preserve the quality of the hay for forage – which would typically be done regardless of concerns regarding gene flow – the crop would not have time to form mature seeds. See, e.g., Draft EIS at 100 (discussing factors influencing the probability of gene flow between fields); Comment Appendix 2 at 23-24.

When hay harvest is delayed by weather or equipment issues, harvesting before the ripe seed stage is still possible in all but the most extreme circumstances. In “extreme weather circumstances, rainfall or snow during the ripening time will cause decreased seed yield and reduces seed quality (e.g., reduction in seedling vigor and reduced percent germination because of fungal pathogen infection of the seed, or seed will sprout prematurely and die while it is still in the pod) (Rincker et al., 1988), further reducing the likelihood of gene flow.” Draft EIS at 102. Moreover, in the event that viable secondary alfalfa seeds that may contain GE traits fall near adult alfalfa, those seeds will have a difficult time growing, given that they must compete for nutrients with the already-established adults, and adult alfalfa plants secrete an autotoxic substance into the soil that inhibits root growth in alfalfa seedlings. Draft EIS at 96, 102.

In other words, for “gene flow to occur in a hay field a sequence of events must occur: concurrent flowering between GE and conventional hay fields, pollen flow between the fields from local pollinators and then, a viable cross-pollinated seed must be produced, dehisced, germinate and successfully compete in an established alfalfa hay field. This series of events requires five to seven weeks after flowering depending on climate. As it is desirable to harvest hay fields prior to bloom to maintain hay quality, producers strive to harvest well before viable seed is established. Even in grazing situations, the chance of viable seed being produced from a neighboring field, pollinating and then establishing is very low, due to the sequence of multiple events that must occur, each having a low probability.” See National Alfalfa & Forage Alliance (“NAFA”), Coexistence for Organic Alfalfa Seed & Hay Markets (June 2008) (citing leading alfalfa expert, Dr. Dan Putnam), available at http://www.alfalfa.org/pdf/CSOrganic.pdf; see also Draft EIS at Ap. V-47 to -48.

As indicated, Monsanto's TUG directs RRA hay growers to harvest at or before 10 percent bloom. Attached hereto as Comment Appendix 6 are the results of a survey conducted regarding RRA hay growers' harvesting practices. The survey demonstrates that a very large majority of RRA growers cut at or before 10 percent bloom. According to the survey, 90 percent of RRA fields in western states were harvested at or before 10 percent bloom; the remaining 10 percent were harvested before 20 percent bloom. None of the survey respondents from these states suggested that they would allow the RRA crop to mature beyond 20 percent bloom. In eastern states, the survey suggested that 77 percent harvested at or before 10 percent bloom and that another 16 percent harvested at or before 20 percent. Again, in these states, in which there is very little seed production, neighboring hay growers face essentially zero risk of gene flow simply by harvesting their hay fields before they produce seed. The survey also suggests that further RRA grower education could increase the number of growers harvesting at or before 10 percent bloom – indeed, the survey indicated that harvest delays for weather-related reasons only occurred less than 25 percent of the time nationwide (28 percent in the East and 9 percent in the West). These weather issues occurred almost entirely in eastern states with very little seed production and where neighboring hay growers could easily eliminate any risk of gene flow. See also Comment Appendix 2 at 24 (discussing additional evidence that hay growers routinely cut before extensive bloom).

RRA hay grower requirements and practices contrast to possible variations in cutting time amongst non-RRA growers, who at times may cut alfalfa past the 10 or 20 percent bloom mark. See, e.g., Draft EIS at Ap. O-11 (noting that allowing late bloom is common in the upper plains states, but also noting that growers in these states are not eligible for GT seed production contracts); id. at Ap. Q-22 to -36 (discussing factors affecting harvest timing among non-RRA growers, and summarizing state-based harvest recommendations). As discussed below, however, any non-RRA hay grower concerned about a low level presence of GE organisms need only harvest the crop before it goes to seed to eliminate the risk of gene flow from alfalfa grown in adjacent farms. See, e.g., Comment Appendix 1, Section A (discussing harvest timing); Comment Appendix 5 (providing technical comments on coexistence issues).

As the Draft EIS explains, given the already low probability of successful gene flow between hay fields and from hay to seed fields, use of measures by RRA hay growers such as appropriate isolation distances and appropriate cutting times will result in essentially zero chance of pollen-mediated gene flow out of RRA hay fields. Draft EIS at Ap. V-57 ("normal forage harvest management practices" reduces the chances of gene flow between hay fields from "essentially zero" to zero, similar results are expected for feral-to-hay and hay-to-seed gene flow); id. at Ap. V-54 (figures illustrating number of events that must occur before successful gene flow could occur); id. at V-65 ("Gene flow into hay fields, whether from a neighboring seed field, hay field or feral population or grazing animal, etc. is very unlikely to result in any gene flow due to numerous biological, agricultural and environmental barriers"); id. at V-65 to -66 (describing expert analysis that the probability of gene flow out of a RRA hay field is 0.0000025% or "very, very, very low"). (Comment Number: APHIS-2007-0044-7620-20)

Response: A description of these measures has been included in appendix V of the FEIS

Comment Excerpt Text:
Measures available to non-RRA growers.

The Draft EIS identifies and analyzes a variety of realistic measures that non-GE growers, whether conventional or organic, can take to "effectively reduce or prevent gene flow from neighboring GE alfalfa crops." Draft EIS at 102. For instance, non-RRA growers can use seed certification organizations to locate RRA fields and identify appropriate isolation distances. They can purchase seed of known genetic purity. They can track flowering habits and harvest schedules on nearby fields in order to appropriately time their own harvests. Non-RRA growers can also minimize commingling of harvested forage, and they can adopt prudent cultured bee management practices. See, e.g., Draft EIS at 137, Ap. V-59 to -60, Ap. V-68 to -72, Ap. V-77 to -79 (discussing methods available to both non-RRA forage and seed growers to prevent unwanted gene flow). All of these steps are commonly used practices for alfalfa and can facilitate the "successful coexistence" of conventional, organic, and Roundup Ready forage and seed alfalfa. Draft EIS at Ap. V-28; see also Comment Appendix 1, Section B (practical and effective measures to prevent gene flow); Comment Appendix 2 at 23 (discussing new AOSCA certification program to assist non-GE growers).

Although these practices are not required, any non-RRA grower interested in supplying a GE-sensitive market has an incentive to follow these measures and, based on norms in other crop species, they can be expected to receive a premium for any increased costs associated with adopting these measures. Indeed, the accepted practice with Identity Preserved ("I.P.") products, such as products identified as organic and/or "GMO-free," is that each I.P. farmer has the responsibility to implement any necessary I.P. processes, which may include sourcing seed appropriate for I.P. specifications and implementing field management practices, such as adequate isolation distances, buffers, and planned differences in maturity between adjacent fields that might cross-pollinate. The extra steps associated with I.P. crop production are generally accompanied by incremental increases in the cost of production and consequently of the goods sold. See, e.g., Comment Appendix 2 at 7-8; see also Draft EIS at 135 (noting that premiums for organic alfalfa hay production are between 10 and 50 percent).

The National Organic Program ("NOP") in the U.S. is an example of an I.P. program, and, as the Draft EIS discusses, organic alfalfa growers not only have the above commonly-used practices to prevent gene flow, they also have the standards outlined in the NOP and each organic grower's organic systems plan. See, e.g., Draft EIS at 137 ("commonly used production practices for alfalfa, and the practical methods typically used by alfalfa farmers using organic methods to protect their crops and maximize their profits and price premiums granted to alfalfa under organic production, currently provide many effective measures to greatly reduce the likelihood of accidental gene flow."). The NOP was created in 1990 by the Organic Foods Production Act, 7 U.S.C. § 6501, et seq., [Footnote 28: See also 7 C.F.R. part 205, subpart E.] to develop uniform standards and a certification process for those producing and handling food products offered for sale as organically produced. The NOP is a process-based system, meaning that the program does not require that organic products be tested to qualify as organic. Instead, the NOP specifies certain practices and products that cannot be used by growers who want their products to qualify for organic status, such as the use of biotechnology-derived crops in their production practices. All organic growers create organic systems plans that outline the growing processes used and the

steps taken to avoid gene flow from any neighboring biotechnology-derived crops. See, e.g., Draft EIS at 136 (noting that organic certification under the NOP gives the organic producer the responsibility to take steps to avoid unintentional contact with non-organic material). These plans must be approved by an organic certifying agent, and the certification process includes on-site inspections to verify that approved procedures are being used. As long as an organic grower follows his or her approved organic systems plan, if some adventitious presence of GE organism is later found in the organic crop, neither the crop nor the organic farmer is in danger of losing organic status. See Comment Appendix 2 at 10-14; see also Draft EIS at 33 ("USDA certification is a process-based certification only").

The only required testing performed on organic crops as part of the NOP certification process is when a certifying agent has some reason to believe that a grower has used excluded methods. 7 C.F.R. § 205.670(b); see also Draft EIS at 133 ("organic certification does not require testing for GE content and focuses on the process used to grow the product – the farming operations – rather than on content of the product itself.") Even then, should testing reveal the presence of GE material, a grower would not necessarily lose the organic certification. Instead, a certifying agent would further investigate to determine whether any prohibited practices were used by the grower claiming organic status. See Comment Appendix 2 at 12-14.

Additionally, any testing that reveals the presence of GE material (in organic or conventional alfalfa) would not necessarily mean a loss in customers willing to purchase the product. As the Draft EIS explains, if an individual lot of hay tests positive for a GE trait and is consequently rejected by its intended GE-sensitive buyer, that grower would still be able to find alternate customers, particularly given the small size of the potential GE-sensitive market in relation to the much larger non-GE-sensitive market. See, e.g., Draft EIS at Ap. V-47 to -48 (discussing potential impacts to organic growers and other "GM-Sensitive" alfalfa producers); id. at Ap. S (evaluating potential impacts on the supply and demand for organic and conventional alfalfa).

Finally, although some biotechnology opponents express concern that customers will cease purchasing organic products if there is a perception that the latter contain some low level presence of GE organisms, there is no statistically significant data suggesting that outcome. See, e.g., Draft EIS at 133-139 (discussing lack of data confirming that the deregulation of RRA would lead to decreased demand for organic alfalfa); id. at Ap. S-16 ("We found no evidence to suggest domestic consumers of organic dairy and meat would shift to substitute products in the event of possible unintended presence of GT alfalfa in feed for dairy and meat."). In fact, the organic crop and livestock industries have experienced nothing but steady growth over the last twenty years at the same time that GE crop production has expanded. See, e.g., Comment Appendix 2 at 14-16 (discussing fast growth in organic markets since biotechnology-derived crops came on the market); Draft EIS at Ap. T-15 ("Successful marketing of NOP certified foods has already had to contend with the risk of GE material accidentally spreading from deregulated cultivars of soybeans, corn, and canola to organic crops. Despite the potential for unintended presence of GE material, however, the evidence cited above indicate that organic food sales in the United States continue to grow at a rapid rate."); see also Draft EIS at 178 (discussing potential cumulative impacts on the growth of organic markets as a result of deregulating RRA, which are difficult to predict, but could include further increases in demand for organic products).

In sum, the mitigation measures available to non-RRA growers are not novel, unknown, or difficult to implement; instead, they are based on practices that have long been applied to virtually all varieties of crops and have allowed for coexistence in agricultural production systems and supply chains for decades. [Footnote 29: There are numerous examples of different varieties of the same plant successfully coexisting. For example, the production of similar commodities such as field corn, sweet corn, and popcorn has occurred successfully and in close proximity for many years. Similarly, oilseed rape varieties with low erucic acid content for food use have successfully coexisted with oilseed rape varieties with high erucic acid content for industrial uses.] Successful coexistence of all agricultural systems is achievable and depends on cooperation, flexibility, and mutual respect for each system. (Comment Number: APHIS-2007-0044-7620-21)

Response: A description of these measures has been included in appendix V of the FEIS.

Comment Excerpt Text:
Practical and Effective Measures that Organic, Export or other GE-Sensitive Producers Can Use to Prevent Gene Flow and Their Costs

APHIS states in the DEIS that it has limited information regarding the incremental costs that would be incurred by non-GT, export or organic seed or hay producers due to the production of GT alfalfa. See DEIS at 132. The impact of GT alfalfa on these markets and specific mitigation strategies were developed by the National Alfalfa & Forage Alliance ("NAFA") and are published on NAFA's website [Footnote 3: The NAFA home page is available at http://www.alfalfa-forage.org (accessed Feb. 24, 2010).], [Footnote 4: NAFA. 2008. Best Management Practices for Roundup Ready ® Alfalfa Seed Production. NAFA Coexistence Document. Adopted January 2008. Available at http://www.alfalfa.org/pdf/CSBMPForRRA.pdf (accessed Feb. 24, 2010).], [Footnote 5: NAFA. 2008. Coexistence for Alfalfa Seed Export Markets. NAFA Coexistence Document. Adopted June 2008. Available at http://www.alfalfa.org/pdf/CSExportSeed.pdf (accessed Feb. 24, 2010).], [Footnote 6: NAFA. 2008. Coexistence for Alfalfa Hay Export Markets. NAFA Coexistence Document. Adopted June 2008. Available at http://www.alfalfa.org/pdf/CSExportHay.pdf (accessed Feb. 24, 2010).], [Footnote 7: NAFA. 2008. Coexistence for Organic Alfalfa Seed & Hay Markets. NAFA Coexistence Document. Adopted June 2008. Available at http://www.alfalfa.org/pdf/CSOrganic.pdf (accessed Feb. 24, 2010).]. NAFA developed these mitigation strategies using information contained in a recent, comprehensive, peer-reviewed publication titled "Gene Flow in Alfalfa: Biology, Mitigation and Potential Impact on Production"1. FGI recommends that APHIS reference these materials in its discussion of mitigation strategies and incremental costs. FGI additionally provides the following discussion of industry norms, science-based methods for continued non-GT production and an incremental cost analysis for APHIS' consideration. (Comment Number: APHIS-2007-0044-7620-24)

Response: Additional suggested references have been reviewed and incorporated in the FEIS in section IV.D.2 and appendix V.

Comment Excerpt Text:
Gene Flow Mitigation Measures Contractually Required for All GT Alfalfa Seed Producers

Although the DEIS discusses the stewardship measures required by the Monsanto MTA and FGI Best Practices, see DEIS at 102-03, FGI recommends that APHIS also update and further discuss the development, adoption, and independent review of the National Alfalfa & Forage Alliance Best Management Practices for Roundup Ready® Alfalfa Seed Production ("NAFA BMP") [Footnote 4: NAFA. 2008. Best Management Practices for Roundup Ready ® Alfalfa Seed Production. NAFA Coexistence Document. Adopted January 2008. Available at http://www.alfalfa.org/pdf/CSBMPForRRA.pdf (accessed Feb. 24, 2010).] by the alfalfa industry as a practicable, contract enforced, science-based and market-driven strategy for coexistence. The NAFA BMP are protocols required of all GT alfalfa seed growers and all GT alfalfa seed producers that are designed to enable coexistence by mitigating all or nearly all unwanted gene flow between dissimilar crops and to aid in protecting non-GT, export and organic forage and seed crops. FGI provides the following information for inclusion in the final EIS and Appendix V at Section 5.8 "Overview of Alfalfa Industry Coexistence Systems Development". DEIS, App. V at V-74.

Background

In October 2007, the National Alfalfa & Forage Alliance hosted a forum titled "Peaceful Coexistence: Creating a Strategy for Harmony Among GM, Conventional and Organic Alfalfa Producers" [Footnote 14: NAFA. 2007. Peaceful Coexistence: Creating a Strategy for Harmony Among GM, Conventional and Organic Alfalfa Producers. Coexistence Strategy Forum, October 10, 2007, Denver, Colorado. The agenda and proceedings are available at http://www.alfalfa.org/CSAgendaProc.html. Steering Committee Member List available on line at: http://www.alfalfa.org/CSSteering.html. The workshop results are available at http://www.alfalfa.org/CSWorkshop.html. The Coexistence Document Series is available at http://www.alfalfa.org/CSCoexistenceDocs.html (accessed Feb. 24, 2010).]. Invited speakers represented and discussed issues of interest for the key stakeholder groups. The open meeting included several alfalfa hay and seed producers, seed company representatives, organic industry members and university scientists. All attendees took part in one or more discussion sessions designed to solicit and record concerns and ideas. A broad-based Steering Committee was formed to refine the contributions of the event's participants into a comprehensive strategy to facilitate coexistence among growers of organic, conventional and Roundup Ready alfalfa. A key work product, facilitated by the entire Steering Committee, was to review and recommend changes to the FGI RRA seed production best practices that were in use at the time. The resulting document, NAFA Best Management Practices for Roundup Ready® Alfalfa Seed Production, was approved by the Steering Committee and the NAFA board of Directors [Footnote 4: NAFA. 2008. Best Management Practices for Roundup Ready ® Alfalfa Seed Production. NAFA Coexistence Document. Adopted January 2008. Available at http://www.alfalfa.org/pdf/CSBMPForRRA.pdf (accessed Feb. 24, 2010).]. Immediately following NAFA's adoption of the BMP in January of 2008, FGI updated its best management practices to encompass the NAFA BMP. FGI has the exclusive right to conduct RRA seed production, with additional rights to sublicense other seed production companies. The sublicense

contract requires adherence to current NAFA BMP, and obligates FGI to the same. All seed growers who produce RRA for seed for any seed licensee must be under contract with FGI, and without exception, each is thereby obligated to also comply with the NAFA BMP.

RRA Seed Producer Key Requirements

The NAFA BMP include third party monitoring at two levels:

1) Company adherence to NAFA BMP - A RRA seed grower must insure that any new RRA planting has the required isolation distance from the nearest conventional alfalfa seed field prior to planting, and must report GPS coordinates of all established and planned RRA seed production fields to local state seed certification officials as early as possible, but no later than two weeks prior to planting. State seed certifying agency personnel then conduct a field inspection to verify the GT alfalfa seed field planting location and that the minimum isolation distances have been met. Although the identity of the RRA seed grower and the location of the field remain confidential, the seed certification agencies are authorized to share isolation distance information to any interested seed grower who contacts the agency.

2) Effectiveness of current NAFA BMP - A NAFA-appointed independent review panel, made up of seed certification officials from three states, conducts an annual review of the effectiveness of the NAFA BMP. The purpose of the review is to validate that the NAFA BMP are effective, and if not, to suggest appropriate changes for improvement. Effectiveness is measured by the actual levels of GT trait adventitious presence found in conventional seed production lots across all NAFA Genetic Supplier seed company members (Cal/West Seeds, FGI and Pioneer Hi-Bred International). These three companies together produce more than 70 percent of U.S. proprietary seed production. In 2009, the companies submitted results from over 1,000 seed lots tracing to production from all ten western states where RRA seed was grown (Lowry, 2010) [Footnote 11: Lowry, G. 2010. Stewardship initiatives to protect our non-GMO seed markets. Pages 27-33, in Proceedings for the 2010 Winter Seed School Conference of the Western Alfalfa Seed Growers Association. January 17-19, 2010, Las Vegas, Nevada.], [Footnote 15: Note that no GT alfalfa seed was produced in Texas, although the NAFA BMP and Roundup labeling authorize seed production in Texas.]. Mr. Greg Lowry, Executive Director of Idaho Crop Improvement and AOSCA Past President, served as the Chair of the 2009 NAFA BMP review panel. In his January 19th presentation to the 2010 Western Alfalfa Seed Growers Association Annual Meeting in Las Vegas, Nevada, Lowry reported that based on the 2009 panel's analysis, the review team concluded that, "[t]he NAFA BMP system seems to be working on a commercial scale" (Lowry, 2010). Highlights of the review were previously shared with the NAFA Board of Directors in June, 2009 [Footnote 16: NAFA. 2009. National Alfalfa & Forage Alliance 2008-09 Annual Report. Available at http://www.alfalfa.org/pdf/annualreport0809.pdf (accessed Feb. 24, 2010).]. The NAFA 2008-09 annual report stated, "In accordance with the Best Management Practices (BMP) for Roundup Ready® Alfalfa Seed Production adopted by NAFA in 2008, a team of state certification agency managers conducted a review of trait stewardship to determine if the NAFA BMP can work on a commercial scale (this review did not represent the Association of Official Seed Certifying Agencies). A summary of the review indicated the NAFA BMP seem to be working on a commercial scale. Should RRA be deregulated, it is recommended that the third party review process be continued." This thorough third-party annual review directly

subjects all GT seed producers to “independent monitoring and oversight of FGI seed stewardship practices” as discussed by APHIS in the DEIS. DEIS, App. V at V-74 (Sec. 5.8).

The NAFA Coexistence Steering Committee [Footnote 14: NAFA. 2007. Peaceful Coexistence: Creating a Strategy for Harmony Among GM, Conventional and Organic Alfalfa Producers. Coexistence Strategy Forum, October 10, 2007, Denver, Colorado. The agenda and proceedings are available at http://www.alfalfa.org/CSAgendaProc.html. Steering Committee Member List available on line at: http://www.alfalfa.org/CSSteering.html. The workshop results are available at http://www.alfalfa.org/CSWorkshop.html. The Coexistence Document Series is available at http://www.alfalfa.org/CSCoexistenceDocs.html (accessed Feb. 24, 2010).] felt that third-party validation of the efficacy and adherence to NAFA BMP by the GT alfalfa seed production companies was critical because this end-point analysis shows not only that the current isolation standards are working to achieve coexistence, but the analysis includes all of the other factors that could potentially lead to incremental low level presence of the GT trait, such as gene flow from feral RRA plants, possible admixtures from inadequately cleaned harvest equipment, and/or possible admixtures during seed processing. The annual effectiveness review also insures that if industry conditions change that make the NAFA BMP less effective, such as increased acreage of GT alfalfa production, there is a science-based, industry-driven mechanism for updating or adjusting the NAFA BMP as necessary.

The NAFA BMP limit GT alfalfa seed production to only eleven (11) western states (CA, OR, WA, ID, MT, NV, UT, WY, AZ, CO and TX). Professional seed growers in the West typically grow alfalfa seed in conformance to AOSCA, State and/or OECD seed certification standards. Glyphosate herbicide has been labeled for GT seed crop use only in these 11 states, and any GT alfalfa grower who uses glyphosate to produce a GT seed crop in other states would be in clear violation of pesticide usage laws in addition to licensing violations.

An additional formal geographic (isolation) stewardship restriction to promote coexistence and enable non-GT seed production for export and organic markets has been implemented for the Imperial Valley of California. See the Imperial Valley Use Agreement, a supplement to the Monsanto Technology Use Agreement [Footnote 17: Section J: Monsanto 2008 and 2009 Technology Use Guides and Associated Materials; Trait Stewardship Considerations: Seed Company/Dealer Policies; Roundup Ready Alfalfa Imperial Valley Use Agreement, in Arent Fox. 2008. Comprehensive Overview and Implementation of Stewardship Measures for Roundup Ready Alfalfa. Proceedings: Presentation to APHIS and APHIS Invitees. Riverdale, Maryland, August 28, 2008. (Unpublished, bound compilation of presentations submitted to APHIS on Sept. 17, 2008).]. This restriction was designed by Monsanto, FGI and Imperial Valley alfalfa producers to restrict GT alfalfa usage in the region to protect alfalfa seed production destined for export markets, a predominant activity in the Imperial Valley. As a planned result, there is a de facto geographic-isolation zone wherein no GT alfalfa is grown because the prerequisite extraordinary isolation cannot be assured. Consequently, no GT hay production users are licensed by Monsanto and no GT seed contracts have been issued by FGI in this geographic area. This industry-led enhanced stewardship requirement for Imperial Valley is consistent with APHIS’ county level analysis wherein APHIS identified that many alfalfa growers in Imperial County, California, may be reluctant to adopt or support deregulation of RRA. DEIS, App. R at R-22.

As discussed above, the NAFA BMP are uniformly required under all RRA seed grower contracts; they are not elective for FGI or its licensees. Third-party monitoring shows the NAFA BMP are being followed [Footnote 18: G. Lowry, Sections G and H: Tools for Seed Industry Stewardship, and, March 2, 2007, Declaration of Greg Lowry, in Arent Fox. 2008. Comprehensive Overview and Implementation of Stewardship Measures for Roundup Ready Alfalfa. Proceedings: Presentation to APHIS and APHIS Invitees. Riverdale, Maryland, August 28, 2008. (Unpublished, bound compilation of presentations submitted to APHIS on Sept. 17, 2008).] and they are effective [Footnote 17: Section J: Monsanto 2008 and 2009 Technology Use Guides and Associated Materials; Trait Stewardship Considerations: Seed Company/Dealer Policies; Roundup Ready Alfalfa Imperial Valley Use Agreement, in Arent Fox. 2008. Comprehensive Overview and Implementation of Stewardship Measures for Roundup Ready Alfalfa. Proceedings: Presentation to APHIS and APHIS Invitees. Riverdale, Maryland, August 28, 2008. (Unpublished, bound compilation of presentations submitted to APHIS on Sept. 17, 2008).]. For example, the results of the 2009 third-party audit demonstrate that the NAFA BMP are effective in preventing AP, or in keeping AP to very low levels (e.g., <0.5%). In particular, the 2009 third-party audit shows that the NAFA BMP are effective in managing AP to at or below the very low levels adopted as industry standards for other biotech crops, see DEIS, App. Q at Q-11 (Figure Q-1), and below the most strict state standard for Certified Seed off-types in California and Montana (0.5 percent), see DEIS at 97 (Table 4-2). (Comment Number: APHIS-2007-0044-7620-29)

Response: APHIS acknowledges the comment. Additional suggested references regarding the contractual practices associated with cultivation of GE alfalfa have been reviewed and incorporated in the FEIS section IV.B4 and appendix V where appropriate.

Comment Excerpt Text:
USDA is completely out of line in assigning sole responsibility for avoiding GE contamination to growers. Even the most conscientious farmers' best-laid plans and intentions are impacted by contingencies and unforeseeable circumstances—USDA's assumption that controlling seed migration is an easy task is outrageous and insulting. It is USDA's job to protect ALL farmers, and so is protecting farmers who choose to grow non-GE crops.
Coordinating planting and harvesting schedules to "avoid simultaneous flowering" with RR alfalfa in a neighbor's field, and "disallow[ing] or remov[ing] commercial beekeepers' hives anywhere near your alfalfa field" is laughably unfeasible, especially in right-to-farm states (EIS p. 102). Farmers in these and other states are fiercely independent and protective of their property rights and will (rightfully) balk at the suggestion that they should change systems that work for them in order to accommodate someone else's new-fangled crop. Attempts to do this with GE corn and soy have proven woefully inadequate and in many areas have wound up pitting farmer against farmer. The U.S. food supply and economy simply cannot afford the disruption that inviting more farmer vs. farmer and farmer vs. Monsanto lawsuits will cause.
Even if all farms operated according to USDA's rosy let's-all-get-along scenario, the measures the Agency outlines would not be enough to prevent significant contamination. For instance: economic realities compel many farmers to contract with third-party companies to swath their fields; the miniscule size of alfalfa seed (half the size of a pin head) elminates the possibility of a

guarantee that swathers won't cross-contaminate fields; even if swathing companies dedicated particular swathers to GE and others to non-GE fields (not likely except for very wealthy business owners), those swathers will still be travelling up and down roads alongside fields—they wouldn't have to enter those fields to incidentally scatter some seed and contaminate them. Contamination from the seeding process itself—due to spray vehicles, etc.—is another possibility, as is accidental contamination from small scale farmers transporting seed in bags—what if farmers go to get seed and the bag rips? If even a few such incidentally scattered seeds germinated, it would be a problem, especially if these kinds of accidents happened on a near daily basis (which they are bound to). There's no way farmers would know or be able to tell that their fields had been contaminated. (Comment Number: APHIS-2007-0044-8397-7)

Response: In regard to the burden of control measures, see response to comment APHIS-2007-0044-11689-10 for issue 9.0 (paragraph 1 of the response). A discussion of the consensus BMPs from NAFA has been added to the FEIS in section IV.B.4 and appendix V.. .These BMPs are considered to be feasible and reasonable.

Comment Excerpt Text:
The USDA document (p 55-56) adequately reviews the value of alfalfa as a sustainable crop that provides significant ecosystem services. The dilemma that we face with alfalfa is that although it is a great environmental and rotational crop, we are dramatically losing acreage for the reasons that are stated in the document. Meanwhile, corn and soybean acreage is ever expanding and developers have had unlimited access to genetic engineering technology to improve these crops. Alfalfa developers have only used conventional plant breeding. It appears that alfalfa breeders have reached a plateau in advancing the crop yield and other traits. If we do not begin to adopt genetic engineering technology for alfalfa it will become a minor crop and we will lose its environmental advantages. This will negatively impact our society.

Conventional growers of alfalfa should have the opportunity to use the latest approaches and technologies available- it is an economic necessity. Indeed, because of the emphasis on commodity production there seems to be no half-way point for growers-either adopt high input technology to produce quantities of commodities or face economic challenges. This is supported by changes in farm size and demographics; the disappearance of medium size farms and the concentration of production and acreage in large farms. See:
http://www.ers.usda.gov/AmberWaves/November07/DataFeature/

Organic agriculture is an important and growing industry. Organic growers have a right to practice organic crop production that often includes use of an alfalfa green manure crop to provide nitrogen and livestock feed. Consequently, organic production practices involving alfalfa must not be compromised by GMO technology. Protection is in part provided to growers and consumers via the national organic standards which are a legal set of practices for organic production and which forbid use of GMO technology.

To strike a balance for the overall sustainability of agriculture, I feel that there should be an opportunity for production of both organic and GT alfalfa. I base this comment on the following:

• Coexistence already exists for GMO and organic corn and soybean, two crops that occupy over half the agricultural landscape in the Midwest.
• Guidelines have been developed to minimize pollen flow, seed contamination, and hay contamination from GT alfalfa. It is the responsibility of developers of the GT products and their users to insure that these be strictly followed to protect organic and other conventional growers.
• Instructions and cautions on the EPA approved label related to glyphosate use on alfalfa must be strictly followed and enforced." (Comment Number: APHIS-2007-0044-9164-6)

Response: APHIS acknowledges the comment. In regard to agricultural approaches supported by APHIS, see the response to comment APHIS-2007-0044-11753-1 for issue 2.0.

Comment Excerpt Text:
If GT alfalfa is deregulated there would be no restrictions or permits required to grow GT alfalfa. Instead, APHIS relies on farmers' perfect adherence to Monsanto MTA and FGI's Best Practices to keep gene flow at bay. APHIS lists several conditions that increase the possibility of gene flow such as seed field proximity, pest management strategy, feral alfalfa gene flow corridors, movement of honey bees and overstocking pollinators. In addition to unenforceable best practices, farmers must also "take these factors and employ methods to counter these factors" to help reduce or prevent gene flow between neighboring alfalfa crops. (DEIS at 105). Yet, despite best practices and additional methods to reduce gene flow, contamination can and will occur. Furthermore, APHIS cannot delegate its statutory duties to third parties in this way and to do so completely in this manner is arbitrary and capricious.

In any event, the sufficiency of mitigation measures has been stated as whether they constitute "an adequate buffer against the negative impacts that may result from the authorized activity." [Footnote 33 National Parks & Conservation Ass'n v. Babbitt, 241 F.3d 722 (9th Cir. 2001).] As a practical matter, the job of preventing gene flow falls to the people least likely to actually take those precautions, namely those who don't care if contamination occurs and a full analysis of the likelihood that such practices will actually be used is lacking. Moreover here it is clear the business as usual practices given APHIS' imprimatur will not prevent contamination. The DEIS documents that wild and farmed pollinators can travel and cross-pollinate well beyond any distances of seed contracts and best practices. APHIS' conclusion that transgenic contamination will not occur despite this fact is flatly contrary to the record evidence. (Comment Number: APHIS-2007-0044-9936-8)

Response: APHIS acknowledges the comment. The DEIS analyzed the effectiveness of the different mitigation methods proposed for reducing gene flow and comingling of alfalfa types in appendix V (sections 5.5 to 5.10). Based on public comments on the DEIS, an additional alternative has been added to the FEIS that was not considered in detail in the DEIS. This alternative is intended to more fully examine the potential impacts on non-GE farmers. Imposing a testing requirement was not analyzed in detail. Full descriptions of this added alternative and alternatives rejected from further consideration are included in chapter 2 of the FEIS. In addition, chapter 4 of the FEIS has been updated per this new alternative.

Comment Excerpt Text:
APHIS discusses at length gene flow potentials from GE alfalfa to non-GE alfalfa. Overall, they conclude that there is limited risk of gene flow from GE alfalfa into other alfalfa populations. NCGA disagrees with this conclusion for a number of reasons. First and foremost, gene flow between GE alfalfa and non-GE alfalfa is not only probable it is likely. The variety of factors including harvest time, pollinator activity, flowering, seed germination and seed dispersal that must be perfectly managed to prevent gene flow is nearly impossible. Indeed Marvier and Van Acker (2005) concluded in their research, "Although stringent regulatory procedures and good stewardship practices will help reduce the level of gene flow between GM and no-GM alfalfa, the total containment of GM traits in commercial systems across a broad region is perhaps impossible."

Unforeseen circumstances including weather, human error and stochastic events are unavoidable and such events will most certainly lead to gene flow from GE populations into non-GE populations (Bagavathiannan and Acker). Kendrick et al. (2005) concluded that non GE alfalfa fields are clearly receptive to the introgression of the CP4 EPSPS glyphosate resistance gene.

Further, evidence suggests that transgenic populations CAN provide potential fitness advantages (Hanock 2003) and even infer a fitness advantage on wild populations (Laughlin et al. 2009), a point that APHIS does not recognize. Additional studies have demonstrated that gene flow from transgenic crops to their cultivated or wild varieties are possible at considerable distances (Messeguer et al. 2001;

Further, gene flow will result for a number of reasons including the following:

1) The Potential for Auto Toxicity is not Guaranteed. Auto toxicity is not necessarily a limitation in GE alfalfa. APHIS notes that "volunteer" plants are unlikely to be an avenue for effective gene flow since alfalfa plants and debris produce compounds that create an auto toxic reaction to germinating alfalfa seeds. As a result of this phenomenon APHIS believes that such limitations of germination will not allow for the successful self-seeding of volunteer plants (APHIS pg. 96). NCGA does not believe that these conclusions are accurate and that auto toxicity in alfalfa is not a guaranteed process. Jennings and Nelson (1998) found in their research that auto toxicity was influenced by soil texture and rainfall, which would affect a variety of factors that would limit auto toxicity. Bagavathiannan and Van Acker (2009) further agreed and noted, "Widely dispersed alfalfa seeds could escape this auto toxic limitation." Given the random potential for such occurrences based on a number of uncontrollable factors, NCGA rejects the notion that auto toxicity will fully limit gene flow from GE alfalfa.

2) Flowering Time and Management Practices Vary. While Monsanto may require that alfalfa hay growers harvest their crop at or before a 10 percent bloom, assuming that this is always done is naïve. In fact, APHIS fully acknowledges that, "there is no optimal harvest schedule, because farmers make different decisions based on changing market demand. Farmers typically harvest between late bud stage and full bloom" (APHIS pg. 70). Further, even if only 10 percent or less of alfalfa flowers are on a field, thus enabling pollination, this amount is clearly enough to result

in considerable gene flow. Rognli et al. (2000) concluded that while a combination of isolation distance, population size and differing flowering times can reduce gene flow from cultivated to feral populations, such practices are difficult to translate into management practices. This is particularly true given that feral populations themselves are variable in flowering times and limiting the pollen donor population essentially defeats the crop production purpose. Gene flow is highly effective and even one GE plant left in a field of many can result in the transfer of GE genes to feral and non-GM alfalfa.

3) Feral Alfalfa Will be Exposed to Glyphosate. APHIS asserts that even if feral alfalfa plants were exposed to GE alfalfa and hybridized, tolerance to glyphosate would not create any competitive advantage unless such populations were exposed to glyphosate. APHIS states that such situations would only occur in managed ecosystems where glyphosate is applied for broad-spectrum weed control. The presence of novel traits like herbicide resistance may facilitate the persistence of feral populations and continued gene flow (Bagavathiannan and Van Acker 2008). Such situations will mostly certainly occur- Monsanto claims that glyphosate is one of the most widely used herbicides in the world and self describes their RoundUp Ready products, which contain glyphosate as the main ingredient, “broad-spectrum, non-selective herbicides.” In fact, glyphosate will be utilized in a variety of managed ecosystems. Monsanto also notes that RoundUp is used for a number of non-agricultural purposes including for the control of weeds in right-of ways, roadsides, along railways, near sidewalks, and in restoration projects (Monsanto 2005).

Research from Kendrick et al. (2005) found that of 940 roadside sites in 47 counties in California, Idaho, Pennsylvania, South Dakota and Wisconsin, approximately 22% of these sites had feral alfalfa populations within 2000m of cultivated alfalfa. Thus, feral alfalfa located in such places as roadsides, which have hybridized with GE alfalfa and thus possess glyphosate tolerance, will absolutely confer a competitive advantage, given their likely potential exposure to glyphosate.

4) Isolation Distances and Barriers are not Adequate. While physical barriers like hedges and woodlands can reduce the flow of pollen, Treu and Emberlin (2000) concluded during their survey research that such features mainly dilute rather than contain flow. Since alfalfa is mostly pollinated by bees, long distance gene flow is also possible. The contractual obligations that currently exist for GE alfalfa growers for isolation distances are not adequate to prevent gene flow through pollination. For example, isolation distances must be 900 feet when using leafcutter bees, 1 mile when using Alkali bees and 3 miles or greater when utilizing honey bees. Yet, research demonstrates that pollinated gene flow can occur at greater distances. Amand et al. (2000) found gene flow and pollination in leafcutter bees occurring up to 1000m and Fitzpatrick et al. (2003) demonstrated bee pollen mediated gene flow up to 805 m away. In honey bees, experiments have determined that they can fly up to 11km (Seely 1985); likewise, bumble bees can travel up to 8km (Shelly et al. 1991). These results demonstrate that the current management isolation distances and barriers are not sufficient to biologically contain pollinated gene flow. (Comment Number: APHIS-2007-0044-11018-9)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

In regard to gene flow due to human error, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1(paragraph 2 of the response).
In regard to gene flow due to unintentional mixing and distribution of seed, see the response to comment APHIS-2007-0044-10263-5 for issue 3.2.
In regard to fitness advantages of transgenes in nature, evaluation of the suggested references demonstrate that although fitness advantages might be implied from these studies, actual fitness increases in nature as a result of selection pressure and transgene gene flow have not been observed.
In regard to autotoxicity, APHIS has expanded appendix V.5.2.3 of the FEIS to discuss that auto toxicity is influenced by soil texture and rainfall, which would affect a variety of factors that would limit auto toxicity. Bagavathiannan and Van Acker (2009) further agreed and noted, "Widely dispersed alfalfa seeds could escape this auto toxic limitation."
Within alfalfa stands, however, in the event that any seed production was to occur, the seed that is produced has a low probability of surviving and developing into a plant that survives the competition of established alfalfa plants.
In regard to timing of alfalfa forage harvest, see the response to comment APHIS-2007-0044-10263-7 for issue 3.1.
In regard to gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.
In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for issue 3.1
Based on public comments on the DEIS, an additional alternative has been added to the FEIS that was not considered in detail in the DEIS. This alternative is intended to more fully examine the potential impacts on non-GE farmers. Imposing a testing requirement was not analyzed in detail. Full descriptions of this added alternative and alternatives rejected from further consideration are included in chapter 2 of the FEIS. In addition, chapter 4 of the FEIS has been updated per this new alternative.

Comment Excerpt Text:
Isolation. This is covered in two bullet points. The first establishes isolation distances. The second puts all responsibility on maintaining these distances on producers who wish to grow non-GE seed. Not surprising because the methodology is parallel to that for organic grain crops. This just plain won't work in practice for alfalfa. With isolation distances in miles it is obvious that not all non-GE seed producers will have control over land between GE fields and their own fields. Without control they will run the risk of having someone between the two locations decide to grow either GE alfalfa for seed (required to register) or forage (not required to register) after they have made the decision to plant their fields. At the very least it guarantees non-GE alfalfa producers will be put at a significant competitive disadvantage. APHIS knows this. There is no plan in the EIS to control it. This is a major flaw in the whole case made for deregulation. (Comment Number: APHIS-2007-0044-2308-6)

<u>Response</u>

Based on public comments on the DEIS, an additional alternative has been added to the FEIS that was not considered in detail in the DEIS. This alternative is intended to more fully examine the potential impacts on non-GE farmers. Imposing a testing requirement was not analyzed in detail. Full descriptions of this added alternative and alternatives rejected from further consideration are included in chapter 2 of the FEIS. In addition, chapter 4 of the FEIS has been updated per this new alternative.

Comment Excerpt Text:
Coexistence Issues. I am aware that another area of concern is the coexistence of RR alfalfa with organic alfalfa or alfalfa grown for other sensitive markets. In my professional opinion coexistence is easily achieved between conventional and RR hay fields due to the safeguards that exist in the hay production system. Numerous conditions must be met for adventitious presence to occur through pollen plow from a RR alfalfa field to a conventional field. These conditions are described in previously published works (Putnam 2007). The greatest barriers are that alfalfa is cut significantly before seed production would occur. And, in the extremely rare event that any seed production was to occur, the seed that is produced has an extremely low probability of surviving and developing into a plant that survives the competition of established alfalfa plants. I have personally done research aimed at trying to thicken thin stands of alfalfa through overseeding and this has been largely unsuccessful even under ideal conditionsmuch better than those that would occur when alfalfa seed falls onto the soil surface.
Gene flow between alfalfa seed fields or from a RR hay field or a feral RR plant along a roadside is a far more likely occurrence than between hay fields. However, this can be prevented or reduced to a negligible level through diligence and proper isolation distances between fields. (Comment Number: APHIS-2007-0044-9931-4)

Response: APHIS acknowledges the comment. In regard to autotoxicity in alfalfa, see the response to comment APHIS-2007-0044-11018-9 for issue 9.2.

10.0 Issue 10 – Cumulative Impacts

Comment Excerpt Text:
This DEIS being the first full Environmental Impact Statement for a genetically engineered crop, it is essential that APHIS fully considers the cumulative impacts from past, present and foreseeable future market introductions of GE crops such as GT alfalfa. A full analysis of cumulative impacts is lacking in the DEIS, in several specific ways.
APHIS recognizes that several crops, which account for a huge acreage in the U.S., have already been converted to Roundup Ready, and that future deregulations are likely. With 115 million acres of GT crops already planted, deregulation of GT alfalfa will likely result in an increase of 10.5 million acres, nearly ten percent of the total GT acreage.[Footnote 36: DEIS at 169 (if only half the current alfalfa acreage is converted; no data supports a conclusion that it will be more or less).] APHIS says that GT alfalfa will lead to a cumulative increase in the use of glyphosate, but dismisses it as not significantly harmful to the environment when used according to label. This dubious conclusion is undermined by the fact that APHIS cannot mandate or guarantee the appropriate use of glyphosate. A thorough discussion of cumulative effects should take practical reality into account; glyphosate will not be use according to the label. APHIS recognizes that weed resistance to glyphosate is an increasing problem, and that an increase in glyphosate use will result from GT alfalfa deregulation, leading to more resistant weeds and the need to use other, more harmful pesticides. The discussion then ends on increased costs to farmers in dealing with weed resistance and even this discussion is inconclusive. As weeds are increasingly resistant to glyphosate, more of it and more harmful pesticides will have to be employed (by nonorganic producers). The DEIS is silent on the long-term effects of increased use of more toxic pesticides in response to weed resistance to glyphosate. Glyphosate is touted as more benign then other herbicides, but if more and more glyphosate-tolerant crops keep flooding the market, and glyphosate use is continually increasing, doesn't this increase the potential for weed resistance? This is a phenomenon that is not going away and the discussion of GT alfalfa's contribution in terms of cumulative effects is
inadequate.
The analysis of the cumulative impacts from seed market concentration is inadequate. The DEIS only includes one paragraph of analysis on the cumulative effects of seed market concentration, and gives only passing attention to the fact that given the increasing concentration in the commercial seed market, there is a possible negative effect on public research and development.[Footnote 37: DEIS at 177.] Considering the recent United States Department of Justice investigation into the seed industry[Footnote 38: Cary Gillam, Monsanto says DOJ wants seed access details, Reuters (Jan. 14, 2010) available at
http://www.reuters.com/article/idUSN1415415420100114] and Monsanto specifically, APHIS must consider the far-reaching impacts to the seed industry if yet another Monsanto glyphosate tolerant crop is deregulated. APHIS must consider the possible impacts to farmers, public research and other commercial entities if Monsanto controls an even bigger piece of the market, considering past and foreseeable future deregulations. NEPA requires an analysis of the socio-economic cumulative impacts of APHIS's actions making Monsanto GT crops commercially available. NEDC commends APHIS for considered climate change in the NEPA process, as climate change will unquestionably affect food security. Adverse effects from anthropogenic greenhouse gas emissions are already being felt, and any EIS should include an analysis of the

alternatives' contribution to and impact from climate change. However, not only are there many unanswered questions regarding the impacts of deregulation in conjunction with climate change, APHIS admits many adverse impacts from deregulation, namely the increase in glyphosate use, and then dismisses these impacts as minimal. If climate change could exacerbate negative effects to amphibians and fish and increased weed resistance, this undercuts the determination that effects from deregulation will be minimal. Further, APHIS relies on unsubstantiated claims and lack of information to reach this conclusion, such as the claim that use of herbicides that are more harmful than glyphosate will decrease, as discussed below in E.1. APHIS also relies on the compliance with herbicide labels to mitigate effects to aquatic environments, likely exacerbated by climate change, a caveat to deregulation that is apparently unenforceable by APHIS, and therefore effects should not be dismissed.
The DEIS mentions the spread of falcata as a reservoir for the GT trait, which will have negative impacts on organic farmers, as well as affect feral alfalfa populations. These potentially far-reaching effects are dealt with summarily, with no discussion of climate change as a further catalyst, especially given the increase in extreme storm events likely connected to overall global climate change. Analysis of the effects from the alternatives to climate change is essential to the EIS, and NEDC urges APHIS to complete a more in depth analysis of the many potential harms from deregulation which will likely be exacerbated by climate change, elevating the harm beyond minimal. (Comment Number: APHIS-2007-0044-11741-15)

Response: APHIS acknowledges the comment regarding concern over adherence to glyphosate labels. However, the comment does not provide APHIS with any information that would suggest that people do not follow herbicide labels. As discussed in section IV.A of the DEIS, violators of the regulations are liable for all negative consequences of their actions; therefore, farmers who use glyphosate are very likely to follow its label restrictions, and adverse impacts from the predicted increased glyphosate use will be minimized. The use of glyphosate is regulated by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) restrictions administered by EPA, which mandate registration and use of all pesticides.
Regarding the comment about long-term effects of increased use of more toxic pesticides, the FEIS models different adoption and management scenarios for GT alfalfa (see appendix J of the FEIS). These scenarios indicate that glyphosate use will likely increase with the adoption of GT alfalfa. Other herbicide use may increase or decrease depending on the adoption rate and the management options used. In some cases adopters of GT alfalfa may increase the use of glyphosate and the use of other herbicides.

If there is an increase in glyphosate-resistant weeds due to the adoption of GT alfalfa, however, there could be a corresponding increase in the amount of other herbicides used for stand removal for non-GT alfalfa. As discussed in section IV.B.5 of the DEIS, the operational factors for GT alfalfa forage production could decrease the probability of weeds evolving resistance to glyphosate in alfalfa fields. However, weed shifts to GT and GR weeds are likely, if the weeds tolerate the frequent mowing associated with forage production.

In addition, there is currently no concrete data, information, or models that provide a prescriptive determination on if or how many weed species may evolve resistance to glyphosate, or how many years it may take for a single weed species to evolve resistance, or which management strategy will completely prevent the evolution of weed resistance to glyphosate, or which

management strategy will result in all weed species evolving resistance to glyphosate. APHIS is not aware of any models that simulate the evolution of weeds resistant to glyphosate in a GT alfalfa production system.

On the cumulative effects of seed market concentration, the DEIS recognizes that new technologies developed and owned by a private firm have the potential to lead to increased market concentration, and that increased market concentration may, although not necessarily, favor monopolistic behavior with potential negative impacts. Fair competition and business practices, however, are enforced through United States anti-trust laws and institutions and are beyond the scope of this EIS.
Currently, only GT alfalfa lines J101 and J163 are being considered for deregulated status. In the future, other petitioned GE organisms would be considered separately by APHIS, and cumulative impacts from past actions would be considered.
As discussed in section IV.I.5 of the DEIS, the quality improvements of GT alfalfa hay may help mitigate some of the potential negative consequences of global climate change on alfalfa and dairy production. The effect of glyphosate use on plant population structure and distribution is small when compared to the impacts of global warming. In this respect, global climate change is not to likely magnify the impacts of the preferred alternatives, and global climate change, in combination with other weed management strategies, could still lead to cumulative adverse impacts on plant populations. Thus, the overall cumulative impact of increasing glyphosate and changing other management strategies is likely small in the context of conventional agricultural production. APHIS acknowledges that the spread of seeds or pollen may occur as a result of severe weather events, and APHIS acknowledges that pathways for unintentional mixing and distribution of seed; see response to APHIS-2007-0044-10263-5 for issue 3.2.

Comment Excerpt Text:
APHIS fails to consider the possible cumulative effect of several routes for contamination that may be small individually, but that together may provide unacceptable levels of contamination. These include gene flow from feral GT alfalfa, seed contamination from machines and due to human error, and gene flow mediated by wild or feral bees. (Comment Number: APHIS-2007-0044-12026-3)

Response: This comment relates to possible indirect GM adventitious presence impacts (not cumulative) because the impacts would arise from the deregulation alternative and not an independent action. The impacts of deregulation of GT alfalfa on gene flow are analyzed in appendix O of the DEIS.

In regard to gene flow due to human error, and adventitious presence of non-GE or organic alfalfa with GT-alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1(paragraph 2 of the response). In regard to gene flow due to pollen, and gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:

The DEIS must fully consider the cumulative impacts from past, present and future foreseeable actions by APHIS or other agencies, including but not limited to future market introductions of GE crops. This is required by the Council on Environmental Quality (CEQ) regulations (40 CFR 1500 to 1508) as part of the EIS process. CFR 1508.7 defines cumulative impacts as:

[T]he impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The cumulative impacts analysis presented in the DEIS is lacking in several ways. First, it inaccurately assumes that glyphosate will replace more toxic herbicides in alfalfa when in fact, alfalfa farming is not dependant on herbicides and herbicides are rarely used. The dramatic increase in glyphosate use from a deregulation of GT alfalfa must be analyzed. Second, the cumulative impacts of stacking are not addressed. Third, the impacts of seed market concentration are minimized. Finally, APHIS underestimates the impacts of increase glyphosate-tolerant crop systems will have on global climate change. (Comment Number: APHIS-2007-0044-9936-16)

Response: As noted in the DEIS (section [IV]), weeds in conventional alfalfa cannot be managed completely with glyphosate and are instead controlled using many other herbicides (based on OMAFRA 2008; Canevari et al. 2007; Rogan and Fitzpatrick 2004; Loux et al. 2007). Although glyphosate use will likely increase with the full deregulation of GT Alfalfa, there may be an overall decrease in the amount and number of other herbicides under some scenarios, which in turn might result in less risk to human health and the environment (see section IV of the FEIS). Whether or not the use of GT alfalfa results in less us of other herbicides depends on the current herbicide use by the adopting grower. In intensively managed alfalfa, the use of other herbicides may decrease. However, if the adopting grower does not currently use herbicides, then GT alfalfa use will result in an increase in glyphosate use without a decrease in other herbicide use. An expanded discussion of trends in herbicide application rates in the United States is contained in appendix V of the FEIS. In addition appendix J of the FEIS models 4 scenarios of changing herbicide use under different adoption and management scenarios.

Currently, only GT alfalfa lines J101 and J163 are being considered for a deregulated status. In the future, other petitioned GE alfalfa lines would be considered separately by APHIS, and cumulative impacts from this action would be considered. Because gene stacking is not a reasonably foreseeable action, as the agency has no other alfalfa petitions before it, the cumulative impacts of gene stacking in alfalfa are not required to be considered in this EIS.

On the cumulative effects of seed market concentration, the DEIS recognizes that new technologies developed and owned by a private firm have the potential to lead to increased market concentration, and that increased market concentration could, although not necessarily, favor monopolistic behavior with potential negative impacts. Fair competition and business practices, however, are enforced through United States anti-trust laws and institutions and are beyond the scope of this EIS.

11.0 Issue 11 – Specific Comments that refer to Appendices

No comments are associated with this issue.

11.1 Issue 11.1-G – Weeds in Crops

Comment Excerpt Text:
Are Roundup Ready weeds in your future?
Bob Hartzler Department of Agronomy, Iowa State University 3nov98
http://www.mindfully.org/GE/Roundup-Ready-Weeds.htm
"Weed shifts occur with all management strategies, including Roundup. The availability of Roundup Ready crops provides farmers a new option for weed management that has advantages over many other products. However, many of the problems, including weed shifts, that have arisen with other herbicides are just as likely to develop with Roundup. It is likely that the initial problems experienced with Roundup will involve weed species such as waterhemp and yellow nutsedge that have sufficient tolerance to Roundup to allow them to occasionally survive commonly used Roundup rates. With continued use of Roundup Ready crops, these tolerant weeds will increase in density such that problems will become more frequent. Farmers will either need to increase the rate of Roundup or use other herbicides that have a higher level of activity on the problem weeds." (Comment Number: APHIS-2007-0044-0933-3)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate usage, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6.
APHIS updated table 3-18, section IV.B.5, appendix G text, tables G-7, G-8, and appendix H-4 in the FEIS with current information from the Weed Science Society of America's reporting system at www.weedscience.com.

Comment Excerpt Text:
Are Roundup Ready weeds in your future? II
by Bob Hartzler Iowa State University
http://www.weeds.iastate.edu/mgmt/2003/glyresistance.shtml
"With the manner that glyphosate is being used in the Midwest, resistance is inevitable. When resistance develops, we will need to control these biotypes with existing herbicides – no new modes of action are coming down the pipeline in the foreseeable future. The large number of alternative products for use in corn and soybean will reduce the impact of glyphosate resistance, but there can be significant costs associated with the problem. The need for application flexibility in today's agriculture increases the cost of glyphosate resistance compared to previous cases of resistance experienced by Iowa farmers. Because of this, evaluating weed management programs in terms of selection pressure placed on weeds should be an important component of crop management planning." (Comment Number: APHIS-2007-0044-0933-4)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate usage, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6.

APHIS updated table 3-18, section IV.B.5, appendix G text, tables G-7, G-8, and appendix H-4 in the FEIS with current information from the Weed Science Society of America's reporting system at www.weedscience.com.

Comment Excerpt Text:
AVOIDING WEED SHIFTS AND RESISTANCE IN ROUNDUP READY ALFALFA
Steve Orloff1, Mick Canevari2, Tom Lanini3
1Univ. of Calif. Coop. Extension, Yreka, 2Univ. of Calif. Coop. Extension, Stockton, 3Univ. of Calif., Davis
http://www.cwss.org/CWSSJournal/CWSSJournalJan07v3n1.pdf
CONCLUSIONS
"The Roundup Ready production system has potential to simplify weed management, while also improving the spectrum of weed control. However, growers should learn from the experience gained in other crops and stay alert to the development of weed shifts and resistant weeds. The key is for growers to reduce selection pressure—not to rely on repeated applications of Roundup year-after-year, application-after-application. Rotate crops, rotate herbicides and utilize tank mixes as needed, depending on the weed species and weed escapes present. A grower should not wait for there to be a problem before he employs these practices; a preemptive approach is strongly encouraged." (Comment Number: APHIS-2007-0044-0933-6)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate usage, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6.
APHIS updated table 3-18, section IV.B.5, appendix G text, tables G-7, G-8, and appendix H-4 in the FEIS with current information from the Weed Science Society of America's reporting system at www.weedscience.com.

Comment Excerpt Text:
Effects due to movement of glyphosate-tolerant alfalfa genes into non-GE alfalfa populations are agro-environment system effects caused by characteristics of RR alfalfa itself, are longer term, and affect the environment at both the field scale and at scales beyond the field.
To see this, we must consider the role of glyphosate in modern agriculture. Glyphosate (N-phosphonomethyl glycine, typically as isopropylamine salt) is the most important and best herbicide that agriculture currently possesses. It is a very broad spectrum herbicide, is relatively less toxic (2), and does not appear to have the kind of residual effects associated with some other types of herbicides. Glyphosate plays a dominant role in enabling no-till management in which it is typically used as a "burndown" herbicide before seeding. This substitution of the chemical plow for tillage with steel leaves a cover of crop residue on the soil surface, and has been shown by decades of research to improve soil quality, increase soil carbon, and decrease soil erosion (3-6).
To see what path RR alfalfa effects will take if release is allowed, we need to look at what has happened with herbicide-tolerant soybean, corn, and cotton, the large majority of which carry Monsanto's RR GE trait, and which as of 2008 had US adoption rates of 92%, 63%, and 93%, respectively (7). The result after the start of these systems in 1996 was that there was an initial

period of years where application of more toxic herbicides were replaced with modest use of glyphosate for after-seeding, in-crop spraying.
Before release of mainline crops with the RR trait in 1996, there were predictions from some agricultural science experts that continued use of glyphosate post planting on RR crops would lead to evolution of glyphosate-tolerant weeds. These predictions were based on widespread prior occurrences of the development of herbicide-tolerant weeds in non-GM crops contexts involving several herbicide chemistries, including the ALS (8) family, which resulted in an approximate average of 5 million acres with weeds tolerant to this chemistry in 1991 to 1995 (7). After an initial period of relatively lower required glyphosate usage, there has been more than a decade-long period of buildup of glyphosate-tolerant weeds accompanied by an equally long period of enabling regulatory quiescence.
And now we have an intolerable, growing agro-environmental crisis with approximately 5 million of acres of glyphosate-tolerant weeds involving all three of the major RR crops (7). In the case of RR-cotton, the rise of such superweeds as glyphosate-tolerant Palmer amaranth and others has led to a renaissance of tillage including reintroduction of the practice of "cotton chopping" and some 10,000 acres of abandoned cotton acres in one southern state (7). The response has been (a) large increases in glyphosate application rates; (b) considerable increase in use of older and more toxic herbicides, such as 2, 4-D (2, 4-dichlorophenoxyacetic acid) and others; and (c) use of tillage. (Comment Number: APHIS-2007-0044-10138-4)

Response: In regard to stand removal practices for GT alfalfa, see the response to comment APHIS-2007-0044-11037-28 for issue 7.1.

In regard to the evolution of glyphosate resistant weeds due to more glyphosate usage, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6.

Comment Excerpt Text:
The process of non-regulated status poorly deals with short-term and long-term crop rotations and cropping systems. The evaluation in paragraph 1 on page G 26 correctly outlines 18 weed species that are already resistant to glyphosate, weed species which are traditionally present in alfalfa and are likely to pose a threat to alfalfa production. Because of the large number of weeds that are already resistant to glyphosate and additional weeds that will eventually become resistant to glyphosate, it is unlikely that glyphosate tolerant alfalfa will be a long-term benefit to American agriculture. It is likely that it will only be a transient advantage to certain growers for a short number of years and a long-term advantage to companies that sell glyphosate tolerant alfalfa seed, as they establish control over their competitors in the alfalfa seed industry. (Comment Number: APHIS-2007-0044-10157-2)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate usage, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6.

Comment Excerpt Text:
Weed Resistance
Herbicides kill weeds by disrupting normal plant functions.

"mode of action," that is, the initial enzyme, protein or biochemical step affected by the herbicide's application. Herbicide resistance occurs when the herbicide's mode of action is no longer effective at killing a target weed. Through evolutionary selection, plants susceptible to the herbicide die, while those few having some type of natural resistance survive and reproduce without competition from the susceptible plants. Through repetition of this process across generations of plants, resistance of a significant portion of a weed population can survive and spread. Herbicide-resistant weeds are not a new phenomenon. Farmers and others in this country have been confronted with the challenge of herbicide resistance in hundreds of weed species for decades. As a result, the agricultural community has developed and implemented a variety of well-known and tested measures to address the potential development of herbicide resistance in weeds.
EPA has addressed the issue of pesticide resistance in a guidance document to pesticide registrants. That guidance document, Pesticide Registration (PR) Notice 2001-5: "Guidance for Pesticide Registrants on Pesticide Resistance Management Labeling," provides labeling guidelines by which a pesticide registrant can alert users to steps they can take to delay pesticide resistance, including the development of the herbicide resistance trait in weeds. [Footnote 35: http://www.epa.gov/PR Notices/pr200 1-5.pdf.] The EPA's PR Notice includes recommended pesticide label statements to remind growers of various herbicide resistance management practices, including recommendations for the use of tank mixes of herbicides with different modes of action and weed monitoring. [Footnote 36: 1d. at 6.] Despite claims by some commenters that pesticide resistance amounts to the creation of "superweeds," the occurrence of pesticide resistance is a simple fact of biological evolution that is well-understood by the farming community, addressed by EPA, and managed by wellestablished agricultural practices. It is not caused by, nor is it unique to, GE cropping systems. (Comment Number: APHIS-2007-0044-10866-9)

Response: APHIS acknowledges the comment and is aware of the “Guidance for Pesticide Registrants on Pesticide Resistance Management Labeling.”

Comment Excerpt Text:
Glyphosate is one of the top herbicides of use throughout the United States and globally, and its introduction into transgenic crops in the 1990s led to a dramatic spike in its use. Even prior to the widespread cultivation of certain types of crops in the United States, predictions were made that the unfettered use of glyphosate in conjunction with GM crops would lead to widespread resistant weeds (Shaner 2000).

Such predictions were even underestimated in some cases, and today glyphosate resistant weeds are confirmed in dozens of states and in countries throughout the world. The proliferation of glyphosate weeds is directly linked to the adoption of glyphosate resistant crops like cotton, corn and soy (Powles 2008). Glyphosate resistant weeds now affect crops in places that are not sown with a majority of GM crops, including perennial crops in states like California (Hanson et al. 2009). This evidence demonstrates that glyphosate resistance in weed populations is virulent and ubiquitous- it has the ability to spread quickly and affect farmers who have utilized GM crops or large amounts of glyphosate (Owen 2008). Indeed studies suggest that the glyphosate resistant

gene is a dominant gene, thus allowing for resistance to proliferate throughout ecological systems (Neve 2008).

The spread of glyphosate resistant weeds is ecologically expected. As farmers adopted GM technology, they became increasingly reliant on glyphosate, spreading it in increasing quantities. The adoption of no-till agriculture has further accelerated the spread of glyphosate resistant weeds by allowing farmers to utilize herbicides almost exclusively in preparation for planting(Owen, 2005; Owen 2008; Powles 2008). The current situation of glyphosate resistance is a serious threat to agricultural sustainability throughout the United States and the world. Management decisions are now limited and scientists are now acknowledging that the only means to combat such weeds is to diversify pest management strategies.

In essence what this means is a reverting back to more toxic herbicides that will be needed in increasingly amounts to combat resistant weeds. Numerous studies, particularly in the past few years, have concluded with management suggestions including a return to herbicides other than glyphosate such as 2, 4-D and atrazine (Vila- Aiub et al. 2008; Neve 2008; Dill et al. 2008; Hanson 2009). In Argentina, where extensive research has been done on the emergence of glyphosate resistant weeds, evidence suggests that a return to more toxic herbicides has already begun. Glyphosate levels have continued to climb in recent years and 2, 4-D and atrazine applications have also stayed steady or increased (Binimelis et al. 2009). The reality of glyphosate resistant weeds is harsh- it clearly demonstrates that glyphosate is quickly losing its efficacy and that more harsh and toxic chemicals will replace its use. Such research is at direct odds with claims that APHIS makes about GM crops allowing for the use of fewer and less toxic herbicides. Instead, glyphosate resistant crops are driving an increase in glyphosate overall, and then a rise in highly toxic herbicides as resistance from glyphosate sets in. (Comment Number: APHIS-2007-0044-11018-12)

Response: APHIS acknowledges the comment. In regard to the evolution of glyphosate resistant weeds due to more glyphosate usage, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6.

Comment Excerpt Text:
Did you know that you can simultaneously graze goats with your cattle and the goats will select harsh weeds to eat, leaving the primary foods for cattle in tact? We need small, diversified family and community owned farms to produce healthy food for our children and our families.
Check out your own website for some insight!
"A long-term experiment will be conducted to evaluate the potential of using goats co-grazing with dairy cattle to control pigweed, other broadleaf weeds and brush invading pastures."
http://www.reeis.usda.gov/web/crisprojectpages/215840.html (Comment Number: APHIS-2007-0044-11445-1)

Response: The cited research has not yet been published. No results are provided on the website indicated.

Comment Excerpt Text:
As part of its decision to grant nonregulated status to GE alfalfa lines, APHIS has preliminarily concluded that there is no significant impact on the human environment. The agency also contends that the cultivation of GE crops has led to the decrease in the use of other hazardous pesticides such as dicamba and paraquat, since GE farmers rely on Roundup for weed control. The agency believes that if GE alfalfa is deregulated, in whole, an overall decrease in the amount and number of other herbicides used would result, leading to less danger of human exposure to toxic chemicals. However, deregulating GE alfalfa would inevitably lead to increased Roundup (glyphosate) use. While the agency acknowledges this fact, it claims that this increase would not be significant. A recently published report which utilized data from USDA shows that GE crops have been responsible for an increase of 383 million pounds of herbicide use in the U.S. over the first 13 years of commercial use of GE crops (1996-2008).[Footnote 18: Benbrook, C. 2009. Impacts of Genetically Engineered Crops on Pesticide Use: The First Thirteen Years. The Organic Center.]
The report identifies the primary cause of the increase as the emergence of herbicide-resistant weeds. Herbicide use would continue to increase significantly in the long-term as farmers battle the emergence of resistant weeds.
The overuse of this single weed management technology, the emergence of new weed species that are only poorly controlled by glyphosate and the evolution of Roundup resistant weeds can result in the introduction of new herbicides, and the spread of current and future resistant weeds.[Footnote 19: Duke, S. & Powles, S. 2009. Glyphosate-Resistant Crops and Weeds: Now and in the Future. AgBioForum,
12(3&4), 346-357] It is well-established that herbicide resistance will evolve fastest where herbicide
selection intensity is most persistent. Most worrisome is that many of these genetically diverse weed species under intense glyphosate selection have already demonstrated the ability to evolve resistance to a number of other herbicide modes of action (multiple resistance).[Footnote 20: Ref #15] This
can only mean that farmers would eventually have to resort to multiple chemicals: alternating herbicides with different modes of action, which would have to be either more toxic, or used in greater frequency, in order to control resistant weeds. Scientists at a conference earlier this year: Pan-American Weed Resistance Conference, hosted by Bayer Crop Science, lamented the most critical issue that threatens agriculture is the resistance of weeds to the broadscale use of the herbicide glyphosate. One well respected scientist in the field of plant biology, Stephen Powles, PhD, noted at the conference, “the massive reliance on glyphosate means that it will be driven to redundancy because many of the big driver weeds such as Palmer pigweeds, waterhemp, ragweed and Johnsongrass will be resistant. There may be many weed species still controlled by glyphosate, but glyphosate will fail on the driver weeds and that means overall failure.”[Footnote 21: Laws, F. Diversity key to glyphosate issue. Delta Farm Press Jan 25, 2010] The agency has not adequately explored this potential scenario for long-term weed resistance and management, nor how weed resistance would impact GE farmers, non-GE farmers and organic farmers. (Comment Number: APHIS-2007-0044-11960-3)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate usage, and the trends of past usage of herbicides, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6. Because organic farmers do not use glyphosate, weeds that are

resistant to herbicides would not be treated any differently from non-resistant weeds by organic farmers.

Comment Excerpt Text:
As a result, several weeds have developed resistance to
glyphosate herbicides, requiring more toxic and expensive chemical controls. The
National Center for Food and Agriculture Policy estimates that Roundup Ready alfalfa
could result in the application of 200,000 pounds more herbicides a year in California
alone.[Footnote 12: National Center for Food and Agriculture Policy. 2002. Plant biotechnology: Current and potential impact
for improving pest management in U.S. Agriculture: An analysis of 40 case studies, herbicide tolerant
alfalfa, www.ncfap.org/40CaseStudies.htm]
For corn, cotton, and soybean producers in the Southeast and Mid-South, effects of
glyphosate's prolific use is seen in fields and felt in pocketbooks. Glyphosate-resistant
weeds are now established in 19 states and deemed a serious economic problem, at times
adding more than $20 per acre.[Footnote 13: Delta Farm Press. 2007. "Glyphosate-resistant
weeds burden growers pocketbook," February 21,] Weed specialists refer to resistant weeds as a "train
wreck" making their way across the country.[Footnote 14: Smith, Ron. 2009. "Train wreck with weed resistance could be headed to Northeast Texas," Southwest
Farm Press, February 24.]
Some of the worst resistance is found in pigweed (Palmer amaranth). Resistant pigweed
now infests hundreds of thousands of acres in the Southeast. For example, 70 to 80% of
Macon County, Georgia, dubbed the "epicenter" of glyphosate-resistant Pigweed, is
infested with the weed, and farmers were forced to abandon 10,000 acres in 2007.[Footnote 15: Robinson, Elton. 2008. "Designing the perfect weed – Palmer amaranth," Delta Farm Press, December
24.] (Comment Number: APHIS-2007-0044-12044-7)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate usage, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6. .Economic considerations associated with increased weed resistance are addressed in section 4 of appendix K of the DEIS. This section was expanded in the FEIS with references provided in comments on the DEIS.

Comment Excerpt Text:
There are at least seventeen (17) different weeds that have been declared as noxious by the State of Utah, and the use of"Round-Up Ready" crops assists us in the control ofmany ofthose weeds. In addition, and probably most important, the use of "Round-Up Ready" crops helps us to keep from breaking the law. Specifically, Utah Noxious Weed Act, Section 4-17-7 which states that noxious weeds standing, being, or growing shan be controlled and spread of the same prevented by effective cutting, tillage, cropping, pasturing or treating with chemicals or other effective method, or combination thereof, approved by the County Weed Supervisor, as often as

may be required to prevent the weed from blooming and maturing seeds, or spreading by root, root stalks or other means. Upon faiiure to comply, the owner or person in possession of the property upon which noxious weeds are present shall be deemed negligent and enforced control measures may be imposed at the discretion of county authorities, with the expense being paid directly by the owner or person in possession of the property, or shaH constitute a lien on the property and become collectible by taxes. (Comment Number: APHIS-2007-0044-12197-1)

Response: APHIS acknowledges the comment. APHIS has evaluated and incorporated the information as appropriate in III. E. of the FEIS.

Comment Excerpt Text:
the DEIS states that although GT alfalfa is likely to result in an increased use of glyphosate, that increased glyphosate use does not immediately or directly result in glyphosate-resistant weeds. On the contrary, glyphosate-resistant weeds such as Palmer Amaranth and Johnsongrass have already been found in soybean fields in the United States and farmers are now being forced to spray more toxic chemicals, such as Atrazine. The planting of GT alfalfa is very likely to accelerate this trend. The adoption of herbicide-tolerant crops will not reduce herbicide use. (Comment Number: APHIS-2007-0044-4904-4)

Response: Regarding changes in the amount of herbicides used, see the response to comment APHIS-2007-0044-11037-1 for issue 6.3.
In regard to the evolution of glyphosate resistant weeds due to more glyphosate usage, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6.

Comment Excerpt Text:
Roundup-Resistant Weeds.
The APHIS EIS states: “Currently, there is no concrete data, information, or models that provide a prescriptive determination on if or how many weed species may evolve resistance to glyphosate, or how many years it may take for a single weed species to evolve resistance, or which management strategy will completely prevent the evolution of weed resistance to glyphosate, or which management strategy will result in all weed species evolving resistance to glyphosate.” P. 107.
This isn’t quite 100% the case. While some of this is technically correct statement as it is, it ignores a few issues that were detailed in a 2009 publication (Orloff et al., 2009), and in earlier publications, including the management strategies designed to prevent weed resistance, which were not cited in your draft EIS.
First, there should be a clear differentiation between weed shifts (favoring of weeds that are already not controlled by glyphosate) and the development of weed resistance in an (otherwise susceptible) population of weeds. Both are a result of repeated applications of a single herbicide. In terms of impact, weed shifts are clearly the most immediate and highest impact effect for farmers, and do not require genetic modeling to determine. We already largely know which weeds would be favored in such a system, since glyphosate is the most-studied herbicide available to farmers. Weed shifts occur with any technology, including organic or tillage, and are an important outcome of a weed management strategy of which growers must contend. Weed scientists have detected weed shifts in many herbicide programs, including early work with GT

Alfalfa (see Van Dynze et al., 2004), and Canevari (2006), and Orloff et al. (2006), and developed proscriptions to prevent this. See http://alfalfa.ucdavis.edu for this and other citations. Resistance of weeds to herbicides and weed shifts are real problems for farmers. However, it is an old problem that is relatively well-understood by weed scientists. We have developed a series of strategies (Orloff et al., 2009) which are well-understood principles to prevent these from occurring. These include weed identification, monitoring for escapes, herbicide rate and timing, crop rotation, agronomic practices (e.g. cutting schedule), tank mixtures and rotation of herbicide. We have provided examples of herbicide programs designed to prevent weed shifts in GT alfalfa. Costs to use these measures are not extraordinary and are comparable to current weed control.
Thus, although the above APHIS quote emphasizes models, we must realize that crop management contains a significant human behavior component, as growers respond to events on the ground, and may not be highly conducive to a modeling approach. The language 'completely preventing' resistant weeds is also curious, since it is difficult to predict such an absolute outcome of anything, particularly something which entails human behavior. However, it is clear that there are well-understood management strategies for preventing weed shifts and weed resistance that are available to greatly reduce the possibility of this outcome. (Comment Number: APHIS-2007-0044-4913-11)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate usage, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6.
APHIS has evaluated and incorporated the information as appropriate in appendix G of the FEIS.

Comment Excerpt Text:
Superweed?
It should be emphasized that weed resistance or shifts are 1) not related uniquely to GE crops, and 2) not necessarily an environmental problem, but a management problem. The most common resistance in weeds to date have not developed in GE crops, but in conventional systems in orchards or ditchbanks or natural areas (examples are ryegrass, horseweed). Additionally, unless it can be demonstrated that resistant populations of weeds have fitness characteristics that are substantially different than non-resistant populations (invasiveness, fecundity, persistence, dormancy, for example), beyond its resistance to glyphosate, it should be questioned whether this is really an environmental problem. It is clearly a technology and a practical problem (negating the usefulness of glyphosate), but would it cause an environmental problem? While some stories have described the potential of development of a 'superweed' with GT alfalfa, to date, there is no evidence to support this contention, and unless the above criteria of association of glyphosate resistance in weeds with greater 'weediness' can be demonstrated. This is not to ignore the practical impact of glyphosate resistance and weed shifts, which, as we've described, are real, but largely preventable. (Comment Number: APHIS-2007-0044-4913-12)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate usage, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6.
APHIS has evaluated and incorporated the information as appropriate in section IV.B of the FEIS.

Comment Excerpt Text:
The primary benefits of GT alfalfa to the environment are 1) replacement of more toxic herbicides with a less toxic herbicide (example-paraquat or gramoxone is commonly used for alfalfa weed control, is highly toxic to humans and animals while glyphosate is not), 2) Better control of toxic weeds which kill or sicken animals each year and are not as well-controlled by other herbicides (examples of toxic weeds are common groundsel, fiddleneck, and high nitrate weeds), 3) Improvement of water quality by replacing the more soluble winter-applied herbicides which have ended up in drinking water wells in our state (see Troiana et al., 2001 – Note: Currently farmers in these sensitive areas have adopted GT alfalfa to prevent water contamination herbicides used in conventional alfalfa), 4) Reducing the spread of noxious weeds which can invade natural areas through movement of hay or manures (there is a requirement for weed-free hay for horses on natural areas under federal control).
As a footnote to this list, I have heard anecdotally from a number of growers of GT alfalfa that their sum-total of herbicide sprays for GT alfalfa has been less than for conventional. The reason for the reduction: they have had such good success of weed control during stand establishment that the vigorous stand of alfalfa out-competes later-germinating weeds, negating the need for subsequent sprays. Some have waited one or two before spraying glyphosate again. Additionally, farmers who grow several annual crops have reported less glyphosate use on GT alfalfa than on other, conventional crops such as corn, tomato, or wheat in rotation, for which they need to spray several times a year (cleaning up fields between annual plantings). These could be confirmed by surveys, but I believe that these are representative of many grower experiences with this technology. This result has already been supported by several current RRA growers who have made these statements in their docket comments (2007 to present). Thus, though there are claims to the contrary, herbicide sprays may actually be decreased or held to the same level by this technology, and its primary effect would be to replace traditional herbicides that have more problems that affect our water quality. Thus, the draft EIS is correct at determining that while glyphosate use may increase, it is primarily replacing other, more toxic herbicides. Although people may have a philosophical problem with GE crops, or a dislike of Monsanto, the potential environmental benefits of this technology are fairly clear. (Comment Number: APHIS-2007-0044-4913-2)

Response: APHIS acknowledges the comment. APHIS has evaluated and incorporated the information as appropriate in section IV.B of the FEIS.

Comment Excerpt Text:
I'm also somewhat confused by terminology used in Appendix G. I agree with the listing of weeds confirmed resistant to glyphosate, but have never before encountered the phrase "historically naturally resistant" and do not understand its meaning. Many of the species listed under this heading are considered less sensitive to glyphosate than other species, but it is tenuous to surmise the peer-reviewed scientific literature would support the phrase "historically naturally resistant" to describe the response of these species to glyphosate. (Comment Number: APHIS-2007-0044-5220-2)

Response: APHIS has updated the terminology of the FEIS. For further discussion in regard to the terminology for resistant and tolerant weeds, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6.

Comment Excerpt Text:
Weed species that are naturally tolerant to glyphosate are likely to infest crop fields on which glyphosate is used. This "weed shift" – a change in the species of weeds likely to infest a particular crop – as a result of differences in plant tolerance to glyphosate, will probably occur more frequently than will the emergence of new resistant weed biotypes (Shaner, 2000). Weed shifts have occurred since the beginnings of agriculture and are due to crop rotation, cultural practices, and methods of weed control [Footnote 5: Penn State Agronomy Guide, Part Two — Pest Management; http://agguide.agronomy.psu.edu/PDF03/part2-1-3.pdf].

Numerous long–term studies are on–going in Roundup Ready crops, and provide information for assessing weed shifts and the risk of resistance (Fast et al, 2005, Wilson et al, 2006; Wilson et al, 2007; Kniss et al, 2007; Stolenberg and Jeschke, 2007; Gulden et al, 2007; Harker et al, 2005). Some of these studies are in the tenth year of evaluation. The objective of these studies is to determine whether repeated use of glyphosate, non–glyphosate herbicides or alternating glyphosate with other herbicides on the same area over a long period of time will affect weed species composition and density or the development of resistant weeds. Although the crops, rotations and herbicide programs vary considerably among these long–term studies, there are some important overall findings or conclusions from these studies. These include:

• Continuous use of glyphosate alone or glyphosate–based programs at labeled rates over a long period of time provides effective weed control;

• High frequencies of glyphosate–resistant crops in the rotation can improve weed management and reduce weed densities due to the excellent weed control of glyphosate–based programs;

• Weed shifts can occur from the repeated use of glyphosate in glyphosate–resistant crops over a long period of time (up to 10 years). Weed shifts can also occur with repeated use of non–glyphosate herbicides, but the weed community may be different;

• Continuous use of glyphosate at less than the recommended label rate can cause increases in weed density and accelerate weed shifts;

• Where one and two applications of glyphosate were compared, one application of glyphosate alone was less effective in controlling weeds throughout the season because of weed germination after application;

• Crop rotation can cause differences in weed community regardless of the herbicide treatment.

No weed species was found to be resistant to glyphosate in these studies over the time they were conducted. Moreover, these studies have not been predictive regarding which weeds would become resistant to glyphosate. To date, there are no profound findings in these long–term

studies other than what one would expect from normal herbicide use in conventional cropping systems. (Comment Number: APHIS-2007-0044-7620.4-10)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate usage, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6. References were evaluated and incorporated as applicable in appendix G of the FEIS.

Comment Excerpt Text:
Mueller et al. (2005) assessed the potential cost to control specific examples of known glyphosate–resistant weed biotypes. Some costs suggested in the publication may be considered conservatively high, but the report's basic conclusion is sound – additional herbicides and cultural practices would be needed to control resistant weeds, and would lead to additional costs to the grower in a Roundup/Roundup Ready cropping system.

As has been the case with many other herbicides to which weeds have developed resistance, however, these increased costs have not caused growers to abandon the use of glyphosate herbicides. On the contrary, growers have continued to adopt and successfully use Roundup Ready crops (James, 2006). A recent grower survey found that Roundup Ready growers in the coastal region of the U.S., an area that has a number of reports of glyphosate–resistant horseweed, had grower satisfaction ratings of 95 percent in 2005 (Marketing Horizons, 2005). Further, market adoption of Roundup Ready cotton has not decreased in the Delta region, including Western Tennessee, an area that also has had numerous reports of glyphosate–resistant horseweed. These findings indicate that, when provided with appropriate technical support and management recommendations, growers have successfully managed a glyphosate–resistant weed, while still using a glyphosate–based weed control system.

This practice is typical of the experiences of growers with other herbicides to which resistance has developed. Moreover, alternatives to herbicide–resistant crop systems may be more expensive and have resistance problems of their own. These alternative herbicide programs have been found to be more expensive than the glyphosate–based programs when their use was simulated to replace a glyphosate–based weed control program based on control of key weed species by state (Sankula, 2006). Additionally, many of the herbicides proposed in these alternative programs have numerous cases of already known resistant weeds (Heap, 2007). (Comment Number: APHIS-2007-0044-7620.4-12)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate usage, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6.

APHIS has evaluated and incorporated the information as appropriate in appendix V of the FEIS.

Comment Excerpt Text:
"Volunteer" herbicide–resistant crops – those plants that grow in a field from seed left from the prior year's harvest – may cause in–field control concerns similar to those caused by herbicide–resistant weeds. Control of volunteer herbicide–resistant crops has recently been reviewed by

Beckie and Owen (2007). Herbicide–resistant soybean and cotton were reported to have lower potential for volunteer control issues, similar to conventional soybean and cotton, because both crops tend not to have weedy tendencies such as seed dormancy, ability to survive the winter, and high competitiveness. Alternatively, herbicide–resistant canola and corn, similar to conventional canola and corn, had a higher potential for volunteer control issues, because of lost seeds (shattering or ear drop) and competitiveness with the planted crop. While there may be additional costs associated with control of herbicide–resistant volunteers, there remain available and effective options for control. In fact, the cost to control volunteers likely has not had significant impact on the adoption of herbicide–resistant crops, as volunteer management is done in conventional crops as well. Studies have found few differences in volunteer management between herbicide–resistant and conventional canola production systems (Buth, 2007), supporting the suggestion by Beckie and Owen (2007) that the herbicide–resistance trait is not a major factor influencing volunteer canola abundance.

Potential for herbicide resistance to occur in weedy wild relatives of herbicide–resistant crops through pollen–mediated gene flow

Gene flow from a crop plant to a sexually compatible wild relative can theoretically transfer glyphosate resistance. This has not been a source of glyphosate–resistant weeds in the U.S.; however, few wild relatives of corn, soybean, cotton or canola exist in the U.S. A recent CAST publication (2007) reviewed the potential nonagricultural/human safety problems associated with pollen mediated gene flow to a wild relative from an herbicide–resistant crop plant. The review suggested a low to medium risk for this gene flow to exacerbate existing problems or create new agronomic problems resulting from gene flow to a wild/compatible relative. None of the currently confirmed glyphosate– resistant weed species identified in the International Survey of Herbicide Resistant Weeds developed as a result of gene flow from an herbicide–resistant crop (Heap, 2007).

The use of good management principles, built upon achieving high levels of control through proper application rate, choice of cultural practices, and appropriate companion weed control tools, will allow Roundup agricultural herbicides to continue providing cost–effective and efficient weed control options (Sammons et al, 2007; Gustafson – accepted for publication). (Comment Number: APHIS-2007-0044-7620.4-13)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate usage, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6. References were evaluated and incorporated as applicable in appendix G of the FEIS.

Comment Excerpt Text:
APHIS has also identified comprehensive and effective mitigation measures to address potential weed resistance to glyphosate.

As the developer of a suite of herbicide products containing glyphosate, Monsanto is keenly interested in the potential development of weeds that are resistant to glyphosate. Weed resistance is not a new issue facing farmers, nor is it an issue unique to Roundup Ready cropping systems.

Farmers have been managing herbicide-resistant weeds for decades, and there are hundreds of known cases of herbicide resistance to other commonly used herbicides. See, e.g., Comment Appendix 3 (discussing weed resistance). The prevalence of the issue does not minimize the potential that glyphosate resistance might create challenges for growers, but the fact that this is a long-standing issue within the agricultural community means that a variety of well-known, tested measures have been developed over the decades to address the development of herbicide resistance in weeds, and these measures are equally applicable to the potential development of glyphosate-resistant weeds.

First, there are cultural practices that growers can and do employ to minimize the amount of weed growth in the first place and thus minimize the amount of herbicides used. Growers can begin by selecting fields with optimum soil characteristics, structure, and fertility to ensure early plant establishment. Additionally, as the Draft EIS discusses, farmers can use appropriate crop rotation, companion crops, mowing, grazing, and tillage or no-tillage to further minimize the development of weeds. Should weeds develop, growers can ensure that they are removed as early as possible, since weeds are generally easier to eradicate at the earliest growing stages. See, e.g., Monsanto Technology Use Guide ("TUG"): The Source for Monsanto's Portfolio of Technology Products, Stewardship Requirements and Guidelines for Use (2010), available at http://www.monsanto.com/monsanto/ag_products/pdf/stewardship/technology_use_guide.pdf (discussing weed management practices); Draft EIS at Ap. J-34 to -44. These types of cultural practices are already routinely used by alfalfa growers, and their use already substantially minimizes the amount of herbicides that are used on alfalfa fields and the potential for development of herbicide-resistant weeds. See, e.g., Draft EIS at 67-68 (citing extensive survey performed from 1988-1992 showing that herbicides are most frequently used in seed fields, but used on less than 17 percent of alfalfa forage fields, and that mechanical and cultural methods for weed control are frequently used).

Second, in order both to minimize the development of herbicide-resistant weeds and to address any weeds that develop resistance, standard procedure is to incorporate other herbicides or particular tank-mixes of herbicides as part of a grower's weed management practice. For RRA, Monsanto's TUG includes specific recommendations to address the potential development of glyphosate-resistant weeds. See Monsanto TUG: The Source for Monsanto's Portfolio of Technology Products, Stewardship Requirements and Guidelines for Use (2010), available at http://www.monsanto.com/monsanto/ag_products/pdf/stewardship/technology_use_guide.pdf. If glyphosate-resistant weeds or weed shifts were to be identified in alfalfa fields, they can be managed with currently used, non-glyphosate weed control strategies. [Footnote 15: See, e.g., Orloff, S., D.H. Putnam, M. Canevari and W.T. Lanini, 2009, Avoiding Weed Shifts and Weed Resistance in Roundup Ready Alfalfa Systems, University of California Division of Agriculture and Natural Resources Publication 8362, available at http://alfalfa.ucdavis.edu/-files/pdf/avoidingWeedShifts_RR.pdf.] See also Comment Appendix 3 at 12-13 (discussing that while the ability to use glyphosate to control weeds in glyphosate-resistant crop fields "has provided growers with another tool to use for weed control in crop production, it does not decrease the number of other weed control options that a grower may choose.").

Beyond the TUG's recommendations, Monsanto actively investigates and studies weed control complaints and claims of weed resistance. When glyphosate-resistant weeds have been

confirmed, Monsanto works with weed scientists and community extension services to develop appropriate response strategies. Monsanto then alerts farmers and farm educators and provides recommended control measures, which would include both chemical and cultural practices. This information is provided through multiple channels, including the herbicide label, a public website containing recommendations and additional information (www.weedscience.org), the annual TUG, media and written communications, Monsanto's website, www.weedresistancemanagement.com, and farmer meetings. As noted above, Monsanto will continue to have a keen interest in ensuring that the most up-to-date information is provided to growers to address potential glyphosate resistance. See also Comment Appendix 3 (discussing weed management strategies and detailing additional comments on EIS analysis of weed resistance issues).

Monsanto's efforts to address potential weed resistance are consistent with guidance developed by the EPA, as part of that agency's comprehensive regulation of pesticides, including herbicides such as glyphosate, under the authority of FIFRA. EPA encourages pesticide manufacturers to provide growers with information regarding a herbicide's mode of action to aid growers in planning herbicide use practices and to foster the adoption of effective weed-resistance management practices. See EPA, PR Notice 2001-5: "Guidance for Pesticide Registrants on Pesticide Resistance Management Labeling" ("EPA believes that this approach to resistance management is sound and would be highly beneficial to pesticide manufacturers and pesticide users."), available at http://www.epa.gov/opppmsd1/PR_Notices/pr2001-5.pdf. EPA's pesticide resistance guidance provides labeling guidelines by which a pesticide registrant can alert users to steps they can take to delay pesticide resistance. The guidelines are the result of joint efforts by the U.S. and Canada to develop and implement a unified North American pesticide resistance strategy.

Monsanto has ensured that the labeling for all of its Roundup products approved for use on RRA is consistent with EPA's guidelines for pesticide resistance management. EPA-approved labels for the Roundup herbicide weed-resistance management recommendations are designed to minimize the potential for the development of glyphosate-resistant weeds. By approving a label for a glyphosate-based agricultural herbicide, EPA has concluded that the product will not pose an unreasonable risk to the environment or human health when used in accordance with the label's directions. Once EPA approves a pesticide label, it is a violation of federal law to use the pesticide for a use or in a manner not in accordance with the label directions.

As the Draft EIS explains, there is no evidence showing that the development of glyphosate resistance in weeds as a result of the deregulation of RRA will result in a significant impact to the quality of the human environment. The nature of alfalfa itself suggests that the risk of the development of glyphosate-resistant weeds is lower than for other crops, and there are ample measures available to address the issue should it occur. See, e.g., Draft EIS at 105-111 (given that alfalfa is a perennial crop that is regularly harvested, weed growth is decreased and glyphosate use is infrequent and in lesser quantities; thus, the development of glyphosate-resistant weeds is less likely due to reduced selection pressure). (Comment Number: APHIS-2007-0044-7620-16)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate usage, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6. References were evaluated and incorporated as applicable in appendix G of the FEIS.

Comment Excerpt Text:
Glyphosate Resistant Weeds

APHIS states the following with respect to new glyphosate-resistant weeds:

New Glyphosate-Resistant Weeds

Glyphosate-resistant biotypes have recently been identified for the following eight weeds that are also common in alfalfa: common ragweed, horseweed, Italian ryegrass, Johnsongrass, Palmer Amaranth, buckhorn plantain, goosegrass, and junglerice. (Effects of Glyphosate-Resistant Weeds in Agricultural Systems (appendix G; Section 4.1.1) briefly discusses each.)

DEIS at 74; see also DEIS, App. G at G-26.

APHIS should clarify that there is no evidence that the glyphosate resistant weed biotypes (per se) are known to be "common in alfalfa". Although it is possible that one or more of the eight candidate weed species may occur in alfalfa production fields, there is no current evidence that resistant biotypes (per se) for any of the eight are common in alfalfa. The lack of resistant biotypes in alfalfa fields is supported by the absence of data in Table 3-18 at page 76 of the DEIS, which does not list alfalfa as a "situation".

APHIS should also expand the list of cultural options available to manage weeds in alfalfa fields to include: (1) rotation to non alfalfa crops (e.g., grains, etc.); (2) rotations with crops having tolerance to a different mode of herbicide action(s); (3) spot burning; and, (4) flood irrigation. See DEIS at 74. (Comment Number: APHIS-2007-0044-7620-34)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate usage, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6. References and information were evaluated and incorporated as applicable in appendix G and U of the FEIS.

Comment Excerpt Text:
Another area where our experience supports APHIS in their conclusion is that production and stewardship practices do mitigate against the risk of developing weed resistance to glyphosate (Section III). Sugarbeet farmers have always practiced crop rotation, which in of itself restricts the development of glyphosate resistance. Our farmers, on average, have a 3-4 year rotation with other crops. Renowned university scientists have concluded that when glyphosate is used properly with these types of cropping systems, glyphosate resistance is not expected to develop (Wilson 2007, Wilson 2009). Moreover, sugarbeet stewardship practices also mitigate against the development of weed resistance. For example; if a particularly difficult weed is encountered, another mode of action is added, rather than just dousing the weeds with glyphosate. Although

our farmers have been growing glyphosate-tolerant sugarbeets for commercial use since 2007 and our industry
has transitioned to 95% glyphosate-tolerant sugarbeets, our members have not reported the development of any glyphosate resistant weeds.
Customers want and demand high-quality products. No farmer is ever paid for his or her effort to produce the crop - only for performance of the quality and quantity of the product. Delivering weeds in a commodity to a processor or customer lowers the value to the farmer. (Comment Number: APHIS-2007-0044-7953-8)

Response: Herbicide use and control of glyphosate resistant weeds in alfalfa are discussed in appendix G of the FEIS.

Comment Excerpt Text:
G–19 McCordick et al. (2008) tested GT alfalfa in 2004 and 2005 growing seasons…….Clear seeded alfalfa treated with glyphosate yielded the highest alfalfa dry matter in both years, even though combined forage yield was higher in the oat companion crop.

Comment: Our work (2007) at Minnesota and Wisconsin found that the yields and quality of roundup ready alfalfas did not differ from those of genetically similar conventional alfalfas treated with conventional herbicides (see Comparing Roundup Ready and Conventional Systems of Alfalfa Establishment C. C. Sheaffer, D. J. Undersander, and R. L. Becker. July 2007; Forage and Grazinglands, doi:10.1094/FG-2007-0724-01-RS). Indeed, if the genetics of RR alfalfa were similar to those of conventional alfalfas except for the RR trait why should we expect RR alfalfas to not be similar in forage yield, forage quality, and stand persistence? I don't think we can assume that the RR trait per se promotes any greater yield, quality or persistence.

G-22 Although weeds can be a problem in alfalfa, once alfalfa is established, it acts as a suppressor of weeds and is commonly used in rotations for weed reduction. For example, prior rotation in alfalfa can reduce weed densities in sunflower to the same level as herbicide treatment and alfalfa in corn rotations also benefited corn yield and suppressed weeds (Clay and Aguilar 1998).

Comment: It is important to note that in addition to suppression by competition, multiple cutting of alfalfa has a significant negative effect on annual weed growth and flowering. In addition, because of the perennial cover and favorable microclimate there is more insect and small mammal predation of weed seeds in alfalfa compared to annual weed crops. While overuse of any herbicide in cropping systems can lead to herbicide resistant weeds, the application of cutting management in alfalfa will minimize selection pressure for resistant weeds. (Comment Number: APHIS-2007-0044-9164-5)

Response: References were evaluated and incorporated as applicable in appendix V.4.3 of the FEIS.

Comment Excerpt Text:

Glyphosate Resistance. In my professional opinion weed resistance in RR alfalfa systems is an important issue, but there are management practices that growers and industry professionals can employ to minimize the risk of the evolution of glyphosate-resistant weeds. That is the reason we developed the publication referenced above to make growers more aware of the production practices they should use in RR alfalfa production systems. The primary issue is to avoid reliance on a single herbicide for weed management during the entire life of an alfalfa stand. We encourage growers of RR alfalfa to integrate herbicides with other modes of action into their weed management program by using tank mixes, alternating herbicides and cultural practices. The key is to reduce selection pressure by incorporating these practices into an effective weed management system.

As we noted in the publication, the alfalfa production system both favors and reduces the likelihood of the evolution of resistant weeds. Factors that favor the development of resistance are that it is a perennial crop so there is potential for repeated treatments with the same herbicide, typically tillage only occurs between crop rotation cycles, and alfalfa is typically grown in large fields with a great diversity of weeds. On the other hand, resistance is less likely to occur in alfalfa because the crop is very competitive with weeds and many weed do not tolerate the frequent cutting that occurs in alfalfa. It is debatable whether the evolution of resistant weeds is more or less likely to occur in alfalfa systems. It is probably less likely but it depends on the grower and their production practices and rotation crops. Regardless, the practices mentioned above such as rotating or tank mixing alternative herbicides with different modes of action and rotating with crops that have a tolerance to herbicides with a different mode of action would be highly effective to avoid weed resistance problems.

Most of the weeds that are currently listed as being resistant to glyphosate are currently not commonly found in alfalfa. Of those that sometimes are found in alfalfa, common ragweed, horseweed, Italian ryegrass, Johnsongrass, Palmer Amaranth, buckhorn plantain, goosegrass, and junglerice, it is not known whether these are the resistant biotypes or not (with the exception of Italian ryegrass which in some CA fields is resistant). I believe that most are not. Even if these resistant biotype appear in alfalfa, that is not a reason not to deregulate RR alfalfa. No single herbicide controls all the weeds potentially found in alfalfa. When tolerant or resistant weeds are found, growers simply use tank mixes or rotate chemicals to control weeds that would escape treatmenta practice that is currently done with conventional alfalfa and existing herbicides.

There is no evidence that I am aware of that weed biotypes that evolve resistance to glyphosate are any more fit in the environment than non-resistant biotypes. Therefore, any tolerant or resistant weeds can be effectively controlled with alternative herbicides and do not present an uncontrollable problem by any means. A wide range of active ingredients all with different modes of action than glyphosate are currently available.

Weed resistance is not unique to glyphosate and is actually a bigger problem with many other herbicides. The rate at which weeds have evolved resistance to herbicides has actually decreased in recent years. Many weed scientists actually believe that this reduction in the rate of resistance is due to the development and popularity of RR crops because resistance to glyphosate is not as common as resistance to many other herbicides, such as acetolactate synthase (ALS) and acetyl-CoA carboxylase (ACCase) herbicides that have a single binding site and single target of enzyme mechanisms of action. The number of glyphosate resistant weeds has increased though, which underscores the importance of using weed management systems with several different types of herbicides (including glyphosate).

Advantages of RR Alfalfa. Glyphosate is the most broad spectrum herbicide developed and controls many weeds that are difficult or impossible to control in conventional alfalfa. This is especially true with perennial weeds. The worlds worst weed, yellow nutsedge, is not adequately controlled in most cropping systems with available herbicides including glyphosate. However, in a RR alfalfa production system, the combination of glyphosate plus alfalfa competition and frequent cutting provides excellent yellow nutsedge control. Other examples of perennial weeds found in alfalfa that are not adequately controlled by any other weed system in alfalfa include quackgrass, dandelion, plantain, and Bermudagrass. Another significant advantage of the RR alfalfa production system is that alfalfa crop injury is avoided. Significant injury can occur with convention weed management systems, especially in seedling alfalfa. There is also a longer application window making weed control much easier for producers. (Comment Number: APHIS-2007-0044-9931-2)

Response: APHIS acknowledges the comment. In regard to the evolution of glyphosate resistant weeds due to more glyphosate usage, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6.

11.2 Issue 11.2-H – Weeds in Non-ag

Comment Excerpt Text:
Alfalfa is the first perennial, insect pollinated crop to be genetically engineered and recommended for deregulation and approval. Alfalfa is a unique crop whose characteristics including high genetic diversity, perenniality, quick re-growth, persistence, deep tap root system, drought and cold tolerance and seed dormancy, can contribute to its fertility. As Bagavathiannan et al. (2009) importantly note,

"With these traits alfalfa is equipped to invade and dominate unmanaged habitats. Feral alfalfa populations can and will act as bridges for long-distance gene flow and facilitate the adventitious presence of novel traits in the environment. As such, feral populations will become a potential barrier for achieving coexistence of transgenic and non-transgenic alfalfa fields." (Bagavathiannan et al. 2009).

With this assertion, NCGA will present data that demonstrates that the assumption of APHIS that organic alfalfa will not be contaminated by GE alfalfa is false and further, that GE alfalfa has the potential perpetuate a variety of other negative environmental impacts including glyphosate resistant weeds. (Comment Number: APHIS-2007-0044-11018-8)

Response: In regard to gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. APHIS has added a discussion of feral GT alfalfa due to both seed scatter, including spread by animals, as well as gene flow due to pollen transfer from crops to previously established feral alfalfa to appendix 5.2.3 of the FEIS.

11.3 Issue 11.3-I – Gene Flow

Comment Excerpt Text:

Regarding the release of RRA one of the expressed concerns stated by opponents of release is that RRA will hybridize with weedy species of the genus Medicago. My professional opinion is there is no reason for concern since years of research in my lab and others have demonstrated such hybridization is impossible. APHIS correctly addresses this issue in the draft EIS: there are no related, sexually compatible relatives of alfalfa in North America therefore gene flow outside of alfalfa (Medicago sativa complex) is not possible.
A ubiquitous Medicago species, Medicago lupulina (common name black medic) has been cited as a potential receptor of the RR gene from RRA and through that gene transfer could evolve into a major weed species. Publications that are almost three-quarters of a century old have been cited as justification for this concern. However, more recent investigations attempting to hybridize these species by natural and by artificial methods have been unsuccessful. It is highly likely that the earlier reports from the 1920's and 1940's of putative hybrids were actually progeny from self-pollination. The putative hybrids were reported to be extremely weak, a common observation associated with selfed progeny in alfalfa. Furthermore, there were no genetic markers available to confirm the putative hybrid nature of the progeny. With the myriad molecular and biochemical markers available today (that have been used to confirm true interspecific hybrids) it is likely the selfed nature rather than hybrid nature of the progeny would have been confirmed. (Comment Number: APHIS-2007-0044-11887-1)

Response: APHIS acknowledges the comment. APHIS has evaluated and incorporated the information as appropriate in appendix H and I of the FEIS.

11.4 Issue 11.4- J – Cultivation Practices

Comment Excerpt Text:
*Tell USDA That GE Alfalfa Would Significantly Increase Pesticide Use and Thereby Harm Human Health and the Environment:

USDA admits (correctly) that introduction of Roundup Ready alfalfa will increase Roundup use. However, USDA's claims that the increase is not significant and that Roundup will replace other, more toxic herbicides are flat-out wrong.

- The great majority of GE crops grown today are Roundup Ready, and their widespread introduction has vastly increased Roundup use and fostered an epidemic of Roundup-resistant weeds. To kill Roundup-resistant weeds requires higher doses of Roundup, often in combination with other toxic herbicides. Over the past 13 years, Roundup Ready crops have significantly increased overall herbicide use on corn, soybeans and cotton - by 383 million pounds[vii] - and Roundup Ready alfalfa will only make matters worse.

- As the agency's own studies here show, the great majority of alfalfa is currently grown without the use of any herbicides at all.[viii] So Roundup Ready alfalfa will increase Roundup use and exacerbate the resistant weed epidemic without displacing other herbicides on most alfalfa farms. (Comment Number: APHIS-2007-0044-0948-5)

Response: In regard to weed occurrence in non-GT alfalfa, see the response to comment APHIS-2007-0044-11037-10 for issue 7.2.

In regard to the potential for increased environmental harm from increased glyphosate use, see the response to comment APHIS-2007-0044-0402-1 for issue 6.3.
In regard to the evolution of glyphosate resistant weeds due to more glyphosate usage, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6.

Comment Excerpt Text:
Immediate and destructive impacts of Roundup® (glyphosate)-tolerant (Roundup Ready® - RR) alfalfa (Medicago sativa L.) will fall on the organic farming sector. Alfalfa (the "Queen of Forages") is a keystone crop for both organic and conventional agriculture, because it is a perennial, high value forage that is widely adapted to different environments, generates symbiotic nitrogen and improves soil quality. Alfalfa can be fed to a variety of animals. It is widespread (naturalized) in a great many parts of the country as a "weedy" or "feral" plant where it serves to support wildlife.
As organic farming does not use manufactured nitrogen fertilizer, it is dependent on rotation in and out of nitrogen-fixing, leguminous forages, particularly alfalfa. Organic farming often depends on integration with animal production, using manure for soil quality maintenance and fertilization. And alfalfa is a keystone forage for supporting animal production. (Comment Number: APHIS-2007-0044-10138-2)

Response: In regard to coexistence of GT alfalfa and organic farming, see response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). Regarding impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Many farmers confronted with RR alfalfa will turn to more toxic and less broad-spectrum herbicides, such as 2, 4-D and dicamba (3, 6-dichloro-o-anisic acid), or mixtures of these with other herbicides. Both 2, 4-D and dicamba carry serious human health problems, which in the case of 2, 4-D includes reproductive heath issuess (10). Effectiveness of replacement herbicides may not be assured, weather could preclude their use, there could be restrictions on use of herbicides at a particular site, and thus tillage would be substituted. The dormant seed characteristic of alfalfa, mentioned above, could mean use of replacement herbicides over multiple years, and thus the use of highly soil-disturbing inversion tillage to bury seeds becomes more attractive. (Comment Number: APHIS-2007-0044-10138-6)

Response: In regard to alfalfa volunteer weeds, see the response to comment APHIS-2007-0044-10263-8 for issue 3.4. In regard to the impact of GT alfalfa on herbicide use, see the response to comment APHIS-2007-0044-6240-2 for issue 6.0. In regard to stand removal practices for GT alfalfa, see the response to comment APHIS-2007-0044-11037-28 for issue 7.1.

Comment Excerpt Text:
Because alfalfa is a deeply rooted crop (there are numerous reports in the agricultural/soil science literature of rooting depths exceeding 10 feet (3 m) and greater), tillage for alfalfa is likely to be fairly deep, and not of the shallower, conservation tillage type. Soil science has

known for a long time that tillage is associated with loss of soil organic carbon and release of CO2. What has been learned in more recent research is that tillage causes immediate and significant oxidative losses of the less indurated (i.e., non-humin and humic acid) fractions of soil organic matter (11, 12).
US agriculture has been making considerable strides in adoption of no-tillage management with all its benefits, which includes increases in soil organic carbon and associated increases in soil quality, retention of crop residues on the soil surface, reduction in soil erosion risk, and reduction of fuel use for tillage. The use of glyphosate in supporting no-tillage and conservation tillage plays a dominant role in this. Conversion of conventional tillage systems to conservation and no-tillage is an important means for sequestering more carbon in the soil, and indeed, carbon credit markets have been established for farmers converting from conventional to no-tillage management (13).
Inclusion of the best overall legume, alfalfa, in crop rotations under no-tillage management brings cropping systems to an even greater level of sustainability, productivity, and capacity to store and retain carbon in the soil. The prospect of RR alfalfa coupled with the widespread dissemination of glyphosate-tolerant weeds generated by up to 13 years of RR soybean, corn, and cotton constitutes a grave threat to the progress towards sustainability that is being achieved in American crop production systems. (Comment Number: APHIS-2007-0044-10138-7)

Response: The deep rooted nature of alfalfa is discussed in appendix H of the DEIS. The discussion of no-tillage in appendix J. 3.2.3 of the FEIS has been expanded

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Comment Excerpt Text:
Farmers using alfalfa as a rotational crop get the benefit of symbiotic nitrogen production coupled with the economics of alfalfa as a high-value forage. Symbiotic nitrogen replaces industrially produced inorganic nitrogen, which is an energy-intensive product requiring natural gas as feedstock. Confronted with RR alfalfa, farmers depending upon alfalfa as a rotational legume will either (a) substitute other leguminous crops with lesser economic/environmental value; (b) resort to more violent, inversion tillage; or (c) use more toxic herbicides as substitute for glyphosate; or (d) resort to tillage after first using substitute herbicides. (Comment Number: APHIS-2007-0044-10138-8)

Response: In regard to alfalfa being deeply rooted and requiring deep tillage, see the response to comment APHIS-2007-0044-10138-7 for issue 11.4.

Comment Excerpt Text:
The argument has been put forward that GT alfalfa hay fields will not genetically contaminate conventional alfalfa seed fields based on contractual agreements that require hay growers to make timely hay harvests, avoiding both pollen transfer from the hay field and seed production within the hay field. These policies demonstrate good intent, but real fields and real weather are not under such tight control. Sometimes wet field conditions or human health do not allow timely operations. Even when most of a field can be harvested, wet spots or corners need to be left unharvested. Areas harvested late can transfer pollen to conventional alfalfa and areas unharvested can transfer pollen and produce seed. Furthermore, towards the end of a growing

season, the last cutting simply may not be worth harvesting and it is not unusual for fields or parts of fields to be let go to seed. These factors make it difficult to contain GT alfalfa to a hay field where it has been planted. (Comment Number: APHIS-2007-0044-10157-11)

Response: In regard to timing of alfalfa forage harvest, see the response to comment APHIS-2007-0044-10263-7 for issue 3.1.

Comment Excerpt Text:
The process of non-regulated status poorly considers cropping systems. On page 55 alfalfa hay is incorrectly discussed as a separate "cropping system". In most of the United States, alfalfa hay is one of a number of crops that are produced in any particular area. Substantial regions of the United States have alfalfa hay as well as glyphosate tolerant soybeans and corn. Other regions such as the Treasure Valley of Idaho and Oregon have alfalfa hay along with glyphosate tolerant sugar beets and corn. In each of these regions, the glyphosate tolerant annual crops are planted in rotations with alfalfa hay. The potential of glyphosate tolerant alfalfa to become a weed in other crops and in the environment as a consequence is downplayed. This conclusion is only possible considering alfalfa hay as a crop as a "cropping system" separate from land planted to corn, soybeans, and other glyphosate tolerant crops. The inclusion of glyphosate tolerant alfalfa hay in rotation with other glyphosate tolerant crops will inevitably reduce the usefulness of glyphosate tolerance in these other crops. While this problem is noted on page 156, the cropping system strategy with the inclusion of glyphosate tolerant alfalfa can be a serious flaw. The non-regulated status statement in the last paragraph on page G-2 recognizes that the other herbicides than glyphosate will be necessary to control alfalfa in other GT crops, yet this logical contradiction is not emphasized. (Comment Number: APHIS-2007-0044-10157-3)

Response: In regard to alfalfa volunteer weeds, see the response to comment APHIS-2007-0044-10263-8 for issue 3.4. Page 55 of the DEIS does not have the language the commenter refers to. In regard to the comment about the amount of herbicide use, see response to comment APHIS-2007-0044-6240-2 for issue 6.0.

Comment Excerpt Text:
The report massively overstates the need for herbicide use that occurs in alfalfa production. By the USDA's own numbers the vast majority (83%) of conventional alfalfa growers (and all organic growers) do not use any pesticides. Another USDA source, the National Agricultural Pesticide Impact Assessment Program, concludes at even lower numbers, concluding that just 7% of alfalfa hay acreage is sprayed with herbicides. (Comment Number: APHIS-2007-0044-10172-4)

> **Response:** See the response to comment APHIS-2007-0044-0402-1 for issue 6.3. In regard to the comment about the amount of herbicide use, see response to comment APHIS-2007-0044-6240-2 for issue 6.0.

Comment Excerpt Text:

APHIS includes several sections in the alfalfa EIS which document the benefits of no-till agriculture which will potentially increase as a result of GE alfalfa and other GE crops. Namely, APHIS states that conservation tillage and no till will improve soil quality, reduce erosion and leaching. Further, APHIS claims that no-till will improve global warming related emissions. NCGA does not believe that there is a preponderance of evidence to suggest that such claims are true. In fact, recent research suggests that no-till agriculture may result in a net increase in global warming gases since it may increase nitrous oxide emissions.

Tillage systems are defined according to the amount of soil disturbance and crop residue left on the surface of the field. No-till, or zero-tillage, involves no mechanical weed control prior to planting; rather weeds are controlled for by the use of chemical herbicides (Day et al. 1999). No-till agriculture has also been implicated in using increased levels of nitrogen fertilizers and elevated or more potent chemical herbicides (Heimlich and Ogg 1982; Bull et al. 1993; Sullivan 2003; Lupwayi 2009). Additional studies have also noted that no-till may increase chemical herbicide and pesticide run-off, a potential environmental consequence that should be considered (Baker and Johnson 1978; Gaynor et al. 1995; Smith et al. 1995; Warnemuende et al. 2007). Further research has also concluded that farmers using no-till were more likely to use more than one type of herbicide (Bull et al. 1993), particularly because multiple applications of glyphosate produces resistant weeds, which could cause farmers to turn to more harmful pesticides (Lupwayi et al. 2009).

While no-till agriculture has been widely promoted as a climate change solution, recent research is suggesting that it may not be able to reduce overall greenhouse gas emissions. Evidence also suggests that no-till agriculture may not actually sequester more carbon than conventional tillage systems. Many scientists have found no significant difference between soil carbon in no-till soils and conventional-till (Angers et al. 2007; Salinas-Garic et al. 1997; Doran 1980; Dick 1983; Bergstrom et al. 2001). As well, some research has found that no-till only affects the distribution of carbon in the soil, rather than increasing the actual amount sequestered (Angers et al. 1997; Potter et al 1998; Wanniarachchi et al. 1999). A review of tillage research found that no-till was particularly ineffective at storing carbon in the Corn Belt area of the United States and the Prairies (Manley et al. 2005).

Additional studies have indicated that no-till soils actually result in sometimes significantly greater amounts of nitrous oxide emissions compared to conventional- till soils. Numerous studies have demonstrated that cumulative ammonia production is significantly higher in no-till than in conventional-till (Al Al-Kanani and MacKenzie 1992; Rochette 2008; Mkhabela et al. 2008; Bacon and Freney 1989). Research also shows that no-till soils result in elevated nitrous oxide emissions for a variety of reasons including elevated moisture levels (Linn and Doran 1984; MacKenzie et al. 1998; Smith and Conen 2004; Grant et al. 2004; Lee et al. 2006; Mosier et al. 2006; Steinbach and Alvarez 2006; Liu et al. 2007; Ball et al. 2008; Beheydt et al. 2008; Halvorson et al. 2008; Mkhabela et al. 2008;Almarez 2009; Ussiri et al. 2009).

As a result of inconclusive results in no-till soils, numerous scientists have begun to question the promotion of no-till as a climate change mitigation tool. Failure to consider net greenhouse gas emissions in conjunction with potential carbon sequestered may lead to the promotion of no-till with unjustified mitigation potential (Six et al. 2004; Smith and Conen 2004). In their

comprehensive review Six et al. (2004) concluded that newly converted no-till systems will continue to increase net greenhouse gas emissions in all types of climates for ten years; significant reductions in net greenhouse gases were only observed in humid climates after ten years or more in practice. In some cases, particularly in wet climates or moist/irrigated soils, adoption of no-till in such "hotspots" could potentially offset any mitigation potential and even increase net greenhouse gas emissions over time to significant levels above conventional till emissions (Smith and Conen 2004; Grant et al. 2004; Li et al. 2005; Gregorich et al. 2006; Lee et al. 2006; Steinbach and Alvarez 2006; Oorts et al. 2007; Rochette 2008; Rochette et al. 2008; Almarez et al., 2009; Tan et al 2009). While no-till can offer numerous environmental benefits including decreased soil erosion (Schahczenski and Hill 2009; Fuglie 1999), it is also associated with numerous potential environmental hazards that APHIS should strongly consider as it is likely to be heavily associated with any deregulated GE crop. (Comment Number: APHIS-2007-0044-11018-16)

Response: Appendix J.3.2.3 of the FEIS has been updated to include additional information discussing the benefits of no-tillage and effects of global warming.

Comment Excerpt Text:
A study by Benbrook mentioned in the DEIS found that genetically modified crops reduced pesticide
use between 1996 and 1998, while pesticide use increased between 1999 and 2004.[Footnote 40: DEIS at 62.] These figures
suggest that studies on pesticide use from before 1999 may not reliably represent current practices and
call into question the reliance on the assertion in Wilke's 1998 study that only 17% of alfalfa acreage
uses herbicides.[Footnote 41: Id.] Without questioning the study itself, the problem is APHIS's reliance on it as
representative of what is happening currently. One study cited in the DEIS found that glyphosate use
increased six-fold between 1992 and 2002 due to adoption of glyphosate-resistant
crops.[Footnote 42: Cerdeira, A.L. and Duke, S.O., The Current Status and Environmental Impacts of Glyphosate-Resistant GT
Crops: a Review, 35 Journal of Environmental Quality 1633 (2006).]

APHIS acknowledges that its preferred alternative, to deregulate GT alfalfa, will lead to an increase
in the use of glyphosate across the country.[Footnote 43: DEIS at 155.] The DEIS raises but fails to address the expected result that increased glyphosate use will accelerate evolution of glyphosate-resistant weeds. This process will lead to more numerous applications of glyphosate as well as more-toxic herbicides to control the
emerging species.[Footnote 44: Cerdeira, supra n.42 at 1636.] APHIS fails to provide expected risks from this known problem.
Increased availability of glyphosate has changed the market for more-toxic herbicides. Glyphosatecontaining

products have become more abundant and affordable since the patent on glyphosate expired. The prices of non-glyphosate herbicides have also fallen as a result of competition, making them more
economically viable choices for use on both GT and conventional crops.[Footnote 45: Id.] Benbrook found that while GT cotton and GT soy tended to decrease the use of non-glyphosate herbicides, GT corn increased their
use 13% between 2002 and 2006.[Footnote 46: DEIS at 62.] APHIS provides no data showing a stronger similarity between GT alfalfa and either GT cotton or GT soy than similarity with GT corn. The assumption that GT alfalfa
will lead to a reduction in non-glyphosate herbicides is therefore unfounded. Furthermore, the spread of
GT alfalfa will necessarily increase to some degree the level of non-glyphosate herbicide use because
removal of a stand of GT alfalfa is not possible with glyphosate.[Footnote 47: DEIS at 66.]
(Comment Number: APHIS-2007-0044-11741-17)

Response: See the response to comment APHIS-2007-0044-0402-1 for issue 6.3.
In regard to the comment about the amount of herbicide use, see response to comment APHIS-2007-0044-6240-2 for issue 6.0.
In regard to the evolution of glyphosate resistant weeds due to more glyphosate usage, see the response for comment APHIS-2007-0044-9936-19 for issue 3.6.

Comment Excerpt Text:
APHIS assures that even with expanded GT alfalfa farming, the risk of oral exposure to glyphosate
on crops will be limited because the EPA sets “tolerances” that establish maximum legal pesticide
residue levels in or on foods. Factors within the “tolerance” analysis include: aggregate nonoccupational
exposure, cumulative effects from exposure to different pesticides, increased susceptibility
in sensitive subpopulations, and endocrine disruption effects.[Footnote 57: DEIS at 148.] The methods for determining “tolerances” lie beyond the scope of APHIS’ authority but if it is to be argued that these factors
extinguish risks posed by APHIS’ preferred alternative to deregulate, then information should be provided regarding both the validity of “tolerance” determinations and compliance with them in practice.
Related to food-borne glyphosate exposure, APHIS assumes without support that GT alfalfa will not
be grown by members of the general public nor in close proximity to non-farm
populations.[Footnote 58: DEIS at 150.] It also assumes that the expanded use of glyphosate with GT alfalfa will not change the risks of exposure that
currently exist and are accepted for labeled uses of glyphosate.[Footnote 59: DEIS at 153.] No evidence appears describing the reliability of proper labeling or the rate of misuse in disregard of label directions.

APHIS makes the tenuous argument that deregulation of GT alfalfa would equate to minimal increased exposure of the general public to glyphosate because glyphosate is the most-used herbicide in
the United States.[Footnote 60: Cerdeira, supra n.42 at 1634.] Considering that the use of glyphosate is expected to increase, and given the cumulative increase in glyphosate use due to past deregulations of GT crops, the potential for increased exposure seems certain. The "No Action" alternative to maintain the regulated status of GT alfalfa
carries no attendant increase in risk of glyphosate exposure, and so should be considered a better choice
on that factor than even a minimal increase of risk.
APHIS also gives only a passing mention about expected precipitation increases from climate change and corresponding higher risks of transferred glyphosate residue from GT alfalfa to nearby
crops.[Footnote 61: Id.] The agency should provide more detailed information about the potential for migration of
glyphosate from one area to another through rainfall and flooding. (Comment Number: APHIS-2007-0044-11741-20)

Response: In regard to the risk of increased glyphosate exposure, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3.

In regard to the risk of potential glyphosate migration, EPA describes in detail the fate and transport of glyphosate in the environment -- see the discussion in DEIS section III.B.1.b. As with all pesticides, care must be taken to prevent glyphosate residues on organic crops.

Comment Excerpt Text:
USDA acknowledges that introduction of RR alfalfa will increase the use of the herbicide, Roundup. However, USDA claims that the increase is insignificant and that Roundup will replace other, more toxic herbicides. They are wrong and evidence exists to the contrary. As USDA's own studies show, the great majority of alfalfa is currently grown without the use of any herbicides at all. [Footnote 10United States Department of Agriculture. Glyphosate-Tolerant Alfalfa Events J101 and J163: Request for Nonregulated Status. Draft Environmental Impact Statement—November 2009. Appendix J, J-25, EIS pp. 34 & 43.] Therefore, the planting of RR alfalfa will increase Roundup applications and exacerbate the resistant weed epidemic without displacing the use of other herbicides. (Comment Number: APHIS-2007-0044-11788-8)

Response: In regard to increased herbicide usage, see the response to comment APHIS-2007-0044-0402-1 for issue 6.3.

In regard to the evolution of glyphosate resistant weeds due to more glyphosate usage, see the response for comment APHIS-2007-0044-9936-19 for issue 3.6.

Comment Excerpt Text:
A recent report

looked at USDA data and estimated that the rapid adoption of Roundup Ready crops (in 2009, 91 percent of soybeans planted in the U.S. were an herbicide-tolerant variety) increased herbicide use by 383 million pounds between 1996 and 2008. [Footnote 10: Benbrook, Charles. 2009. Impacts of Genetically Engineered Crops on Pesticide Use: The First Thirteen Years, retrieved at http://www.organic-center.org/.] In Iowa alone, 952,000 pounds of glyphosate were applied on 15 percent of the state's soybean acreage when Roundup Ready soybeans were first introduced. Ten years later, glyphosate use had grown eightfold: more than 90% of Iowa's soybean acreage was applied with 12 million pounds of glyphosate.[Footnote 11: Hubbard, Kristina. 2009. Out of Hand: Farmers Face the Consequences of a Consolidated Seed Industry, National Family Farm Coalition.] (Comment Number: APHIS-2007-0044-12044-6)

Response: The suggested reference has been added to appendix N of the FEIS.

Comment Excerpt Text:
Lastly, I would like to briefly discuss the issue of increased herbicide use and GT alfalfa. Drawing primarily on USDA data, Charles Benbrook's 2009 report, "Impacts of GeneticallyEngineered Crops on Pesticide Use: The First 13 Years," concludes that the introduction ofGE crops has lead to an increase in the use ofpesticides in the U.S. by 318 million pounds. Benbrook discusses the widespread adoption of weeds that are becoming resistant to glyphosate. In October of2009, ABC's World News Tonight featured a story on these "superweeds" and farmers struggling to contend with them. Although the report downplayed Monsanto and glyphosate, the "superweeds" described in the report had developed in GT cotton fields to resist glyphosate. The implications ofglyphosate-resistant weeds are a growing concern to farmers and ifGT alfalfa is planted across the country, the problems associated with these "superweeds" will eventually affect alfalfa growers as well. The EIS cites Benbrook's 2004 report, but APHIS should review the 2009 report and consider the consequences ofwidespread use of glyphosate on yet another U.S. crop. (Comment Number: APHIS-2007-0044-12145-4)

Response: In regard to the evolution of glyphosate resistant weeds due to more glyphosate usage, see the response to comment APHIS-2007-0044-9936-19 for issue 3.6.

Comment Excerpt Text:
I am forwarding this comment in full support of the reintroduction of Roundup Ready Alfalfa to the production choices available to domestic alfalfa growers. Regulatory issues aside, the glyphosate weed control system has proven to be an environmentally safe and effective production tool. The environmental impact statement prepared by APHIS validates this safety and efficacy statement.
I am a vendor of agricultural seeds to Forage and Grain producers in a significant area of Northern California and

Southern Oregon. I market seed to customers in the full range of production methods: i.e. high input commercial,
natural non-organic and certified organic. In that capacity, I interact with all farming philosophies and methods. During
the brief sales period of Roundup Ready alfalfa, I sold a limited amount of the product. In our production region the
presence of glyphosate tolerant alfalfa has not and will not limit grower choice across the spectrum of production
schemes as they have coexisted without conflict since the 2006, 2007 plantings.
I am particularly sensitive to pesticide load introduced to the environment as a significant portion of our production
area is bounded by National Wildlife Areas and open water bodies, streams, rivers and canals. In practice,
glyphosate resistant alfalfa production practice has lessened weed control herbicide application by a factor of 2 to 3
times. Essentially, after the application in the establishment year, Roundup applications have only been needed every
2 to 3 years versus annual applications of 2 to 3 herbicides in conventional production. Given the low volatility, nonexistent
soil activity and minimal toxicity of glyphosate herbicide, this is a great benefit to the environment.
In practice, conflict between glyphosate production and organic production is a non-event as forage producers
harvest the crop before seed is produced. Alfalfa harvested for forage at flowering and through seed set rapidly loses
its feed value which defeats the purpose of the harvested forage. In addition, there remains multiple effective means
of destroying glyphosate tolerant alfalfa stands when the decision is made to rotate into other uses.
I believe the environmental safety of Roundup Ready production supports the reintroduction glyphosate tolerant
alfalfa to the marketplace. (Comment Number: APHIS-2007-0044-12175-1)

Response: APHIS acknowledges the comment.
In regard to agricultural approaches supported by APHIS, see the response to comment APHIS-2007-0044-11753-1 for issue 2.0.

Comment Excerpt Text:
Thirdly, the environmental impact of Roundup Ready GE alfalfa
needs to be further examined. An earlier USDA report shows that
current GE crops have caused a significant increase in the use of the
herbicide Roundup Ready [Footnote 4: fvii} http://truefoodnow.org/2009/11/17/new-report-revealsdramatic-
rise-in-pesticide-use-on-genetically-engineered-ge-cropsdue-
to-the-spread-of-resistant-weedsI] (Comment Number: APHIS-2007-0044-12261-3)

Response: See the response to comment APHIS-2007-0044-0402-1 for issue 6.3.

Comment Excerpt Text:
Organic producers must graze animals more than conventional farmers. This is currently driven by consumer preference but is now part of the NOP. Alfalfa is an important addition to pastures. It makes them more drought resistant and is a perennial legume versus many popular pasture legumes that are not.
? There is an overlapping niche market where alfalfa is extremely central: grass fed beef and milk from grass fed cows – both organic and non-organic . Contrary to the model explained first on p 139 where beef is finished in feed lots and thus has little input from alfalfa, the grass fed producers in the upper Midwest make ample use of alfalfa in pastures and harvested forage. Feed is usually 65% of total cost of an animal going to slaughter and composed entirely of legumes and grass. It is common for the legume content to be 60-70% of hay and 50% of pasture. The legume of choice in hay is alfalfa and about half of the graziers use alfalfa in their pastures. (Comment Number: APHIS-2007-0044-2308-10)

Response: APHIS acknowledges the comment. Grazing is included as a use for alfalfa.

Comment Excerpt Text:
Beehive removal. There is a significant deterrent to accomplishing the intent. The hives are not the property of the farmer under contract. Unless the apiarist is party to the license contract what is keeping him/her from removing his own property? Further, there is no provision for hives owned by others on land owned by others but adjacent to fields where GE alfalfa is grown. The EIS does not address these situations. (Comment Number: APHIS-2007-0044-2308-5)

Response: In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for issue 3.1.

Comment Excerpt Text:
Stand removal. Sounds good on paper but in practice complete stand removal is problematic. I'm not a seed grower but I've talked to 3-4 of them, I've talked to degreed university forage specialists and I have seen correspondence that indicate this to be virtually impossible to achieve. As a user of non-GE seed I have no faith in the methodology concluded in the EIS to stop contamination. (Comment Number: APHIS-2007-0044-2308-7)

Response: In regard to stand removal practices for GT alfalfa, see the response to comment APHIS-2007-0044-11037-28 for issue 7.1.

Comment Excerpt Text:
Will farmers using glyphosate on RR crops pay for the damage that causes disease and fungus problems in neighboring fields?
The opportunistic fungi does not know where the fence line is located when the wind is blowing. What is the total cost?
Can you buy this type of liability insurance?
The saddest part of the whole day was the reality that each of these individuals does not get to hear the truth. The radio ads and farm publications are dominated with advertising from chemical and biotech seed companies. They certainly can afford to advertise with the amount of tech fees they are collecting from farmers on GMO seed.
It is to bad that the research conducted by Dr. Kremer at the University of Missouri and Dr. Huber at Purdue University and others is not printed by farm publications. This research proves beyond the shadow of a doubt that glyphosate and RR crops are causing damage to the soil and establishing the perfect environment for disease and fungus to thrive. This opportunistic fungi causes mold and micotoxins to end up in the grain and food supply. (Comment Number: APHIS-2007-0044-3395-5)
Response:
Concerning increased susceptibility to disease in plants sprayed with glyphosate, the DEIS section IV.C.4, IV.G.1, Appendix J section 2.2.2, acknowledged that some studies (USDA FS 2003) have shown an increase in microbial activity in soils subject to glyphosate application. The FEIS has been revised to include additional discussion of glyphosate and plant susceptibility to disease in section IV.G.1, and Appendices J and N.

Comment Excerpt Text:
2) In November, 2009 the Organic Center also published, "Impacts of Genetically Engineered Crops on Pesticide Use: the First Thirteen Years," in which they conclude that the planting of GE crops has resulted in the use of "318 million more pounds of pesticides, requiring 26% more pounds of pesticides than conventional varieties, all as a result of the rapid spread of glyphosate-resistant weeds." (This issue contrasts sharply with the APHIS study, which claims that "weed management is an old problem with agriculture, and can be managed with diverse weed management strategies that have been developed over many years by weed scientists. If it occurs, it will primarily have an impact on the effectiveness of Roundup, not the environment.") (Comment Number: APHIS-2007-0044-6353-3)

Response: See the response to comment APHIS-2007-0044-0402-1 for issue 6.3.

Comment Excerpt Text:
This EIS shows USDAs lack of real world knowledge of growing alfalfa. The agency claims that alfalfa is harvested before 10% of plants reach full flower. As an alfalfa grower, I can tell you that this is not true. In climates where there is only the opportunity for one cutting or stands are left to gather snow, many plants go to full flower. Furthermore, for many farmers, the alfalfa is

also used as a cover and grazing crop. In this case, even if it is hayed once or twice in a season, the later plants have the opportunity to flower to full bloom. When this happens the pollination will happen and contamination is impossible to prevent.
The USDA shows even further ignorance when it claims that I can prevent contamination by changing planting and harvesting schedules to avoid simultaneous flowering with RR alfalfa. Weather conditions allowing for haying are out of my control. Furthermore, the best way to use grazing of alfalfa may change from year to year, depending on weather conditions and plant growth. The pollination of honey bees and other pollinating insects is also out of my control. I cannot control where my neighbors choose to put hives or how far those bees travel to cross pollinate. (Comment Number: APHIS-2007-0044-6811-3)

Response: In regard to timing of alfalfa forage harvest, see the response to comment APHIS-2007-0044-10263-7 for issue 3.1.
In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for issue 3.1.
In regard to the use of alfalfa for grazing, see the response to comment APHIS-2007-0044-10263-7 for issue 3.1.
Gene flow from GT alfalfa to grazing pastures is unlikely if it is grazed before seed is set. In regard to gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
While the ability to use glyphosate to control weeds in glyphosate–resistant crop fields has provided growers with another tool to use for weed control in crop production, it does not decrease the number of other weed control options that a grower may choose. As shown in the examples below, Monsanto and other herbicide experts recommend a mixture of glyphosate use along with other herbicidal methods of action in order to maximize weed control and minimize the risk of weed resistance.

• Corn – Recommendations for herbicide use in Roundup Ready corn typically include the use of a soil residual herbicide for early season weed control, followed by glyphosate used in–crop. Alternatively, the soil residual herbicide and glyphosate could be applied together in a tank–mix in the crop. Glyphosate is also commonly used as a burndown application in no–till corn production.

• Cotton – Recommendations for herbicide use in Roundup Ready cotton typically include the use of a soil residual herbicide for early season weed control, followed by glyphosate used in–crop. Glyphosate is also commonly used as a burndown treatment in no–till cotton production.

• Soybeans – Recommendations for herbicide use in Roundup Ready soybeans typically include the use of glyphosate in–crop with the added recommendation to use soil residual herbicides for early season weed control and/or tank–mixes of postemergent herbicides to control dense stands of hard–to–control weeds. Glyphosate is commonly used as a burndown application in no–till soybean production.

• Canola – Recommendations for herbicide use in Roundup Ready canola typically include the use of glyphosate in–crop. Other herbicides can be used prior to or after crop emergence, provided their use does not contradict the Roundup agricultural product label. Glyphosate could also be used as a burndown application in no–till canola production. (Comment Number: APHIS-2007-0044-7620.4-9)

Response: APHIS acknowledges the comment.

Comment Excerpt Text:
Let me tell you a story about alfalfa: you cut it at least 3 times, sometimes as often as 5 times, per year. There are very few, if any, weeds that can withstand this heavy amount of mowing pressure. Last year I converted 46 acres of row crop land to organic alfalfa (1st year transition). My farm has a terrible ragweed problem. The alfalfa/grass blend was planted in early spring and by June I had a horrifying monocrop of giant ragweed growing--46 acres of ragweed. It was the most disheartening thing I had ever seen. What happened? I mowed the ragweed hay in late June, raked it and baled it. Obviously the yield was low, but much to my surprise, my beef cows ate it happily. By August, the field was ready for a second cutting. The ragweed was now thin and spindly, barely holding on. The alfalfa and grasses were growing happily through it and I got a lovely 2nd crop of hay off that land that yielded 1 ton/acre. Hay should yield about a ton/acre/cutting, so my newly established, prior ragweed-infested field was right on target. 3rd cutting was beautiful. A separate field of 3 yr old alfalfa has virtually no weeds--the weeds simply cannot take the mowing pressure.
Now tell me, why do we need glyphosate-resistant alfalfa? The cost of spraying Round-up will be about the same as harvesting one bad crop of hay on the very first year you plant it. You risk the livelihood of many farmers, put the environment at risk, and enable monopoly control of a market by 1 company. GM alfalfa is unnecessary and unwanted. No, no, no. (Comment Number: APHIS-2007-0044-8321-2)

Response: In regard to weed occurrence in non-GT alfalfa, see the response to comment APHIS-2007-0044-11037-10 for issue 7.2.

Comment Excerpt Text:
As experienced organic farmers, we know that chemicals/herbicides are NOT necessary to produce premium and supreme quality alfalfa. For over a decade we have consistently produced alfalfa that is as good as (or usually better than) conventionally produced alfalfa. Taking into account the fact that our geographic region produces some of the best quality alfalfa in the entire U.S., this is a very significant accomplishment. (Comment Number: APHIS-2007-0044-8492-4)
Response: In regard to herbicide usage in non-GT alfalfa, see the response to comment APHIS-2007-0044-11037-10 for issue 7.2.

Comment Excerpt Text:
On page 70 of the DEIS, it was stated that ‘Farmers typically harvest between late bud stage and full bloom.’ We would dispute this statement, at least in Wyoming; most, if not all, alfalfa

growers seek to cut alfalfa at late bud to early bloom, thus maximizing the total amount of nutrition harvested from each acre of alfalfa hay.
We would also remind APHIS that gene flow, however unlikely, flows both directions. The gene flow from organic alfalfa presents a danger to the purity of conventional varieties, grown under seed certification standards, and serves to lessen the productivity of conventional agriculture, given that the concerns of the organic community related to gene flow in alfalfa are valid. We would recommend that the organic alfalfa seed industry adopt 'Best Management Practices', as the GT alfalfa seed producers, and many certified seed producers have done. (Comment Number: APHIS-2007-0044-8508-4)

Response: In regard to timing of alfalfa forage harvest, see the response to comment APHIS-2007-0044-10263-7 for issue 3.1.
In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
The USDA concludes in its EIS that the introduction of these two lines of GM alfalfa will lead to increased concentration and dominance of GM alfalfa in the marketplace, but it dismisses this trend as being of no consequence. The reality, however, is the level of concentration in the seed market is significant, and marketing programs of major biotech seed companies have forced farmers to utilize seed varieties that are genetically-engineered and in some instances, with multiple traits. Meanwhile, seed varieties that are lower cost, and conventionally-bred, are removed from the market. Consequently, farmers seed costs are rapidly increasing.
Alfalfa is an important crop, both as a source of fodder, and also as a soil-builder and nitrogen-fixer. It has a very competitive nature, and generally establishes quite easily without requiring herbicides. These very characteristics make it an important rotational crop in organic and conventional agriculture. Its ability to out-compete weeds makes it invaluable to clean up crop land from several weed issues. It prevents erosion where it is planted, and by fixing nitrogen, it adds to soil fertility. This makes it extremely important in organic agriculture, as herbicides and fertilizers are not an option. GM crops are also not an option, so contaminated or GT alfalfa will render the use of alfalfa for these purposes unlikely. As a consequence, organic agriculture will be destroyed in many areas. Conventional alfalfa producers in Canada, and I expect to a large extent in the US, feel that this is a largely unnecessary and harmful product. (Comment Number: APHIS-2007-0044-8978-11)

Response: In regard to market seed concentration, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0. In regard to economic impacts on organic farmers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Additionally, most alfalfa for dairy cattle is harvested at the bud stage (before flowering) because more mature alfalfa has increased fiber and results in reduced milk production when the higher fiber hay is fed to dairy cattle. Alfalfa for other purposes (beef cattle, growing dairy animals, horses, etc) is often harvested at 10% bloom. However for seed to form on alfalfa, a plant must

be left 24 to 36 days after flowering and pollination. While hay harvest is sometimes delayed by rain, it is never delayed this long since alfalfa regrows for harvest in 30 to 40 days, a farmer leaving hay in the field 4 to 6 weeks after flowering would lose one harvest of alfalfa. (Comment Number: APHIS-2007-0044-9720-3)

Response: In regard to timing of alfalfa forage harvest, see the response to comment APHIS-2007-0044-10263-7 for issue 3.1.

Comment Excerpt Text:
A number of concerns of roundup ready alfalfa relate to lack of understanding of pollen movement in alfalfa. In some crops pollen is blown in the wind (e.g. corn). This is not true for alfalfa where pollen is not released from the canopy; pollen is only moved to other alfalfa plants only by insects (bees). The chance of cross-pollination decreases exponentially with distance and the risk is zero if seeds are not formed. Although honey bees have received much attention in the comments, honey bees, do not prefer to gather nectar or pollen from alfalfa because, when visited, a part of the alfalfa flower pops up and violently hits them. Honey bees are mainly nectar collectors and are inefficient pollinators of alfalfa; they prefer to gather nectar on many other crop and wild plants. This is why western seed growers use pollen collecting bees like leafcutter or alkali bees instead of honey bees to pollinate alfalfa. The low natural bee population in most hay producing regions and their nonpreference for alfalfa is why movement of alfalfa pollen among alfalfa fields is almost non-existent in hay production regions. Therefore, normal harvest maintenance of non-Roundup Ready hay fields in the proximity of Roundup ready alfalfa requires no special or costly control methods to be used by conventional hay growers. Due to the biology and morphology of alfalfa, measures to counter the gene flow of the RR trait will have no cost to alfalfa hay growers and will require no significant change in common farming practices, counter to what some commentators have claimed. Hay growers need only plant non-GE seeds and harvest before secondary seeds are ripe. (Comment Number: APHIS-2007-0044-9720-5)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.
In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for issue 3.1.

Comment Excerpt Text:
Another significant advantage of the RR system that I did not foresee relates to stand establishment failures. Oftentimes, for various reasons new plantings of alfalfa have areas with inadequate alfalfa plant populations. This presents a significant problem for producers. Those areas typically have greater weed pressure but the growers cannot treat because most conventional herbicides have soil residual that would affect the emergence of new seedlings in any area that needs to be reseeded. If the grower waits until the reseeded area is mature enough to treat, the weeds are typically too large in the rest of the field and inadequate control results. This is not an issue with RR alfalfa because glyphosate does not have soil residual activity and the alfalfa is tolerant at any growth stage. This means the alfalfa can be treated as needed and replanting is not a problem.

Another significant advantage of RR alfalfa is that glyphosate is less toxic than most (if not all) the other herbicides used on alfalfa. It is less toxic in terms of human exposure and environmental risk. Other herbicides have been found to contaminate groundwater and/or surface water and the use of glyphosate avoids these environmental risks.
Because of the advantages of the RR system mentioned above, all the growers in the Intermountain area that I know have planted RR alfalfa were very pleased with the results. In fact, some growers were so satisfied with the RR system that they considered delaying future alfalfa plantings until RR alfalfa was again deregulated. However, with the delay in completing the EIS, they elected to plant conventional alfalfa. (Comment Number: APHIS-2007-0044-9931-3)

Response: APHIS acknowledges the comment. Further discussion regarding the utility of GT alfalfa to help prevent patches of weeds in fields where alfalfa seedlings have trouble establishing in Appendices G and J of the FEIS.

11.5 Issue 11.5-K – Farming Economics

Comment Excerpt Text:
Economics: In my area, conventional alfalfa production costs are not significantly different than RR costs. At $6.50 per pound (The last retail price of 2007, I doubt it will ever be that cheap again), RR seed would have been about $3.00 a pound higher than conventional varieties in 2009. Roundup Ready alfalfa seed sold in 2007 contained a 8% coating (about 4 lbs./ 50 lb. bag) and it was said to have a possible 5-7% non Roundup Ready tolerance. At 30 pounds per acre, about $90 can purchase broader spectrum herbicide/s that perform very well in our area, and better than Roundup. Actually annual and perennial weeds, both grasses and broadleaves are well contained by winter and spring/summer spraying in my area. Some growers are ignorant to the fact Roundup will NOT give them a 100% kill of ALL weeds. I've talked to growers who have mixed Roundup with other herbicides to kill nettle, johnsongrass, and pig weed in their RR alfalfa. I don't understand their logic or the Roundup Ready value factor.!
[See original comment for table - Conventional Alfalfa vs. Roundup Ready Cost Comparison]
(Comment Number: APHIS-2007-0044-0933-13)

Response: See the response to comment APHIS-2007-0044-0511-1 for issue 5.8.

Comment Excerpt Text:
Monsanto's Seed Prices Will Drain Rural America
Organization for Competitive Markets
Wednesday, 30 July 2008
http://www.competitivemarkets.com/index.php?option=com_content&task=view&id=221&Itemid=43
It's pretty clear that Monsanto has quashed competition to the extent that it can raise prices unencumbered. It seems farmers have never had more forces against them, which is all the more reason for state attorneys general to ramp up their investigation into Monsanto's anticompetitive conduct in the seed industry. Read more and become involved here.

“In California, the price of RR seed corn has doubled since Monsanto has entered the market; and probably tripled in the corn belt. The technology does have value, but just how much? bT and Yield Guard technology don’t apply to California agronomics and is discounted for that reason. The main reason California has become about 70% RR in it’s corn production is because of seed availability. Monsanto would much rather offer all Triple Stack products with differentiation (especially when ALL competitors must run through the Monsanto channel) than offer a choice to farmers. If approved, I can see RR alfalfa at $8-$12 per pound within a few years.” (Comment Number: APHIS-2007-0044-0933-8)

Response: In regard to the impact on seed market concentration, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0.

Comment Excerpt Text:
The Nevada Organic Advisory Council has a long interest in GE (genetically engineered) crops, and in 2008 had written a letter to the Nevada Department of Health, requesting them to initiate a study of the safety of such crops. Please refer to the attached letter, which effectively states our position on the matter.
Since the 2008 letter, we have continued to follow various scientific and economic research studies on GE crops, further adding to our convictions in the following areas:
1) In December, 2009 the Organic Center published a study entitled, The Magnitude and Impacts of Biotech and Organic Seed Price Premiums, in which they conclude that GE seeds will result in markedly higher costs with little or no impact on crop yields and income in most years. The biotech premium is much larger than the organic seed premium, and is likely to grow larger still, in step with the steep upward trajectory of GE seed prices.
2) In November, 2009 the Organic Center also published, Impacts of Genetically Engineered Crops on Pesticide Use: the First Thirteen Years, in which they conclude that the planting of GE crops has resulted in the use of 318 million more pounds of pesticides, requiring 26% more pounds of pesticides than conventi. (Comment Number: APHIS-2007-0044-10120-1)

Response: APHIS acknowledges the comment. The analysis of the potential impact of GT alfalfa deregulation on seeds has been expanded in section 3.2.2 of appendix S of the FEIS, and incorporates the suggested reference on seed prices.
In regard to increased pesticide use, see the response to comment APHIS-2007-0044-0402-1 for issue 6.3.

Comment Excerpt Text:
Any analysis of the regulatory matter at hand must look at both the affected sectors of US agriculture and at the agricultural system as a whole and how the overall environment will be affected by any proposed action. The analysis must distinguish shorter term economic impacts on various sectors of US agriculture from longer term, systemic impacts on agriculture, the environment, and US society. (Comment Number: APHIS-2007-0044-10138-1)

Response: APHIS acknowledges the comment. The DEIS analysis considered the impacts on alfalfa farming, downstream uses of alfalfa and interconnections to the rest of the agricultural

system (e.g., through the cumulative use of glyphosate). Short term impacts (such as those on sensitive markets) and long term impacts (such as the potential for increased weed resistance) were considered and both environmental and socioeconomic aspects were taken in consideration.

Comment Excerpt Text:
Alfalfa Hay Supply – Loss in Organic Premium

Alfalfa grown for forage is the third-ranked crop in the U.S. by value and fourth ranked by total acreage. In the U.S. alfalfa is grown on 21 million acres. The total production was 69.6 million tons of alfalfa and alfalfa mixtures. The average production per acre is 3.32 tons per acre (USDA-NASS, 2009). In terms of tonnage, alfalfa comprises 47.8 percent of total hay production.
Organic alfalfa production comprises 0.92% of total U.S. acreage (204,380 acres) (Page 37, EIS).
The total estimated U.S. organic alfalfa production in 2005 was about 606,242 tons based on differences in organic and conventional alfalfa yield from Long et al. (2007), (page 48, EIS).

Most of the organic alfalfa is fed to livestock for organic food production with a small amount sold as seed sprouts and food supplements. Most of the organic alfalfa is fed to livestock for organic food production with a small amount sold as seed sprouts and food supplements.

The production of organic alfalfa has been shown to have a lower yield but a higher price. The organic premium more than offsets the lower yield. The end result is that total revenue per acre from organic production is higher than conventional production. In the draft EIS, Table 3-5 (Page 37) Long et al. (2007) demonstrates the differences between conventional and organic alfalfa production. In that table, the 2005 organic value premium is $18.25 per ton over the conventional alfalfa. If GE alfalfa totally displaces all alfalfa production, the total organic hay premium loss based on 606,242, tons or organic alfalfa, would be $11,348,850. (Comment Number: APHIS-2007-0044-10172-9)

Response: APHIS acknowledges the comment; however, as discussed in appendix S of the DEIS, APHIS neither expects GT alfalfa to “totally displace all alfalfa production,” nor the organic premiums to remain the same with GT alfalfa deregulation (they might increase or decrease, depending on shifts in supply and demand).

Comment Excerpt Text:
The economic consideration of glyphosate resistant weeds is also considerable. Glyphosate resistant weeds will affect all kinds of farmers- GM, conventional and organic. Research shows that such impacts may be economically devastating. In Argentina, the rise in glyphosate resistant weeds, which thus led to a solid increase in 2, 4-D, resulted in an increase to farmers cost by 19.3% per hectare (Binimelis et al. 2009). As well, farmers may face additional upfront costs in their efforts to combat potential future glyphosate resistant weeds (Weersink et al. 2005). Clearly glyphosate resistant weeds offer substantial plant pest risks to the agricultural community, and their drive and increase is being directly facilitated by GM crops. (Comment Number: APHIS-2007-0044-11018-14)

Response: APHIS acknowledges the comment. Section 4 of appendix K of the FEIS revised the discussion of the economic impact of glyphosate-resistant weeds taking into consideration the sources cited

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Comment Excerpt Text:
Farmers are required to treat their fields
with no prohibited varieties for three years before the ground and crops produced on it can be certified
organic. The body of acreage currently in transition is analyzed as conventional alfalfa production even
though in short order it will be organic. Thus, this data is still shy of the actual upward trends in organic
production, and the analysis based on it fails to adequately appreciate the value of the organic markets.
The DEIS falls short of adequately discussing the current demand for organic alfalfa for forage and the
impact that deregulation will have on such demand. For example, APHIS claims that "the value of
organic hay...must be estimated."[Footnote 27: DEIS at 49.] The value of organic hay could be easily surveyed in much the same
way that conventional hay is surveyed and its value measured. Additionally, the DEIS claims that
"weeds, for example increase costs for all alfalfa producers."[Footnote 28: DEIS at 56.] While this may be true, the amount of
increase varies with production methods and weed control strategies. There is no analysis of how much
weed management costs with GT alfalfa's increased seed price, and applications of glyphosate, as
opposed to tillage or intentional polyculture cultivation common to organic production methods.
Without a cost analysis that compares production methods and weed control strategies, it is impossible
to conclude that there will be a positive economic impact based on deregulation or an absence of a
negative economic on non-GE production methods. (Comment Number: APHIS-2007-0044-11741-10)

Response: Appendix K of the DEIS supports your comment that the costs of alfalfa production will vary depending on production methods and illustrates conditions under which GT alfalfa will likely be chosen by farmers. The analysis done by APHIS reported in appendix S of the DEIS, however, shows that the impact can be analyzed conditional on the extent of GT alfalfa adoption.

Comment Excerpt Text:

Domestic consumer demand for organic food is currently outstripping domestic production, leading to increasing importation of organic foods. Additionally, grain crops that can be used as foods
enjoy higher relative organic production than other grain crops.[Footnote 31: Catherine Greene, et al., Emerging Issues in the U.S. Organic Industry, EIB-55. U.S. Dept. of Agriculture, Economic Research Service, June 2009 [hereinafter "Greene"].] Before deregulation, we ask that APHIS consider the following questions:
a. Domestic sales of organic foods continue to increase steadily; what is the current growth trend in the organic market?
b. Organic feed is necessary to produce organic meat and dairy products. With the current inadequate domestic supplies of organic alfalfa, what percent of organic feedstuffs must be imported to fulfill both domestic and foreign demand?[Footnote 32: See Lynn Clarkson, Statement of the President of Clarkson Grain Co., Inc. Subcommittee on Horticulture and
Organic Agriculture—Public Hearing. "Review of economic impacts of production, processing, and marketing of
organic agricultural products." 110th Congress 2007-2008, Witness Opening Statements, House Committee on
Agriculture, April 18, available at http://agriculture.house.gov/hearings/statements.html ("In particular, organic
dairy producers and soy food processors face shortages of domestically produced organic feed grains and
soybeans."); see also Greene, supra n.13 ("Quarterly farm-level prices for organic grains and feedstuffs have
risen steadily since USDA began tracking prices for these products in January 2007—in some cases more than
tripling by third-quarter 2008 outpacing conventional grain price increases and reflecting tight organic supplies.")]
c. Although USDA-NOP standards do not take into account trace amounts of GE products in organic labeling, what market share of organic products are solely USDANOP certified, what do other independent certification requirements demand, and how is consumer perception and preference influenced by different certification standards? (Comment Number: APHIS-2007-0044-11741-12)

Response: APHIS acknowledges the comment. The DEIS describes organic food sales and trends in appendix S. U.S trade data do not discriminate for organic products. Regarding independent certifications in the organic market, the share that is solely certified per NOP standards is not available. However, the analysis of the impact of deregulation of GT alfalfa on organic markets done in appendix S of the DEIS was expanded in the FEIS to incorporate comments received, including recognition of the growth of private marketing initiatives such as the "Non-GMO Project."

Comment Excerpt Text:
According to the FGI, there is a huge demand for this technology in the forage sector. This is not true. There were only 210,000 acres seeded with RR alfalfa after approximately five years of

product and market development in conjunction with almost two seasons of sales. This is less than 1% of the total 22 million acres of alfalfa based forage (NAFA data). RR alfalfa demand was not substantiated by sales of the seed.
Why should we risk the contamination of all alfalfa varieties in North America to satisfy such a small market demand?
Where are all the enforceable rules and regulations that will protect the majority of forage growers and alfalfa seed producers who do not want this product?
In conclusion, the gene flow study was done with no practicality; there are many un-noted socioeconomic impacts; and there is neither product necessity, nor much product demand.
(Comment Number: APHIS-2007-0044-12038-3)

Response: APHIS acknowledges the comment. APHIS can grant a petition for nonregulated status in whole or in part based on its assessment of the regulated GE organisms under the regulations 7 CFR part 340.6. The size of the market for the lines is not a consideration outlined in this section. However, market adoption can influence the effects on the human environment and so are considered where relevant in that analysis. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Throughout the EIS there are many descriptions of market trends and forces in terms of averages or majorities. See especially pages 56-60. The conclusion seems to be that the consumer-driven market for GE food is not real because on average American eaters don't care if they eat GE food – especially after education. This may be true but there is a small group of people who consider themselves well educated on these subjects and totally reject GE food. You may disagree with their "education" but that's what they believe. These consumers have this and other reasons for buying organic. This is nature of a niche market. Table 3-16 indicates that the organic niche is growing at a CAGR of 24% for dairy and 38% for beef. To those of us who sell organic products to this niche, growth rates of this magnitude allow pricing and other marketing opportunities that are important. In real terms that means we can sell organic pasture based beef at $2.00 per pound Hot Carcass Weight (after processing, transportation and all marketing costs) versus conventional at $1.40 (USDA AMS Feb 2010). Thus, if we lost organic certification and had to sell on the conventional market we'd experience a 30% reduction in revenue per head.
(Comment Number: APHIS-2007-0044-2308-11)

Response: Regarding consumer preferences for foods free of genetically engineered content and impact of unintended presence of genetically engineered material for organic certification, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
Although cost of production may be lower for GT- alfalfa, there is no evidence that markets for hay containing the GT trait would be necessarily improved (as the EIS says) – hay price is a

function of supply and demand, and weed free hay is preferred by markets whether they contain the GT trait or not. Weed-free high quality hay can be produced with conventional, GT, or organic methods, it's just easier to do using some methods or combination of methods vs. others (especially GT methods). Likewise, there is no evidence that GT-sensitive farmers would have a reduction in demand – in fact the opposite is just as likely to be the case, as some GT-sensitive buyers may favor non-GT alfalfa as a result of the availability of GT alfalfa in the market. Examples include organic and export hay, which have done fine during this early introduction of GT alfalfa. Many exporters are testing export hay currently to assure that the hay is non-GE – this hay could have a premium, although currently does not. Although I quibble with the above points, your essential conclusion that there would be in sum total no impact on in markets is essentially correct. (Comment Number: APHIS-2007-0044-4913-6)

Response: It is unclear what the commenter means by "markets for hay containing the GT trait would be necessarily improved," since this is not stated in the DEIS. APHIS found no inconsistency between the commenter's remarks on hay price and the analysis done in appendix S of the DEIS. The possibility of GT alfalfa deregulation leading to an increase in demand for organic foods is discussed in appendix T of the DEIS. appendix S in the FEIS has been revised to reflect this possibility as well.

Comment Excerpt Text:
Market Structure

In the discussions regarding the issue of market structure, APHIS states that for various reasons, GT alfalfa deregulation could result in an increase in non-GT farm size. APHIS makes the following three points in support of its assertion:

If purchasing land to provide a separation distance between GT and non-GT alfalfa is the only mechanism used to minimize the presence of GT alfalfa in GT-sensitive alfalfa fields, these increased land costs could benefit larger non-GT alfalfa farmers.

To the extent that organic farming is more suitable for small farms than conventional farming (less economies of scale related to greater dependency on labor), a reduction in the demand for organic products could favor larger farmers.

However, land needs for GT-sensitive alfalfa forage growers may be reduced as there are other mechanisms available to minimize the presence of GT alfalfa in GT-sensitive alfalfa fields.

DEIS at xvii; see also DEIS at 144.

The average farm size has been increasing for a century; farm size has grown since the advent of improved mechanization, crop storage and transportation systems. This increase in farm size predates biotech crops, gene flow mitigation concerns and organic industry production trends. Based on the well-documented biological principles of hay to hay gene flow discussed in detail in Sections A and B, it is not feasible or foreseeable that farm size for hay production would increase as a direct or indirect result of GT alfalfa deregulation.

Organic farm size, just like traditional farm size, is increasing to improve economies of scale regardless of concerns about cross-pollination buffers with neighboring biotech crops. As discussed in Sections A and B, the key mitigation strategy for organic hay producers is simply to harvest on time (prior to ripe seed), independent of farm size.

FGI agrees with APHIS' statement that "…there are other mechanisms available to minimize the presence of GT alfalfa in GT-sensitive alfalfa fields", such as timing of harvest and planting seed choice. These other practices are highly effective, very practical and very likely to be implemented by farmers concerned about protecting their non-GT alfalfa crops. The overwhelming majority (> 99 percent) of alfalfa producers grow alfalfa hay, not seed. The barriers to effective gene flow in hay production settings are profound and the risk of gene flow into hay from neighboring fields is highly improbable under current farm size conditions [Footnote 1: Van Deynze, A.E., S. Fitzpatrick, B. Hammon, M.H. McCaslin, D.H. Putnam, L.R. Teuber and D.J. Undersander. 2008. Gene Flow in Alfalfa: Biology, Mitigation, and Potential Impact on Production. Special Publication 28. Council for Agricultural Science and Technology (CAST), Ames, Iowa. 30 pp. (cited at DEIS, App. Q at Q-88 and App. V at V-96).], [Footnote 6: NAFA. 2008. Coexistence for Alfalfa Hay Export Markets. NAFA Coexistence Document. Adopted June 2008. Available at http://www.alfalfa.org/pdf/CSExportHay.pdf (accessed Feb. 24, 2010).] and therefore such risk cannot be further reduced by increasing farm size. Increased farm size (i.e., increased buffer areas) would be illogical as it is without biological relevance with respect to effective gene flow mitigation.

Increasing isolation distance from GT alfalfa will be a key mitigation strategy for non-GT seed production, especially for seed destined for export markets. The new AOSCA program for facilitating successful seed production for GMO sensitive markets specifies the required isolation in this process-based certification (AOSCA, 2010) [Footnote 10: AOSCA. 2010. Chet Boruff, Chief Executive Officer, Association of Official Seed Certifying Agencies, Public Comment on DEIS for GT Alfalfa.], [Footnote 11: Lowry, G. 2010. Stewardship initiatives to protect our non-GMO seed markets. Pages 27-33, in Proceedings for the 2010 Winter Seed School Conference of the Western Alfalfa Seed Growers Association. January 17-19, 2010, Las Vegas, Nevada.]. Spatial isolation of a given field is independent of farm size. Furthermore, individual alfalfa seed production fields or clusters of fields of the same variety are often less than 100 acres in total because the contracted seed field acreage is typically proportional to the quantity of seed needed for sales of a specific variety for the year.

Instead of the technology disproportionately benefiting larger farmers, it is more plausible that smaller sized farms may benefit more from GT alfalfa, because they will be able to efficiently and effectively improve weed control with more limited labor inputs. Large farms often hire pest control advisors or custom applicator services to assist with weed management, whereas many small or hobby farmers do not.

In sum, there will be no significant impact to farm size from the deregulation of GT alfalfa. (Comment Number: APHIS-2007-0044-7620-32)

Response: In regard to the potential impacts of GT alfalfa deregulation on farm size see response to comment APHIS-2007-0044-4913-7 for issue 5.1. References provided in comments to the DEIS were revised and incorporated to the FEIS when containing new and reliable information relevant to the analysis.

Comment Excerpt Text:
In 2007, alfalfa was grown on over 22 million acres in the U.S (USDA-NASS, 2007). In 2005, the first biotechnology-derived varieties were introduced containing the glyphosate-tolerance trait. Acreage planted with biotechnology-derived alfalfa peaked at approximately 200,000 acres in 2006, and future plantings were halted by court order effective March 30, 2007 (Geertson 2007). The vast majority of alfalfa currently grown for forage in the U.S. is devoted to conventional alfalfa. However, specialty alfalfa (primarily organic) is a growing industry and, during 2002 to 2005, certified organic alfalfa hay production increased by 17 percent per year (Table 1). Organic production still remains below one percent of total alfalfa acres.

Biotechnology-derived alfalfa may in the future displace conventional alfalfa, as has happened with other crops where varieties improved with biotechnology traits are available. If this occurs, specialty alfalfa producers operating in organic or "non-GMO" markets will need to ensure their compliance with established specialty production practices, such as isolation distances from biotechnology-derived crops (e.g., Organic Systems Plans) in order to maintain their specialty premiums. A discussion of those production strategies and other relevant information regarding alfalfa production is provided in the following sections.

Alfalfa Seed Standards. Similar to other crops, the alfalfa industry developed seed standards to assure the production of high quality seed. The standards have been in place for well over 20 years, and these high quality seeds of known genetic purity may serve as the source of either commodity or specialty alfalfa production. For the past 20 years, most of the U.S. alfalfa seed crop was produced by registered variety name (known seed source), within official state field isolation inspection programs and under contract for a relatively small number of seed companies that develop or produce proprietary varieties. The majority of the U.S. alfalfa seed crop is of AOSCA registered proprietary cultivars that are intensively managed by contracted seed growers. Plantings are grown to optimize alfalfa seed yield and seed quality using sufficient field isolation, in-crop volunteer control and field history to minimize genetic off-types due to unintended gene flow between conventional cultivars (e.g., using AOSCA field isolation standards) (AOSCA 2003).

Alfalfa is an exclusively bee-pollinated crop, and considerable research has been conducted to understand the dynamics of pollen mediated gene flow (CAST, 2008). Much of this information was developed in anticipation of the introduction of the glyphosate-tolerance trait in alfalfa so that seed growers could make informed decisions regarding seed production practices needed to produce seed for certain markets. A detailed summary of this work is discussed in the document entitled "Impacts of Roundup Ready® Alfalfa on Production Practices and Marketing of Alfalfa Seed and Hay" (document NO. 04-AL-116U-6) previously submitted to USDA APHIS. Information presented in this document shows that production of specialty alfalfa with <1% biotechnology-derived material (considered off type) for U.S. markets easily can be accomplished using existing AOSCA isolation distances for breeder, foundation and certified

classes of alfalfa seed. Greater isolation and cooperation will be required for seed producers who wish to export seed to markets where alfalfa with biotechnology traits is not approved. (Comment Number: APHIS-2007-0044-7620-42)

Response: APHIS acknowledges the comment. In regard to gene flow, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0 and the response to comment APHIS-2007-0044-10263-5 for issue 3.2. In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
The loss of markets is a particularly key issue that must be addressed in the EIS. For the USDA to simply dismiss the issue of market contamination is not acceptable. A majority of American alfalfa seed exports go to Saudi Arabia and a majority of American alfalfa hay exports go to Japan and South Korea. All of these countries will reject GM-contaminated seed and hay. Examples of massive losses due to market contamination are plentiful. The Liberty Link rice incident resulted in economic damages of over $1 billion a cost that was borne by American exporters.
In Canada, flax growers experienced a devastating drop in market prices in the fall of 2009, when the European market suddenly closed due to the discovery of GM contamination in shipments of flax from Canada. The European market is extremely important to Canadian flax producers, accounting for approximately 70% of the total exports. Prices fell virtually overnight from about $12 per bushel to about $6.50 per bushel. While flax prices in Canada have currently stabilized at about $8.00 per bushel, there is great concern over the high cost of attempts to clean up and eliminate GM contamination in the flax seed supply. The original source of the contamination was a GM flax variety that was deregistered before it could be distributed to farmers for general planting. The variety was pulled from the system precisely because of the potential harm it would cause if it contaminated the overall flax supply. Unfortunately, the seed from this variety has entered the system and the damage is now done. Farmers will be left to bear the cost of this disaster. What is particularly distressing is that even Breeder seed that is controlled very carefully has been found to be contaminated with this GM variety, thereby making all the progeny of two other flax varieties contaminated. This contamination issue at the Breeder seed level is not an isolated incident. Studies conducted in Canada within five years of the introduction of GT and other GM canolas showed contamination also at the Breeder seed level. Organic farmers had to give up growing canola altogether to maintain their certifications. Conventional farmers who do not wish to grow GM canola have huge difficulties sourcing seed. Again, alternate forms of production disappear.
Clearly, the only way to avoid similar disasters with other crop varieties is to prevent the release of GM varieties into the environment in the first place. (Comment Number: APHIS-2007-0044-8978-9)

Response: In regard to impacts of GT alfalfa deregulation on U.S. trade, see the response to comment APHIS-2007-0044-3404-1 for issue 5.4. In regard to cases of deregulation of other genetically engineered crops and their relevance for the analysis of the potential consequences of GT alfalfa deregulation, see response to comment APHIS-2007-0044-9936-10 for issue 11.15.

Comment Excerpt Text:
As the Geertson Court noted: “Once the gene transmission occurs and a farmer’s seed crop is contaminated with the Roundup Ready gene, there is no way for the farmer to remove the gene from the crop or control its further spread.” [Footnote 53 2007 WL 518624 *5.] Despite documented incidents of Alfalfa contamination, APHIS nevertheless concludes that granting nonregulated status to GT Alfalfa will not have significant impact on the human environment. This conclusion is contrary to NEPA.

Contamination will cost farmers their right to sow the crops of their choice and consumers the right to feed their families non-GE food. The court expressly found that this was cognizable harm pursuant to NEPA in his underlying order. “A federal action that eliminates a farmer’s choice to grow non-genetically engineered crops, or a consumer’s choice to eat non-genetically engineered food, is an undesirable consequence: another NEPA goal is to “maintain, wherever possible, an environment which supports diversity and variety of individual choice.” 42 U.S.C. § 4331(b)(4).”). (Comment Number: APHIS-2007-0044-9936-11)

Response: The DEIS states explicitly in appendix S and the Executive Summary that organic producers and consumers could be negatively affected by unintended presence of genetically engineered material in organic farming for philosophical reasons and life choices, independent of whether this unintended presence has or not an impact on sales of organic products. Chapter 4 of the FEIS has been revised for clarity on this issue.

11.6 Issue 11.6-L – Human Health

Comment Excerpt Text:
Herbicide in Your Food
Most people who aware of the issue are not comfortable with herbicides/pesticides on their food in the first place, let alone in increasing amounts, "Glyphosate ... is absorbed by the foliage and translocated rapidly throughout the plant" says this study from the Centre for Agriculture and Environment. "Residues of the commonly-used herbicide glyphosate have been found in a variety of fruits and vegetables. Residues can be detected long after glyphosate treatments have been made. Lettuce, carrots and barley planted a year after glyphosate treatment contained residue at harvest" says Caroline Cox, staff scientist for the NCAP (Northwest Coalition for Alternatives to Pesticides) and editor of the Journal of Pesticide Reform [43] See also [44] under Accumulation in Confined Rotational Crops. Also see NCAP's glyphosate factsheets [45]. (Comment Number: APHIS-2007-0044-0933-17)

Response: APHIS acknowledges the comment. Regarding concerns about the human, animal and wildlife exposure to residual glyphosate, see the response to comment APHIS-2007-0044-0263-1 for issue 6.3.

Comment Excerpt Text:
- Roundup has been associated with increased rates of several cancers in pesticide applicators (e.g. non-Hodgkin’s & multiple myeloma),[ix] and is highly toxic to frogs at field-relevant

concentrations.[x] The Environmental Protection Agency (EPA) is currently re-assessing the safety of glyphosate, the active ingredient in Roundup, for the first time in over 15 years. USDA should wait for this new EPA assessment before it considers approving GE alfalfa. (Comment Number: APHIS-2007-0044-0948-6)

Response: APHIS acknowledges to the comment. Regarding concern about Roundup being associated with increased rates of several cancers, see the response to comments APHIS-2007-0044-0263-1 for issue 6.3 and APHIS-2007-0044-4924-2 for issue 6.0.

Comment Excerpt Text:
Regulation of Pesticides
Congress saw the need for a separate statute regulating herbicides and other pesticides when it passed the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) in 1947. Through subsequent major revisions to FIFRA in 1972, 1975, 1978 and 1988, and the passage of the Food Quality Protection Act in 1996, Congress has provided for an increasingly comprehensive pesticide regulatory system that is protective of health, safety and the environment.
EPA is the federal agency charged with the responsibility for regulating pesticides. Under FIFRA, every herbicide and other pesticide sold or distributed in the United States must be granted a registration. The regulations and policies that implement FIFRA are revised and updated as necessary to address new needs and the latest science and technologies. EPA's responsibilities include ensuring the correct use instructions are available to growers through the evaluation of supporting health, safety and environmental data and approval of the herbicide label. A pesticide product can only be used legally according to the directions for use on the label.
Herbicide Safety
Nearly 900 scientists and program officials in EPA's Office of Pesticide Programs ensure that products are properly registered and comply with federal law. These expelis are responsible for ensuring that pesticides cause no unreasonable adverse effects on the environment and human health. EPA's initial registration and subsequent reregistration and registration review processes include the evaluation of potential health effects on humans and environmental effects on wildlife and other non-target organisms - birds, amphibians, mammals, beneficial insects, including bees, and plants. These processes include scientific, legal, and administrative elements through which EPA examines the ingredients of the pesticide; the particular site or crop on which it is to be used; the amount, frequency, method and timing of application, and other conditions of its use; and storage and disposal practices.
Under FIFRA's strict provisions, the process of bringing pesticides to market by securing an EPA registration is complex and demanding, based on strong scientific principles and undertaken according to stringent government review and regulation. EPA requires over 100 separate scientific safety tests to ensure that a product, when used properly, does not present an unreasonable risk to health or the environment, as required by law. [Footnote 3l: http://www.epa.gov/pesticides/regulating/index.htm#eval.] On average, only one in 139,000 chemicals makes it from the chemist's laboratory to the farmer's field; pesticide development, testing and EPA approval takes 8 to 10 years and costs manufacturers between $152-184 million for each product. [Footnote 32: http://www.pestfacts.org/use/responsibleuse.htm.]

The data required by EPA are used to evaluate whether a pesticide has the potential to cause adverse effects on humans, wildlife, fish, and plants (including endangered species and other "non-target" organisms - organisms that the pesticide is not intended to act against). The registration applicant must also supply data addressing the pesticide's potential impact on surface water or ground water (which might result from leaching or runoff, for example). Potential human health and safety risks range from short-term toxicity to long-term effects such as cancer and reproductive system disorders.

A pesticide's registration is not the only opportunity EPA has to evaluate that product's safety. For example, EPA recently completed a program to review older pesticides (those initially registered before November 1984) ensure that they meet current scientific and regulatory standards. This process, called reregistration, considers the human health and ecological effects of pesticides and results in any actions necessary to reduce risks that are of concern. Glyphosate and many other herbicides satisfactorily completed the EPA's reregistration process. EPA concluded its reregistration evaluation of glyphosate in 1993. At that time, the Agency produced a 291-page Reregistration Eligibility Decision document (RED) on glyphosate, setting forth the data on which it made a decision to reregister all then-existing uses of the pesticide, based on the pesticide having met the no unreasonable adverse effects standard found in FIFRA.

Where pesticides may be used on food or feed crops, EPA also sets tolerances (maximum pesticide residue levels) for the amount of the pesticide that can legally remain in or on foods. EPA undertakes this analysis under the authority of the Federal Food, Drug, and Cosmetic Act (FFDCA). Under the FFDCA, EPA must find that such tolerances will be safe, meaning that there is a reasonable certainty that no harm will result from aggregate exposure to the pesticide chemical residue. This finding must be made and the appropriate tolerance established before a pesticide can be registered for use on the particular food or feed crop in question. Several factors must be addressed each time that a tolerance is established or modified, including a tolerance to allow the use of an herbicide over-the-top of an herbicide-tolerant crop. Those factors include:

• the aggregate, non-occupational exposure from the pesticide (exposure through diet, from using pesticides in and around the home, and from drinking water);

• the cumulative effects from exposure to different pesticides that produce similar effects in the human body;

• whether there is increased susceptibility to infants and children, or other sensitive subpopulations, from exposure to the pesticide; and

• whether the pesticide produces an effect in humans similar to an effect produced by a naturally-occurring estrogen or produces other endocrine-disruption effects. [Footnote 33: Based on determinations of safety made under the FFDCA, EPA has granted food and feed safety tolerances

allowing for the post-emergence use of glyphosate and other herbicides on every commercialized herbicide-tolerant

crop. See generally 40 C.F.R. pt. 180.]

EPA's registration, reregistration and tolerance decisions for glyphosate and other pesticides provide a formal and authoritative record of federal agency action that should be adopted by APHIS and incorporated by reference as a matter of course in NEPA assessments prepared for any actions proposed under Part 340 that involve a pesticide. [Footnote 34: See 40 C.F.R. § 1502.21.] (Comment Number: APHIS-2007-0044-10866-8)

Response: APHIS acknowledges the comment. Regarding concerns about the human, animal and wildlife exposure to residual glyphosate, see the response to comment APHIS-2007-0044-0263-1 for issue 6.3. In regard to concerns about independent review and testing of GT alfalfa, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
According to the EIS, consumers who ingest Roundup may experience "general and non-specific signs of toxicity from subchronic and chronic exposure to glyphosate includ[ing] changes in liver weight, blood chemistry (may suggest mild liver toxicity), liver pathology, and weight of the pituitary gland."
The EIS warns that, "Based on upper estimates of exposure ... infants consuming fruit and all age groups consuming vegetables may be at risk of adverse effects associated with acute exposure to glyphosate residues." (Comment Number: APHIS-2007-0044-11034-3)

Response: See the response to comment APHIS-2007-0044-11034-3 for issue 6.3 and APHIS-2007-0044-9204-3 for issue 6.0.

Comment Excerpt Text:
Glyphosate has a low toxicity but must be applied with surfactant chemicals to increase uptake by
plants and prevent runoff.[Footnote 48: Glyphosate Fact Sheet. 33 Pesticide News 28 (1996).]
Surfactants are typically classified as ‘inert’ components in herbicides, they
are not toxicologically inert and in many cases they are found to be more toxic than the herbicide itself.[Footnote 49: DEIS at 64 (quoting USDA-FS 2003).] APHIS admits that formulations of glyphosate include more of the surfactant POEA than
glyphosate itself.[Footnote 50: DEIS at 65.] POEA is a serious eye, skin, and respiratory tract irritant. It has also been found to
contain dioxane contaminants, which may be carcinogenic. Monsanto markets some glyphosate products
with benign surfactants, but these are more expensive and buyers still choose the prior formulations.
Also third-party producers of glyphosate products still sell products using harsh surfactants.[Footnote 51: Glyphosate Fact Sheet, supra n.49 at 28.]
The EPA lists glyphosate in its least toxic categorization (IV) for dermal exposure leading to slight
irritation, but category III for oral exposure. APHIS explains that the risk to the general public of being
exposed to substantial levels of glyphosate on food is minimal under typical conditions. No information
about the rate of accidental exposures is provided. Chronic oral exposure leads to symptoms like loss of
body weight, “change in liver weight, blood chemistry (may suggest mild liver toxicity), liver pathology,

and weight of the pituitary gland."[Footnote 52: DEIS at 64.] APHIS explains that 30% of ingested glyphosate is absorbed into
the body,[Footnote 53: DEIS at 151.] but provides no explanation of the metabolic breakdown of glyphosate within the body.

APHIS dismisses the findings of toxicity risks in the technical report in appendix L as worst-case scenario calculations, "anticipat[ing] that only a very small number of individuals will have this magnitude of exposure and therefore be at this level of risk."[Footnote 54: DEIS at 65.] The small number is not estimated or
defined and the dismissal of the risk is inappropriate given that infants up to 1 year old consuming
glyphosate-tainted fruit and all persons consuming glyphosate-tainted vegetables at the upper estimate of
consumption levels are expected to suffer from one or more of the above symptoms.[Footnote 55: DEIS at 146.] A more exact
calculation of the number of expected affected persons should be provided as well as the expected rate
of geographical expansion of GT alfalfa and resulting heightened risk of glyphosate residue on adjacent
crops. (Comment Number: APHIS-2007-0044-11741-18)

Response: APHIS acknowledges the comment. In regard to concern about human health effects of POEA (surfactant) and glyphosate exposure, see the response to comments APHIS-2007-0044-6240-2 for issue 6.0 and APHIS-2007-0044-0352-1 for issue 6.3. Information about the rate of accidental exposures was added to sections III.D.2.a.1 and IV.E.3.a and appendix M of the FEIS.

Comment Excerpt Text:
Glyphosate is not least-toxic as the agency would want farmers and the public to believe. Recent studies, which may have been overlooked by the agency, have shown that the ingredients in RoundUp - glyphosate and polyethoxylated tallowamine (POEA), are incredibly toxic to human cells. In recent comments[Footnote 22: Beyond Pesticides. 2009. Comments to EPA on Registration Review; Glyphosate Docket Opened for Review and
Comment. Docket Number: EPA–HQ–OPP–2009–0361. September 21, 2009] to the U.S. Environmental Protection Agency (EPA),
Beyond Pesticides identified a 2008 study which confirmed that the adjuvants in Roundup formulations kill human cells, particularly embryonic, placental and umbilical cord cells, even at very low concentrations.[Footnote 23: Benachour, N., & Seralini, G.-E. 2008. Glyphosate Formulations Induce Apoptosis and Necrosis in Human
Umbilical, Embryonic, and Placental Cells. Chemical Research in Toxicology, 22(1), 97-105.
] The researchers found that Roundup formulations cause total cell
death within 24 hrs, through an inhibition of the mitochondrial succinate
dehydrogenaseactivity, and necrosis, by release of cytosolic adenylate kinase measuring membrane damage. POEA , the surfactant used in Roundup and other herbicidal products, was

found to be the most potent “inert ” ingredient and was responsible for the elevated toxic effects. Another study found that the cytotoxicty of Roundup formulations were amplified with time and that exposure affects human reproduction and fetal development.[Footnote 24: Benachour N, Sipahutar H, Moslemi S, Gasnier C, Travert C, & Séralini GE. 2007. Time- and dose-dependent effects of roundup on human embryonic and placental cells. Arch Environ Contam Toxicol., 53(1), 126-133.] Roundup reduces human placental JEG3 cell viability at least 2 times more efficiently than glyphosate, disrupts aromatase activity and mRNA levels.[Footnote 25: Richard S, Moslemi S, Sipahutar H, Benachour N, & Seralini GE. 2005. Differential effects of glyphosate and roundup on human placental cells and aromatase. Environ Health Perspect, 113(6), 716-720.] In EPA’s 1993 RED document for glyphosate the agency noted that “a toxic inert in glyphosate end use products” was toxic to fish, necessitates labeling requirements, and requests toxicity data for POEA “due to uncertainty about its risk to aquatic animals.”[Footnote 26: U.S.EPA. 2009. Glyphosate Summary Document Reregistration Review: Initial Docket (p10). Office of Prevention, Pesticides and Toxic Substances.] We also urge APHIS to revise its assessment of human and environmental toxicity regarding POEA and other potentially toxic “inert” ingredients in glyphosate formulations based on the above mentioned data and in light of increased glyphosate use and exposures as a result of GE alfalfa cultivation. (Comment Number: APHIS-2007-0044-11960-4)

Response: APHIS acknowledges the comment. Regarding concern about human health effects of POEA (surfactant) and glyphosate exposure, see the response to comments APHIS-2007-0044-6240-2 for issue 6.0 and APHIS-2007-0044-0352-1 for issue 6.3.

Comment Excerpt Text:
Inadequate human safety assessment
Besides use of GE alfalfa in dairy production, there is also a market for alfalfa sprouts, which USDA estimates at 15 to 18 million pounds in 1998. Thus, consumers could be directly exposed to GE alfalfa sprouts. USDA argues that “FDA concluded that CP4 EPSPS protein produced by GT [glyphosate tolerant] alfalfa lines J101 and J163 was biochemically and functionally equivalent to CP4 EPSPS produced by other Roundup Ready crops, and to the family of EPSPS proteins that naturally occur in crops and microbiologically-based processing agents that have a long history of safe consumption by humans and animals.” However, FDA did not come to any such conclusion; Monsanto did. The FDA’s Biotechnology Consultation note to Monsanto on GE alfalfa, referenced by USDA, states “The CP4 EPSPS protein used in this study was produced in E. coli. Monsanto and Forage Genetics note that the CP4 EPSPS protein produced in E. coli is biologically, chemically, and functionally equivalent to the CP4 EPSPS protein produced in plants” (italics added). More importantly, FDA has not come to any conclusions about the relative safety of GE alfalfa or of the CP4 EPSPS; it simply states that the company does not think there are any safety issues. As FDA noted in their letter to Monsanto on December 10, 2004, “Based on the safety and nutritional assessment Monsanto and Forage Genetics have conducted, it is our understanding that Monsanto and Forage Genetics have concluded that food

and feed derived from the new alfalfa varieties are not materially different in composition, safety, and other relevant parameters from food and feed derived from alfalfa varieties currently on the market, and that the genetically engineered alfalfa varieties do not raise issues that would require premarket review or approval by the FDA." USDA also notes that "while acute toxicity in mice was observed, allergenic responses associated with Roundup Ready crops have not been reported by farm workers or members of the general population since the commercialization of these crops in 1996." In other words, there was no follow-up to this finding in mice.
Since FDA has not conducted a proper safety assessment of the GE alfalfa lines J101 and J163, we urge USDA to require more safety data on these crops. In fact, we urge USDA to require a food safety assessment that should be at least as stringent as the range of tests laid out in the Codex Alimentarius "Guidelines for the Conduct of Food Safety Assessment of Foods Derived from Recombinant-DNA Plants" (CAG/GL 45-2008). (Comment Number: APHIS-2007-0044-12036-3)

Response: In regard to concern about the independent review and testing of health and safety of glyphosate, see the first section of the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
Increased use of Roundup Ready has
in turn been linked to harmful effects on health and the environment
[Footnote 5: Hardell, L., & Eriksson, M. (1999). "A Case-Controlled
Study of Non-Hodgkin's Lymphoma and Exposure to
Pesticides," Cancer, 85(6), 1353-1360; Hardell L,
Eriksson M, &Nordstrom M. (2002). "Exposure to
pesticides as risk factor for non-Hodgkin's lymphoma
and hairy cell leukemia: pooled analysis of two Swedish
case-control studies," Leuk Lymphoma, 43(5), 10431049;
De Roos, et al. (2003). "Integrative assessment of
multiple pesticides as risk factors for non-Hodgkin's
lymphoma among men," Occup Environ Med,60(9); De
Roos, A. J. D., Blair, A., Rusiecki, J. A., Hoppin, J. A.,
Svec, M., Dosemeci, M., Sandler, D. P., & Alavanja, MC
.2005. Cancer Incidence among Glyphosate0Exposed
Pesticide Applicators in the Agricultural Health Study.
Environmental Health Perspectives, 113(1),49054.]. In light of the fact that most alfalfa is
currently grown without the use of herbicides at all [Footnote 6: United States Department
ofAgriculture. Glyphosate-Tolerant
Alfalfa Events JI0l and J163: Request for Nonregulated Status. Draft
Environmental Impact Statement-November 2009. Appendix J, J25,
EIS pp. 34 & 43·], it seems unthinkable to consciously
support a product that is guaranteed to have a negative impact on the
health of people and the earth. (Comment Number: APHIS-2007-0044-12261-4)

Response: Regarding concern about the human health and safety of GT crops and glyphosate exposure, see the response to comments APHIS-2007-0044-0352-1 for issue 6.3 and the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
I do care about GE contamination! I urge you to REJECT approval of Roundup Ready alfalfa. Studies have shown a clear link between glyphosate and non-Hodgkins lymphoma (Journal of the American Cancer Society), and have found that glyphosate damages and kills human cells even at diluted levels far below recommendations (American Cancer Society).
My family and I do care! Please DO NOT approve Roundup Ready alfalfa! (Comment Number: APHIS-2007-0044-2086-1)

Response: Regarding concerns about the human health and safety of GT crops and glyphosate exposure, see the response to comments APHIS-2007-0044-0352-1 for issue 6.3 and the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0. In regard to concern about the link between glyphosate and non-Hodgkins lymphoma, see the response to comment APHIS-2007-0044-4924-2 for issue 6.0.

Comment Excerpt Text:
Glyphosate's inhalation toxicity has also not been evaluated by the FDA, neither has its ingestion toxicity. The EIS acknowledges that infants who eat fruit and every person who eats vegetables are at risk of adverse effects from acute glyphosate exposure. (Comment Number: APHIS-2007-0044-2325-9)

Response: Regarding concern about the human health and safety of GT crops and glyphosate exposure, see the response to comments APHIS-2007-0044-0352-1 for issue 6.3 and the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
Conclusion: Draft Environmental Impact Statement; Determination of Regulated Status of Alfalfa Genetically Engineered for Tolerance to the Herbicide Glyphosate paints a pretty picture of harmlessness of glyphosate. Inexplicably numerous studies showing adverse effects of the herbicide were overlooked in the final report by APHIS. In spite of its gigantic volume the impact overlooked crucial studies that impact on human health. The 1476 pages of the report would have been much larger had APHIS included the numerous peer reviewed publications which contradicted or failed to support the APHIS conclusion that glyphosate exposure following treatment of the glyphosate resistant alfalfa is not harmful to humans. On top pf the information on human injury from glyphosate exposure both domestic and wild animals may be injured by exposure to glyphosate. The draft report must be enhanced by the addition of those studies on the toxicity of glyphosate that do not agree with their conclusions about the safety of the herbicide. (Comment Number: APHIS-2007-0044-3410-1)

Response: Regarding concerns about the human health and safety of GT crops and glyphosate exposure, see the response to comments APHIS-2007-0044-0352-1 for issue 6.3 and the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0. Available, credible scientific studies about glyphosate-based herbicide use and health risks are rigorously analyzed in the DEIS; new studies and information were analyzed and incorporated into the FEIS as appropriate.

Comment Excerpt Text:
Glyphosate Human Toxicity: Glyphosate based herbicides are toxic and endocrine disrupters These impacts appeared at very low concentrations of the herbicide. The main targets for cell damage included membrane, energy metabolism and programmed cell death involing nuclear DNA fragmentation.(Footnote 1: Gasnier C, Dumont C, Benachour N, Clair E, Chagnon MC, Séralini GE. Glyphosate-based herbicides are toxic and endocrine disruptors in human cell lines. Toxicology. 2009 Aug 21;262(3):184-91) (Footnote 2: Ho.M-W. Ban Glyphosate Herbicides Now Science in Society 2009,43, 34-5).
Glyphosate formulations induce apoptosis and necrosis in human umbilical , embryonic and placental cells the adjutants in herbicide formulations are not inert but contribute to the herbicide toxicity (Footnote 3: Benachour N, Séralini GE. Glyphosate formulations induce apoptosis and necrosis in human umbilical, embryonic, and placental cells.Chem Res Toxicol. 2009 Jan;22(1):97-105.). (Footnote 4: Ho,M-W, Cherry,B. Death by Multiple Poisoning ,Glyphosate and Roundup Science in Society 2009,42, 14) (Footnote 5: Ho,M-W,Cummins,J. Glyphosate Toxic and Roundup Worse Science in Society 2005,26, 12). Glyphosate is implicated in oxidative stress in liver and brain (Footnote 6: Astiz M, de Alaniz MJ, Marra CA Effect of pesticides on cell survival in liver and brain rat tissues. Ecotoxicol Environ Saf. 2009 Oct;72(7):2025-32).Glyphosate has been proven teratogenic in rats and the implication for humans is clear (Footnote 7: Dallegrave E, Mantese FD, Coelho RS, Pereira JD, Dalsenter PR, Langeloh A. The teratogenic potential of the herbicide glyphosate-Roundup in Wistar rats. Toxicol Lett. 2003 Apr 30;142(1-2):45-52.) (Footnote 8: Ho,M-W, Glyphosate Herbicide Could Cause Birth Defects Science in Society 2009, 43, 36)
Roundup (glyphosate formulation) effects human reproduction and fetal development in case of contramination based on studies employing human embryo cells (Footnote 9: Benachour N, Sipahutar H, Moslemi S, Gasnier C, Travert C, Séralini GE. Time- and dose-dependent effects of roundup on human embryonic and placental cells. Arch Environ Contam Toxicol. 2007 Jul;53(1):126-33) Glyphosate formulations effect cell cycle regulation. Which in turn effects chromosome stability according to studies with sea urchin cells in culture(Footnote 10: Marc,J,Mulner-Lorillon,O,Belle,R. Glyphosate based pesticides affect cell cycle regulation Biology of the Cell 2004,96,245-9). Glyphosate caused alteration in estrogen regulated genee expression in humans as determined by powerful micro array analysis (Footnote 11: Hokanson R, Fudge R, Chowdhary R, Busbee D. Alteration of estrogen-regulated gene expression in human cells induced by the agricultural and horticultural herbicide glyphosate. Hum Exp Toxicol. 2007 Sep;26(9):747-52.). Glyphosate breaks and damages the chromosomes in bone marrow cells of mice (Footnote 12: Prasad,S,Srivastava,S, Singh,M, Shukla,Y. Clastogenic Effects of Glyphosate in Bone Marrow Cells of Swiss Albino Mice Journal of Toxicology Volume 2009 (2009), Article ID 308985, 6 pages doi:10.1155/2009/308985). Glyphosate damages and breaks the chromosomes of normal and cancerous human cells in culture (Footnote

13: Monroy CM, Cortés AC, Sicard DM, de Restrepo HG. Cytotoxicity and genotoxicity of human cells exposed in vitro to glyphosate Biomedica. 2005 Sep;25(3):335-45.). The genotoxicity of glyphosate is well supported by the studies listed. That fact should be recognized by APHIS not denied.

The main breakdown product of glyphosate is aminoethylphosphoric acid (AMPA). That product accumulates in a treated hepatocellular carcinoma cell line and is genotoxic is such cells. The genotoxicity was well established (Footnote 14: Manas F, Peralta L, Raviolo J, García Ovando H, Weyers A, Ugnia L, Gonzalez Cid M, Larripa I, Gorla N. Genotoxicity of AMPA, the environmental metabolite of glyphosate, assessed by the Comet assay and cytogenetic tests. Ecotoxicol Environ Saf. 2009 Mar;72(3):834-7). APHIS denies that glyphosate and its breakdown product is genotoxic but did not provide any indication that they had studied the scientific literature.
An epidemiologic study o f Swedish people exposed tio glyphosate showed that the herbicide exposure doubled the risk of non-Hodgkin lymphpma with a ten year latency periode (Footnote 15: Eriksson M, Hardell L, Carlberg M, Akerman M. Pesticide exposure as risk factor for non-Hodgkin lymphoma including histopathological subgroup analysis. Int J Cancer. 2008 Oct 1;123(7):1657-63.). Aphis does not acknowledge that study, but they should. Studies of glyphosate induced cancer in mouse skin show that the herbicide is a powerful promoter of cancer (Footnote 16: George J, Prasad S, Mahmood Z, Shukla Y. Studies on glyphosate-induced carcinogenicity in mouse skin: A proteomic approach.J Proteomics. 2010 Mar 10;73(5):951-964). A clinical study of an accident describes a 26-year-old teacher who used glyphosate correctly but suffered from severe dysphonia after some hours. Laryngostroboscopy revealed decreased vocal fold mobility suggesting innervation impairment. The symptoms resolved spontaneously 6 weeks later and vocal fold mobility returned to normal. Glyphosate neurotoxicity has been discussed in the literature therefore, the dysphonia observed here may have been due to an intermittent neuropraxia of the laryngeal nerve (Footnote 17: Ptok M. Dysphonia following glyphosate exposition [Article in German] HNO. 2009 Nov;57(11):1197-202.) (Comment Number: APHIS-2007-0044-3410-2)

Response: See the response to comment APHIS-2007-0044-3410-2 for issue 6.3.

Comment Excerpt Text:
4) In 2009 a French research team at the University of Caen published a report analyzing the "proprietary " inert ingredients in various Roundup formulations, with a focus on POEA. Their findings assert POEA to be far more toxic than glyphosate (Roundup) itself, and that the combination of the two chemicals amplifies each other's toxicity. The study finds that the inert can kill human cells, particularly embryonic, placental and umbilical cord cells. (Comment Number: APHIS-2007-0044-6353-5)

Response: See the response to comments APHIS-2007-0044-6240-2 for issue 6.0 and APHIS-2007-0044-0352-1 for issue 6.3.

Comment Excerpt Text:

5) In 2009 an Argentinean research group sought a ban on the use of Roundup, citing elevated birth defects and cancer in areas close to fields sprayed with the herbicide. (Comment Number: APHIS-2007-0044-6353-6)

Response: See the response to comments APHIS-2007-0044-6240-2 for issue 6.0 and APHIS-2007-0044-0352-1 for issue 6.3.

Comment Excerpt Text:
6) In May, 2009 The American Academy of Environmental Medicine reported studies which find a relationship between GMO foods and infertility, accelerated aging, dysfunctional insulation regulation, changes in both major organs and the gastrointestinal system, and immune problems such asthma, allergies and inflammation. The AAEM has since advised physicians "to educate their patients the medical community and the public to avoid GM foods when possible and provide educational materials concerning GM foods and health risks." They also advised an immediate ban on biotech food, prior to extensive testing, along with GM labeling. (Comment Number: APHIS-2007-0044-6353-7)

Response: See the response to comments APHIS-2007-0044-6240-2 for issue 6.0 and APHIS-2007-0044-0352-1 for issue 6.3.

Comment Excerpt Text:
Glyphosate has a complete and comprehensive regulatory database (toxicity, environmental fate, and ecological toxicity) that has been evaluated by EPA to support all currently approved uses including use in conjunction with glyphosate-tolerant alfalfa. EPA has stated that it has a high level of confidence in the quality of the existing studies and the reliability of the toxicity endpoints that are the basis for its risk assessment. [Footnote 12: See U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Glyphosate New Use (bent-grass): Environmental Fate and Effects Risk Assessment, DP No. D324409 (May 26, 2009); U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Glyphosate Human Health Risk Assessment for Proposed Uses on Safflower and Sunflower, Petition No. 4E6878, DP No. 314476 (Sept. 5, 2006); U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Glyphosate Human Health Risk Assessment for Proposed Use on Indian Mulberry and Amended Use on Pea, Dry, Petition No. 536987, DP No. 321992 (Sept. 29, 2006).] In establishing food and feed tolerances to support the use of glyphosate on animal feed and forage crops (the group tolerance that supports the use of glyphosate in conventional and glyphosate-tolerant alfalfa), EPA noted that it had conducted "a complete and thorough review of the available data for glyphosate," and determined that "glyphosate will not pose unreasonable risks or adverse effects to humans or the environment." [Footnote 13: Glyphosate; Pesticide Tolerances, 67 Fed. Reg. 60934, 60938-39 (Sept. 27, 2002).] See also Comment Appendix 3 at 7-8 (discussing EPA authority to regulate herbicides, including glyphosate, and noting that under "FIFRA's strict provisions, the process of bringing pesticides to market by securing an EPA registration is complex and demanding, based on strong scientific principles and undertaken according to stringent government review and regulation."). (Comment Number: APHIS-2007-0044-7620-13)

Response: APHIS acknowledges the comment. See the response to comment APHIS-2007-0044-7620-13 for issue 6.3.

Comment Excerpt Text:
1. APHIS correctly identifies EPA as the federal agency responsible for pesticide registration and tolerance setting.

FIFRA requires that before sale or distribution of a pesticide in the United States, a registration must be obtained from EPA. See, e.g., Draft EIS at 92 (explaining that EPA is the agency charged with the responsibility to regulate glyphosate use pursuant to FIFRA). Before registering a new pesticide or a new use for a previously registered pesticide, EPA must first ensure that the pesticide, when used according to its label directions, will not cause unreasonable adverse effects on the environment. In order to address this standard, EPA must evaluate potential risks to humans and the environment, and may require applicants to submit more than 100 different scientific studies and tests conducted according to EPA guidelines.

The data required by EPA are used to evaluate whether a pesticide has the potential to cause adverse effects on humans, wildlife, fish, and plants (including endangered species and "non-target" organisms – organisms that the pesticide is not intended to act against). The registration applicant must also supply data addressing the pesticide's potential impact on surface water or ground water (which might result from leaching or runoff, for example). Potential human health and safety risks that are assessed range from short-term toxicity to long-term effects such as cancer and reproductive system disorders.

Based on its assessment of a pesticide's potential health and environmental effects, EPA approves the language that appears on the pesticide label. It is a violation of FIFRA for any person to use a pesticide in a manner inconsistent with its labeling. 7 U.S.C. § 136j(a)(2)(G).

A pesticide's registration is not the only opportunity EPA has to evaluate that product's safety. EPA is required to review older pesticides (those initially registered before November 1984) under FIFRA to ensure that they meet current scientific and regulatory standards. This process, called reregistration, considers the human health and ecological effects of pesticides and results in actions to reduce risks that are of concern. EPA concluded its reregistration evaluation of glyphosate in 1993. At that time, the Agency produced a 291-page Reregistration Eligibility Decision document ("RED") on glyphosate, setting forth the data on which it made a decision to reregister all then-existing uses of the pesticide, based on the pesticide having met the no unreasonable adverse effects standard found in FIFRA.

Where pesticides may be used on food or feed crops, EPA also sets tolerances for the amount of the pesticide that can legally remain in or on foods. EPA undertakes this analysis under the authority of the Federal Food, Drug, and Cosmetic Act ("FFDCA"). Under the FFDCA, EPA must find that such tolerances will be safe, meaning that there is a reasonable certainty that no harm will result from aggregate exposure to the pesticide chemical residue. This finding must be made and the appropriate tolerance established before a pesticide can be registered for use on the

particular food or feed crop in question, including glyphosate-tolerant crops. Taken together, the provisions of FIFRA and FFDCA vest EPA with comprehensive responsibility for the regulation of glyphosate and for addressing the cumulative health, safety and environmental effects of glyphosate use in the United States. (Comment Number: APHIS-2007-0044-7620-14)

Response: APHIS acknowledges the comment. See the response to comment APHIS-2007-0044-7620-14 for issue 6.3.

Comment Excerpt Text:
MYTH #4: The Government ensures that genetic engineering is safe for the environment and human health.
REALITY: Neither the FDA4, the Department of Agriculture (USDA)5, nor the Environmental Protection Agency (EPA)6 has done any long-term human health or environmental impact studies of GE foods or crops, nor has any mandatory regulation specific to GE food been established. Biotech companies are on the honor system. They have virtually no requirements to show that this new technology is safe. FDA scientists and doctors warned that GE foods could have new and different risks such as hidden allergens, increased plant-toxin levels and the potential to hasten the spread of antibiotic-resistant disease. The USDA has reviewed more than 5,000 applications for experimental GE crop field trials without denying a single one. USDA officials claimed they would conduct long-term studies of GE crops, but have no plans to require any pre-market or pre-release assessment. Studies conducted after our environment and food supply have been contaminated will be too late. (Comment Number: APHIS-2007-0044-8810-4)

Response: Regarding concern about the independent review and testing of health and safety of glyphosate, see the first section of the response to comment APHIS-2007-0044-0278-1 for issue 6.0. Regarding concern about the human health effects of glyphosate exposure, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3.

Comment Excerpt Text:
MYTH #5: There is no scientific evidence that GE foods harm people or the environment
REALITY: There is no long-term study showing that GE foods or crops are safe, yet the biotech industry and government have allowed our environment and our families to become guinea pigs in these experiments. Doctors around the world have warned that GE foods may cause unexpected health consequences that may take years to develop. Laboratory and field evidence shows that GE crops can harm beneficial insects, damage soils and transfer GE genes in the environment, thereby contaminating neighboring crops and potentially creating uncontrollable weeds. (Comment Number: APHIS-2007-0044-8810-5)

Response: Regarding concern that consumers that ingest GT alfalfa (and thus modified gene products) are risking their health, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:

GM genes can convert your intestinal bacteria into living factories that continuously produce pesticides or other harmful products
The ONLY published GMO human feeding study (thats right, theres only one) confirmed that genes transfer from GM soybeans into the DNA of bacteria living inside our small intestines and continue to function.[27]
Human subjects that ate Roundup Ready soybeans ended up with Roundup Ready gut bacteriaunkillable with Roundup. If the pesticide-producing Bt gene in corn chips were also to transfer, it could turn your intestinal flora into living pesticide factoriespossibly for the long term. (Comment Number: APHIS-2007-0044-9298-10)

Response: Regarding concern about food and feed safety of GT alfalfa, see the response to comment APHIS-2007-0044-11037-18 for issue 6.3.

Comment Excerpt Text:
GMOs might cause infertility or hurt newborns
When GM soy flour was added to the diets of female rats, most of their babies died within three weekscompared to only a 10 percent death rate among mothers fed natural soy.[2] The GM-fed offspring were smaller, and later had problems getting pregnant.[3]
When male rats were fed GM soy, their testicles changed from the normal pink color to dark blue.[4] Mice testicles also showed changes, including damaged young sperm cells.[5]
The DNA in mice embryos functioned differently when their parents ate GM soy.[6] And an Austrian government study reported that mice fed GM corn had fewer and smaller babies.[7]
About two dozen US farmers say that thousands of their pigs became sterile after consuming certain GM corn varieties. Some had false pregnancies, others gave birth to bags of water. Cows and bulls also became infertile when fed the same corn.[8] Investigators in the state of Haryana, India, report that most buffalo that ate GM cottonseed had reproductive complications such as premature deliveries, abortions, infertility, and prolapsed uteruses. Many calves died.[9]
[2] Irina Ermakova, “Genetically modified soy leads to the decrease of weight and high mortality of rat pups of the first generation. Preliminary studies,” Ecosinform 1 (2006): 4–9.

[3] Irina Ermakova, “Experimental Evidence of GMO Hazards,” Presentation at Scientists for a GM Free Europe, EU Parliament, Brussels, June 12, 2007

[4] Irina Ermakova, “Experimental Evidence of GMO Hazards,” Presentation at Scientists for a GM Free Europe, EU Parliament, Brussels, June 12, 2007

[5] L. Vecchio et al, “Ultrastructural Analysis of Testes from Mice Fed on Genetically Modified Soybean,” European Journal of Histochemistry 48, no. 4 (Oct–Dec 2004):449–454.

[6] Oliveri et al., “Temporary Depression of Transcription in Mouse Pre-implantion Embryos from Mice Fed on Genetically Modified Soybean,” 48th Symposium of the Society for Histochemistry, Lake Maggiore (Italy), September 7–10, 2006.

[7] Alberta Velimirov and Claudia Binter, “Biological effects of transgenic maize NK603xMON810 fed in long term reproduction studies in mice,” Forschungsberichte der Sektion IV, Band 3/2008

[8] Jerry Rosman, personal communication, 2006

[9] Personal communication with investigative team, and transcript of videotaped interviews

(Comment Number: APHIS-2007-0044-9298-7)

Response: Regarding the commenter’s concern that GT alfalfa (and thus modified gene product) will lead to adverse reproductive and other negative human health effects, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0. The commenter refers to studies about the negative human health effects of GT alfalfa, but either does not provide complete citations or some of the studies are not peer reviewed, are not relevant, or are simple anecdotes, which makes it difficult for APHIS to validate the results. For a response to Ermakova’s work, see the response to comment APHIS-2007-0044-9516-1 for issue 6.0.

Comment Excerpt Text:
GM corn contains a toxic pesticide in every bite
Some GM varieties produce poisontheir DNA creates an insect killing in every cell. Monsanto and others claim that the toxin is safe for humans and mammals because the gene that produces it comes from the soil bacteria Bacillus thuringiensis.
Farmers have long used these natural bacteria as a pesticidal spray. But when the spray was widely dispersed to fight gypsy moths in Washington and Vancouver, about 500 people reported allergic and flu-like symptoms.[10]
Genetic engineers insert the bacterias toxin-creating gene into corn and cotton plants, which produce a more toxic poison. Its thousands of times more concentrated than the spray and cannot be washed off.
Close-up of testicles: Rats fed non-GM soy vs GM soy.
Now, thousands of Indian farm laborers who are exposed to Monsantos Bt cotton plants are suffering from the same symptoms as those in the Pacific Northwest.[11]
In addition, thousands of sheep, goats, and buffalo have died after grazing on Bt cotton plants.[12] Countless other livestock have suffered reproductive disorders, skin disruptions, and upper respiratory ailments.
In one small feeding study, all the sheep that consumed Bt plants died within a month. Those that ate natural plants remained healthy.[13]
Bt corn is also linked to animal deaths in Germany[14] and The Philippines,[15] and according to an Italian government study, evokes serious immune responses in mice.[16] Even Monsantos 90-day rat feeding studies with Bt corn showed vital organ damage and signs of toxicity.[17]
4. GMOs might cause allergies
Soon after GM soy was introduced to the UK, soy allergies skyrocketed by 50 percent.[18] There are many reasons why people may be more reactive to GMOs.

* GM soy, corn, and papaya fail the allergy screening protocol recommended by the World Health Organization; their GM proteins have properties of known allergens.[19]
* The widespread collateral damage resulting from the process of creating GMOs can introduce new allergens or elevate existing ones. GM corn contains a new unintended allergen[20] and GM soy has up to seven times more of the soy allergen trypsin inhibitor.[21]
* Preliminary allergy tests confirm that some people have skin prick reactions to GM soy, but not to a wild natural variety.[22]
* Consuming GMOs may also provoke allergies to other foods.
* Mice not only reacted to Bt-toxin[23] and an experimental GM pea,[24] they then started reacting to other foods that previously had no impact.
* GM soy drastically reduces digestive enzymes in mice.[25] If your digestive ability is also impaired, you could become allergic to many types of food.

[10] Washington State Department of Health, "Report of health surveillance activities: Asian gypsy moth control program," (Olympia, WA: Washington State Dept. of Health, 1993); see also M. Green, et al., "Public health implications of the microbial pesticide Bacillus thuringiensis: An epidemiological study, Oregon, 1985-86," Amer. J. Public Health 80, no. 7(1990): 848–852.

[11] Ashish Gupta et. al., "Impact of Bt Cotton on Farmers' Health (in Barwani and Dhar District of Madhya Pradesh)," Investigation Report, Oct–Dec 2005; see also numerous articles, such as Sunday Indian, October, 26, 2008

[12] See for example, "Mortality in Sheep Flocks after Grazing on Bt Cotton Fields—Warangal District, Andhra Pradesh" Report of the Preliminary Assessment, April 2006, http://www.gmwatch.org/archive2.asp

[13] DDS researchers, personal communication and site visit

[14] "Cows Ate GM Maize & Died," ISIS Press Release, January 13, 2004, http://www.isis.org.uk/CAGMMAD.php

[15] Mae-Wan Ho, "GM Ban Long Overdue, Dozens Ill & Five Deaths in the Philippines," ISIS Press Release, June 2, 2006

[16] Alberto Finamore, et al, "Intestinal and Peripheral Immune Response to MON810 Maize Ingestion in Weaning and Old Mice," J. Agric. Food Chem., 2008, 56 (23), pp 11533–11539, November 14, 2008

[17] Stéphane Foucart, "Controversy Surrounds a GMO," Le Monde, 14 December 2004; referencing, John M. Burns, "13-Week Dietary Subchronic Comparison Study with MON 863 Corn in Rats Preceded by a 1-Week Baseline Food Consumption Determination with PMI Certified Rodent Diet #5002," December 17, 2002 http://www.monsanto.com/monsanto/content/sci_tech/prod_safety/fullratstudy.pdf; and de Vendômois JS, Roullier F, Cellier D, Séralini GE. A Comparison of the Effects of Three GM Corn Varieties on Mammalian Health. Int J Biol Sci 2009; 5:706-726. Available from http://www.biolsci.org/v05p0706.htm

[18] Yearly food sensitivity assessment of York Laboratory, as reported in Mark Townsend, "Why soya is a hidden destroyer," Daily Express, March 12, 1999.

[19] Gendel, "The use of amino acid sequence alignments to assess potential allergenicity of proteins used in genetically modified foods," Advances in Food and Nutrition Research 42 (1998), 45–62

[20] See L Zolla, et al, "Proteomics as a complementary tool for identifying unintended side effects occurring in transgenic maize seeds as a result of genetic modifications," J Proteome Res. 2008 May;7(5):1850-61 http://pubs.acs.org/doi/abs/10.1021/pr0705082; Hye-Yung Yum, Soo-Young Lee, Kyung-Eun Lee, Myung-Hyun Sohn, Kyu-Earn Kim, "Genetically Modified and Wild Soybeans: An immunologic comparison," Allergy and Asthma Proceedings 26, no. 3 (May–June 2005): 210-216(7).

[21] A. Pusztai and S. Bardocz, "GMO in animal nutrition: potential benefits and risks," Chapter 17, Biology of Nutrition in Growing Animals, R. Mosenthin, J. Zentek and T. Zebrowska (Eds.) Elsevier, October 2005

[22] Hye-Yung Yum, Soo-Young Lee, Kyung-Eun Lee, Myung-Hyun Sohn, Kyu-Earn Kim, "Genetically Modified and Wild Soybeans: An immunologic comparison," Allergy and Asthma Proceedings 26, no. 3 (May–June 2005): 210-216(7).

[23] Vazquez et al, "Bacillus thuringiensis Cry1Ac protoxin is a potent systemic and mucosal adjuvant," Scandanavian Journal of Immunology 49 (1999): 578–584. See also Vazquez-Padron et al., 147 (2000b).

[24] V. E. Prescott, et al, "Transgenic Expression of Bean r-Amylase Inhibitor in Peas Results in Altered Structure and Immunogenicity," Journal of Agricultural Food Chemistry (2005): 53.

[25] Malatesta, et al, "Ultrastructural Analysis of Pancreatic Acinar Cells from Mice Fed on Genetically modified Soybean," J Anat. 2002 November; 201(5): 409–415; see also M. Malatesta, M. Biggiogera, E. Manuali, M. B. L. Rocchi, B. Baldelli, G. Gazzanelli, "Fine Structural Analyses of Pancreatic Acinar Cell Nuclei from Mice Fed on GM Soybean," Eur J Histochem 47 (2003): 385–388. (Comment Number: APHIS-2007-0044-9298-8)

Response: Regarding the commenter's concern that GT alfalfa will lead to adverse health effects, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0. The commenter refers to studies about the negative human health effects of GT alfalfa, but most of the studies either are not relevant to GT crops or are simple anecdotes, which makes it difficult for APHIS to draw conclusions related to GT alfalfa or to validate the results The response to comment APHIS-2007-0044-11328-1 for issue 6.0 provides a discussion about some of the published studies. Regarding broader concerns that consumers who ingest GT alfalfa (and thus modified gene product) are risking their health, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0 and APHIS-2007-0044-0352-1 for issue 6.3.

Comment Excerpt Text:
The impacts of the Glyphosate-Tolerant Crop System on health must also be analyzed. Roundup use has been associated with increased risk of non-Hodgkin's lymphoma and hairy cell leukemia in pesticide applicators, [Footnote 74 Hardell et al (2002). Exposure to pesticides as risk factor for non-Hodgkin's lymphoma and hairy cell leukemia: pooled analysis of two Swedish case-control studies," Leuk. Lymphoma, 43(5):1043-9.] and increased risk of neurobehavioral disorders in children of Roundup applicators. [Footnote 75 Garry et al (2002). "Birth Defects, Season of Conception, and Sex of Children Born to Pesticide Applicators Living in the Red River Valley of Minnesota, USA," Environmental Health Perspectives, 110, Suppl. 3, 441-449.] Roundup/glyphosate has been shown to inhibit steroidogenesis. [Footnote 76 Walsh et al (2000). "Roundup inhibits steroidogenesis by disrupting steroidogenic acute regulatory (StAR) protein expression," Environmental Health Perspectives, 108(8):769-76.] Both Roundup and glyphosate have been found to inhibit the aromatase enzyme involved in estrogen production, though Roundup was more potent. [Footnote 77 Richard et al (2005). "Differential Effects of Glyphosate and Roundup on Human Placental Cells and Aromatase," Environmental Health Perspectives, 113: 716-720; for a comprehensive review of the adverse human and environmental impacts of glyphosate, see: FoE UK (2001). "Health and Environmental Impacts of Glyphosate," Friends of the Earth UK, July 2001.
http://www.foe.co.uk/resource/reports/impacts_glyphosate.pdf. (Comment Number: APHIS-2007-0044-9936-25)

Response: See the response to comment APHIS-2007-0044-9936-25 for issue 6.3.

11.7 Issue 11.7-M – Field Workers

No comments are associated with this issue.

11.8 Issue 11.8-N – Chemical Impacts on Wildlife

Comment Excerpt Text:
In the first part of this series, which originally figured to be two parts, we looked at some very significant and potentially far-reaching research concerning the impact of a chemical called glyphosate. It dealt primarily with the influence of the chemical on the microbial populations in soils. We know that it is these micro-flora and fauna which are the major contributors to plant nutrition. Anything added to soil which diminishes their capacity to provide optimal nutritional support is potentially quite harmful in the food chain.
What Huber, Means and others have done now is reveal that not only is the beneficial population of soil microbes placed in jeopardy when this material is exuded from ALL plant root systems, it also serves as a signal to pathogenic micro-organisms to reproduce. (Comment Number: APHIS-2007-0044-10170-1)

Response: Because the commenter did not provide citations, the bases for the comments cannot be evaluated. In section IV.G.2, Appendix J section 2.2.2, the DEIS acknowledged that some studies (in USDA FS, 2003) have shown an increase in microbial activity in soils subject to glyphosate application. Although some fungi do increase in biomass in soils with the addition of glyphosate, the herbicide does not serve as a "signal" for them to do so. See the response to

comment APHIS-2007-0044-10170-4 for issue 8.1. Regarding glyphosate effects on microbes in the soil, the FEIS includes an expanded discussion of glyphosate and nitrogen-fixing bacteria and other beneficial and pathogenic microbes in soils, glyphosate's relationship to nutrients in soils, and its relationship to plant susceptibility to disease in section IV.G.1 and Appendices J and N.

Comment Excerpt Text:
The other thing that was up in 2009 was the growth of anaerobic soil micro-organisms. The pathogenic type are numbered among these and the denitrifiers who steal nitrogen necessary for normal crop production. When nitrogen is getting scarce and the pathogens are proliferating, the plants trying to grow suffer specific amino acid deficiencies. For example, tryptophan which is used by the plant to create rooting hormones, tyrosine for water usage regulation and very importantly, phenylalanine which is used in the production of phytolaxins to control diseases in the plant tissues . In the previous part of this series we talked about the lignification of wounds caused by invading pathogenic fungi. This is what phytolaxins are about. So when these essential amino acids are not being made available to the plant and the populations of pathogenic bacteria and fungi are exploding, we have a crop that is trouble even when it looks fine.
The lack of heat units to mature the corn plant, prolonged the time period that systemic infections which had occurred very early in the growing season, had to spread throughout the plant tissues. It wasn't that late rainfall or the tight husks on the corn variety that caused the problems. The pathogens responsible for the vomitoxin loading in the plant that eventually concentrated in the fruit of the plant had gained effective entry a long time before the mold appeared on the ear. (Comment Number: APHIS-2007-0044-10170-3)

Response: Anaerobic soil micro-organisms capable of denitrification flourish under conditions in which oxygen is low or absent. Oxygen, which is needed by plant roots for respiration, is present in cultivated fields under virtually all conditions. Only if standing water is present in the root zone soils for long enough for microbial degradation of organic matter to deplete the water of its oxygen could the environment become anaerobic. Agricultural crops are intolerant of anaerobic conditions in the root zone for any length of time. Anaerobic conditions are common in the deeper sediments in wetlands and permanent water bodies.

Comment Excerpt Text:
Since we now recognize the function of the glyphosate in signaling pathogen proliferation, try to perform burn-down operations with a different chemical. In Israel the label for glyphosate products suggests waiting two weeks before planting wheat. The reason is to afford the soil an opportunity to recover from the flush of pathogens before exposing the sprouting crop to attack. Another opportunity to protect young plants is to start with seed coatings which are beneficial microorganisms. Instead of using a fungicide which is not selective, cover the seed with actively growing microbes which will battle for control of the pathogens and stimulate plant immunity. Lastly, provide the germinating seed and beneficial microbes with adequate nutrition. This could logically include high quality phosphate and micro-nutrients. This is especially important since the research has shown that the glyphosate is actively chelating or clamping metals preventing them from being available to microbes and hence the plants for balanced production of amino

acid and enzyme production for the production of glucose. The glyphosate's ability to do this is now documented to last as long as ten years in the soil.
The selection of these nutritional inputs is critical to their success. Many mineral nutrients which are available are rendered ineffective because they are easily chelated by the glyphosate. So the source materials must be already chelated but readily available to the microbes. IDS chelation used in Presto Gold is such a source.
Part of the nutrition which could prove very valuable to plant survival is seaweed. It will in most cases contain a broad-spectrum of amino acids and vitamins. This will bypass the interference which glyphosate creates in the production of amino acids by complexing micro and macro-nutrients such as calcium in the production of microbes and the amino acids which they PRODUCE AND SUPPLY to the growing crop.
The addition of a calcium source may also prove effective in minimizing the impact of residual glyphosate. Another option to consider would be using calcium chelating agents such as glutaric acid. It contains no calcium so it can mixed with phosphate fertilizers. It increases the supply of calcium to the microbes which are competing with the glyphosate for it. (Comment Number: APHIS-2007-0044-10170-4)

Response: Because the commenter did not provide citations, the bases for the comments cannot be evaluated. Section III.D.2.b of the DEIS acknowledges that herbicides other than glyphosate are required for GT alfalfa stand removal at 2 to 8 year intervals. Regarding glyphosate effects on microbes in the soil, the FEIS includes an expanded discussion of glyphosate and nitrogen-fixing bacteria and other beneficial and pathogenic microbes in soils, glyphosate's relationship to nutrients in soils, and its relationship to plant susceptibility to disease in sections IV.C.3 and IV.G.1 and appendices J and N.

Comment Excerpt Text:
Glyphosate is a broad-spectrum herbicide, able to injure or kill most plants and many microorganisms. More glyphosate applications, longer during the season and over more acres, means a greater potential for negative impacts on all plants in the area near alfalfa: trees, shrubs and wildflowers in borders and fencerows; meadow and prairie plants; aquatic and semi-aquatic plants in streams, ditches and ponds; and non-Roundup Ready crops in neighboring fields.
Exposure of wild plants to glyphosate occurs via: 1) direct application to the crop itself, exposing any wild plants that are intermingled, 2) drift during applications to crops, 3) movement of glyphosate-laden soil particles and contaminated water from the application site, and 4) intentional application to areas adjacent to crop fields (hedgerows, ditches, roadways, fence lines).
Assumptions used by APHIS to determine risk to wild plants led them to conclude there would be low risk from most applications to Roundup Ready alfalfa.

In the DEIS consideration of impacts on plants, APHIS estimated the direct effects of glyphosate application and drift on injury and mortality of T&E plants within and adjacent to RR alfalfa fields. They also examined risks to non-T&E plants as an indicator of possible indirect effects on other organisms (Mortensen et al. 2008, p. 10). Assumptions and calculations are cited are clearly elaborated in the supporting document "Tier I Endangered Species Assessment for

Agricultural Uses of Glyphosate and Glyphosate-Containing Herbicides", Mortensen et al., 2008, Monsanto Study RPN-2007-227 (Mortensen et al. 2008).

For estimating risk to plants from direct exposure, the Monsanto reports relied upon by APHIS assumed the following:

1) Acute but not chronic risks are assessed for plants, and those considered are "phytotoxicity, survival, plant height, plant dry weight" originally from Monsanto Report No. MSL-13320, MRID 43088701 as cited by Mortensen et al. 2008, p. 31.
2) The lowest "no-observed-effect concentration" (NOEC) for glyphosate of 0.035 lb a.e/A, determined from a study of 10 crop plants and based on the 4 growth parameters, is representative of the effect of glyphosate on wild species and growth processes important for their evolutionary fitness (Mortensen et al. 2008, p. 31).
3) The ground application rate will be the maximum allowed on the label (1.55 a.e. lbs/A) whereas the aerial application rate will be a typical rate rather than the maximum allowed (0.77 a.e. lbs/A) (Mortensen et al. 2008, p. 9).
4) Exposure from drift will be 1% of the application rate from ground equipment and 5% from aerial sprays (Mortensen et al. 2008, p. 12, 30).
5) Impacts will be the result of single applications of glyphosate rather than cumulative from multiple applications during the year, because "glyphosate is not expected to accumulate to appreciable levels from one application to the next…" (Mortensen et al. 2008, p. 9).
6) There is no difference in toxicity to plants between different formulations of glyphosate and the acid itself (Mortensen et al. 2008, p. 10).
7) Exposure is entirely from drift, with no plant absorption from soil solutions or runoff (Mortensen et al. 2008, p. 12).
8) Surfactants bind to soil and are not absorbed by plants other than by direct contact with leaves (Mortensen et al. 2008, p. 12).

Based on these assumptions, Monsanto determined that when glyphosate is applied to RR alfalfa at the maximum label rate using ground equipment, drift levels will not be at high enough concentrations to injure or kill plants. Aerial applications at both maximum label rates and typical rates could result in drift concentrations high enough to injure or kill T&E terrestrial and semi-aquatic plants, but not aquatic plants, and not non-endangered terrestrial and semi-aquatic plants (Mortensen et al. 2008, p. 32). (Comment Number: APHIS-2007-0044-10966-2)

Response: APHIS acknowledges the comment. Regarding the commenter's concern about the use of glyphosate over more toxic herbicides, see response to comment APHIS-2007-0044-0402-1 for issue 6.3. Section III.B and appendix N discuss effects of glyphosate and aerial drift on T&E species.

Comment Excerpt Text:
In the DEIS (p.119), APHIS stated that only 2% of glyphosate is applied from the air onto crops in the US, and extrapolates this figure to RR alfalfa. APHIS said impacts from aerial applications could be mitigated by label use restrictions requiring lower application rates in areas where T&E plants are found within a certain distance from alfalfa fields, but that APHIS cannot mandate

label use restrictions (DEIS:119), and supporting documents mention that the lower application rates are unlikely to be commercially acceptable (Mortensen et al. 2008, p. 32).

Assumptions used by APHIS to determine risks to wild plants were flawed, and likely underestimated risks.

Of course, the assessment by APHIS is only as good as the assumptions upon which it is based, and aspects of the assumptions are invalid. Relevant scientific studies are minimized or ignored, making APHIS' analysis of risks to T&E wild plants inadequate.

The most important problems with the assumptions about risk to plants are the following:

1) APHIS does not take into account the well-known sub-lethal effects of glyphosate on reproduction that can affect survival of plant species. (APHIS assumption 1: Acute but not chronic risks are assessed for plants, and those considered are “phytotoxicity, survival, plant height, plant dry weight.)

2) These reproductive problems have been shown to occur in wild plants at concentrations of glyphosate much lower than the lowest NOEC used in the risk calculations. Therefore, APHIS underestimates the risk to T&E terrestrial and semi-aquatic plants from adoption of RR alfalfa. (APHIS assumption 2: The lowest “no-observed-effect concentration” (NOEC) for glyphosate of 0.035 lb a.e/A, determined from a study of 10 crop plants and based on the 4 growth parameters, is representative of the effect of glyphosate on wild species and growth processes important for their evolutionary fitness.)

The data regarding sub-lethal glyphosate effects on plant reproductive success is reviewed, and added to by original research, in a key peer-reviewed scientific paper, not cited in the DEIS: Blackburn, L.G. and C. Boutin, 2003. Subtle effects of herbicide use in the context of genetically modified crops: a case study with glyphosate (Roundup®). Ecotoxicology 12: 271-285.

In fact, this research specifically addresses risk to the success of wild plants from drift levels of glyphosate related to increased use of glyphosate associated with RR crops, so its omission from the DEIS is puzzling – and a serious shortfall. The authors state: “The use of these new crops has raised concern about an increase in reliance on glyphosate for weed control with detrimental consequences on nontarget plants and habitats due largely to the broad spectrum nature of this herbicide. The objective of this paper is twofold: (1) to review the literature on the effect of glyphosate on seed germination and early seedling growth, and (2) to present the results of a new experiment with several crop and noncrop species. The attempt was made to build on past findings and to add to the knowledge base in an effort to move away from studies on crop plants such as soybean and grain by focusing mainly on noncrop plant species.” (Blackburn and Boutin 2003, p. 272)

Past findings are that sometimes plants that have not suffered mortality after contact with glyphosate, and in fact may not have exhibited visible symptoms of injury at all, nevertheless produce fewer seeds or seeds that have problems with germination or vigor (references cited in Blackburn and Boutin 2003; Walker and Oliver 2008; Thomas et al. 2005). Also, plants that

reproduce vegetatively from tubers or rhizomes sometimes show injury in the generation subsequent to actual glyphosate application or contact (Viator et al. 2008).

Specific, unique properties of glyphosate explain how it can affect subsequent plant generations. Glyphosate applied to leaves and stems translocates with photosynthates to the most rapidly growing tissues and organs of plants, such as developing flowers and seeds (Feng et al. 2003, Feng and Chiu 2005). In most plant species, glyphosate is not metabolized, and these plant parts not only accumulate the glyphosate but also are particularly sensitive to it (Feng et al. 2003, Chen et al. 2006). Therefore glyphosate can cause pollen sterility (Chen et al. 2006, US Patent 4,735,649), potentially resulting in fewer seeds; or can cause seeds that form to be less viable and vigorous[Footnote 2: APHIS commented on the sensitivity of germinating seeds to glyphosate, but these were seeds treated as they were germinating, rather than during development, and thus are exposed at a different stage and route than the seedlings impacted in the studies discussed in Blackburn and Boutin (2003). DEIS:N-7 states: "Glyphosate Terrestrial Plant Toxicity - Glyphosate is toxic to plants. The NOEC for seed germination in both monocots and dicots is 4.5 lbs a.e./acre application rate (USDA, 2003). The highest reported NOEC for growth is 0.56 lb a.e./acre (USDA, 2003). Therefore, glyphosate is much less toxic to germinating plants than it is to the foliage of growing plants."] (Thomas et al. 2005, Walker and Oliver 2008), probably because of damage to their meristems. Storage organs such as tubers and rhizomes can also accumulate glyphosate resulting in reduced viability of the next season's individuals, again from damage to their buds when glyphosate is remobilized as they break dormancy (Viator et al. 2008). Different species of plants are more or less sensitive to glyphosate's sexual and vegetative reproductive effects, and the stage of development at which the plant is exposed to glyphosate influences the response, as well (Blackburn and Boutin 2003, Feng et al. 2003). Environmental conditions also determine how much glyphosate is required to have an effect (Yasuor et al. 2006). In many cases, drift levels of glyphosate have been shown to cause these effects (Blackburn and Boutin 2003). Thus sub-lethal doses of glyphosate can reduce the fitness of an affected plant species, reducing population levels in subsequent generations. Because other herbicides have different basic properties – for example, less efficient or no translocation to reproductive tissues, or metabolism within the plant resulting in less accumulation and persistence – the substitution of other herbicides by glyphosate is likely to have unique effects on plants, and preferentially affecting reproductive success at low rates may be one of these. (Comment Number: APHIS-2007-0044-10966-4)

Response: APHIS acknowledges the comment. Regarding the commenter's concern about the effect of glyphosate exposure on human health, see response to comment APHIS-2007-0044-0352-1 for issue 6.3. APHIS has expanded its discussion of the potential effects of glyphosate on wild plants, including T&E species, in sections IV.C.2 and in Appendix N of the FEIS. The discussion includes studies of glyphosate toxicity on reproductive endpoints (e.g., seed set, germination vigor) and other sublethal endpoints and references cited by the commenter. Furthermore, the effects of other herbicides used on conventional alfalfa have been shown to be generally more environmentally harmful than glyphosate. For example, as discussed in section 5.2 of Appendix N of the DEIS, the Environmental Impact Quotient (EIQ), a universal indicator that effectively integrates the various environmental impacts of individual pesticides into a single indicator value, of glyphosate is lower than the EIQs of all but one of the many other herbicides

associated with alfalfa, whether the herbicide is used on alfalfa to control weeds or for use in clearing stands of alfalfa.

Comment Excerpt Text:
In regard to the first issue, I should first like to make clear that I have read the indemnifying statements
contained in the EIS to the effect that APHIS is not responsible for pesticide regulation, and that APHIS
is in compliance with CEQ requirements.
On page xv the statements are made "GT alfalfa is not toxic to animals... ". I find this reasoning
unsatisfactory, because, as APHIS itself notes in the EIS, the herbicides intended to be used with these
GT strains of alfalfa contain undisclosed surfactants. On page 64 the statement is made, "While
surfactants are typically classified as "inert" components in herbicides, they are not toxicologically
inert and in many cases they are found to be more toxic than the herbicide itseICUSDA-FS, 2003)".
And on page 29, in regards to the water flea, "...glyphosate formulations are several orders of
magnitude more toxic than technical glyphosate." That this greater toxicity applies to more than just
that particular species is borne out by comments on page 28 as follows: "...amphibians exhibited
greater sensitivity to Roundup® formulations than to glyphosate tested as an acid or IPA salt." and "In
general, the glyphosate formulations (herbicide plus other chemicals) were more toxic to fish than
technical glyphosate (herbicide only). The increased toxicity is due to the presence of a surfactant in
glyphosate formulations..." This variability of toxicity seems to have been left out ofAPHIS's line of
reasoning when it makes the statement on page xv that "Due to the use ofglyphosate on GT alfalfa,
overall glyphosate use may increase in alfalfa production, but such an increase should be not be a
significant impact on the environment..." and on page xiii that "granting nonregulated status to
glyphosate-tolerant (GT) alfalfa lines nOl and n63 will not result in significant impacts to the human
environment." According to USDA-APHIS Regulations and Assessments Title 40, the definition of
human environment (1) includes the definition ofeffect, which states "Effects and impacts as used in
these regulations are synonymous. Effects includes ecological.. .aesthetic, historic, cultural, economic,
social, or health, whether direct, indirect, or cumulative."
It is reasonable to assume that commercial products containing surfactants ofunknown, but reasonably
considerably toxic, surfactants shall be used in conjunction with GT alfalfa (as opposed to glyphosate

in isolation) based on the comment, "While additional glyphosate products may be used, five products
are recommended for use on GT alfalfa. The five herbicides are Monsanto products and include:
Honcho®, Honcho Plus®, Roundup Original MAX®, Roundup WeatherMAX®, and Roundup Ultra
MAX II®." found on page 63.
This is significant, because the EIS also acknowledges on page xvi that "the net effect on alfalfa
production with the increased adoption and planting ofGT alfalfa should be some increased use of the
less toxic glyphosate with a decreased use of more toxic herbicides." as well as pages 61 that there is
reason to expect that use of such products will increase in response to the deregulation of GT alfalfa
("A few studies have claimed that the volume of herbicide use is greater due to GT crops...") and 62
("Gianessi and Reigner (2006) noted that an increase in glyphosate usage coincided with a decrease in
total amount of herbicide usage by 61 million pounds (of active ingredient) between 1997 and 2002.
Much of this reduction occurred in cotton and soybeans, where several herbicides were replaced by
glyphosate.") and the afore-quoted statement from page xv to similar effect.
In light of the forgoing, it is very difficult to accept the statement made on page xiii that "The APillS
Biotechnology Regulatory Service's (BRS) mission is to protect America's agriculture and environment
using a dynamic and science-based regulatory framework. ..", especially when considering the
aforementioned definition of the term "human environment". Despite the USDA-APillS's
indemnifying disclaimer delineating its particular area of responsibility as well as its compliance with
CEQ requirements, APillS's declaration that GT alfalfa presents "no significant impact on the human
environment" (page xv) is clearly incompatible with the statements acknowledging that the use of
unknown and very probably considerably toxic substances in the production offood destined for
human consumption, may, as a direct result of deregulation, increase. It is unreasonable that such an
increase could not have an impact of considerable significance on the human environment, and that
therefore either the alternative of deregulation must in good conscience be postponed until the
composition of the herbicides in question are fully disclosed and have been demonstrated to pose no
significant risk to the human environment or else rejected altogether in favor of continued regulation.
To do otherwise clearly violates USDA-APillS's own mission statement. (Comment
Number: APHIS-2007-0044-12345-1)

Response: APHIS acknowledges the comment. In regard to the concern about human health and safety, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0. Glyphosate will replace other herbicides that are more harmful - the response to comment APHIS-2007-0044-0280-1 for issue 6.0.

Comment Excerpt Text:
Attached file:

Center for Food Safety
660 Pennsylvania Ave., SE, Suite 302
Washington, DC 20003
September 21, 2009
Office of Pesticide Programs
OPP Regulatory Public Docket (7502P)
Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460
RE: Registration Review; Glyphosate Docket Opened for Review and Comment.
Docket Number: EPA–HQ–OPP–2009–0361
(Comment Number: APHIS-2007-0044-7570-1)

Response: APHIS acknowledges the comment. In regard to the commenter's concern about human health and safety, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0. Glyphosate will replace other herbicides that can be more harmful - refer to the response to comment APHIS-2007-0044-0280-1.

Comment Excerpt Text:
Glyphosate has a complete and comprehensive regulatory database (toxicity, environmental fate, and ecological toxicity) that has been evaluated by EPA to support all currently approved uses including use in conjunction with glyphosate-tolerant alfalfa. EPA has stated that it has a high level of confidence in the quality of the existing studies and the reliability of the toxicity endpoints that are the basis for its risk assessment. [Footnote 12: See U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Glyphosate New Use (bent-grass): Environmental Fate and Effects Risk Assessment, DP No. D324409 (May 26, 2009); U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Glyphosate Human Health Risk Assessment for Proposed Uses on Safflower and Sunflower, Petition No. 4E6878, DP No. 314476 (Sept. 5, 2006); U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Glyphosate Human Health Risk Assessment for Proposed Use on Indian Mulberry and Amended Use on Pea, Dry, Petition No. 536987, DP No. 321992 (Sept. 29, 2006).] In establishing food and feed tolerances to support the use of glyphosate on animal feed and forage crops (the group tolerance that supports the use of glyphosate in conventional and glyphosate-tolerant alfalfa), EPA noted that it had conducted "a complete and thorough review of the available data for glyphosate," and determined that

“glyphosate will not pose unreasonable risks or adverse effects to humans or the environment.” [Footnote 13: Glyphosate; Pesticide Tolerances, 67 Fed. Reg. 60934, 60938-39 (Sept. 27, 2002).] See also Comment Appendix 3 at 7-8 (discussing EPA authority to regulate herbicides, including glyphosate, and noting that under “FIFRA’s strict provisions, the process of bringing pesticides to market by securing an EPA registration is complex and demanding, based on strong scientific principles and undertaken according to stringent government review and regulation.”).
(Comment Number: APHIS-2007-0044-7620-13)

Response: APHIS acknowledges the comment. With respect to the agencies and requirements to regulate glyphosate based on its potential effects on health, see the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
APHIS conclusion tha RR alfalfa no significant impact on human
environment ignores scientific data regarding glyphosate long
term effect on soil biology and immediate effect on legume
crops. Toxic to nitrogen fixing organisms/ Manganese reducing
organisms in rhizosphere and enhancing pathogen populations
able to take advantage of these changes.
This is not textbook or research discussion. I have operated a
private forage/ag lab for 26 years and seen the effect of
glyphosate on corn/RR corn. Mycotoxins are now common
and molds a serious issue, especially in certain varieties. Animals
consuming crop are susceptible to more diseases and ultimately
become a risk for foodborne illnesses.
Farmers do not realize effectiveweed control, simplified manage
ment and cleaner harvest products as touted by glyphosate
producer do not offset induced weakening of plant defenses,
increased pathogen populations in soil, and reduced vigor from
glyphosate accumulation.
Human environment depends on healthy animals, plants, soils.
Agronomists evaluate from a different perspective than nutritionists and physicians. Glyphosate predisposes crops and
perennial weeds to disease for several years and compromise
immune systems. As a former medical microbiologist I know
how little understanding exists among specialty fields.
The trangene has not been demonstrated to perform in all
tissues exactly like the native EPSP under alll conditions.
Studies are ongoing to evaluate trace mineral and Manganese
uptake of RR crops compared to non-RR. (European J.Agronomy findings) To allow RR alfalfa
at this time when wheat, corn, and soybeans are having problems is to ignore
an effect that can ultimately render plants less nutritious and
does have significant effects on the "human environment"
So far alfalfal has not shown the susceptibility other crops
have and growers need to look at more than yield. They

need to consider sustainability. (Comment Number: APHIS-2007-0044-7924-1)

Response: Because specific sources were not provided by the commenter, APHIS cannot validate the accuracy of comments regarding nutrient effects in GT crops. In regard to the evolution of glyphosate-resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for issue 3.6.

Comment Excerpt Text:
We strongly support the statements in the Draft EIS that glyphosate is less harmful to the environment than many other herbicides (Sections IV C; IV G). Our experience in growing sugarbeets demonstrates this point in at least one important respect: less tillage is required. With Roundup Ready sugrbeets, our growers make on average of two fewer tillage trips across their fields, reducing the potential for runoff and sedimentation - which is a key benefit to the environment. (Comment Number: APHIS-2007-0044-7953-2)

Response: See the response to comment APHIS-2007-0044-0402-1 for issue 6.3.

Comment Excerpt Text:
USDA argues that RR alfalfa is environmentally friendly because it will lead to Roundup replacing more toxic herbicides (EIS, pp. 120-21). In reality, RR alfalfa will increase Roundup use without significantly displacing other herbicides. USDA also admits that RR alfalfa will require 2,4-D, dicamba, clopyralid, or picloram for taking out old stands (EIS, App. N, p. N-109).
The end result is that GE alfalfa would significantly increase pesticide use, harming human health and the environment. (Comment Number: APHIS-2007-0044-8397-10)

Response: In regard to health effects, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3. In regard to increased use of pesticides, see the response to comment APHIS-2007-0044-0402-1 for issue 6.3.

Comment Excerpt Text:
MYTH #3: GE crops eliminate pesticides and are necessary for environmentally sustainable farming.
REALITY: Farmers who grow GE crops actually use more herbicide, not less. For example, Monsanto created Roundup-Ready (RR) soy, corn and cotton specifically so that farmers would continue to buy Roundup, the company's best-selling chemical weed killer, which is sold with RR seeds3. Instead of reducing pesticide use, one study of more than 8,000 university-based field trials suggested that farmers who plant RR soy use two to five times more herbicide than non-GE farmers who use integrated weed-control methods. GE crops may be the greatest threat to sustainable agriculture on the planet. Many organic farmers rely on a natural bacterial spray to control certain crop pests. The advent of genetically engineered, insect-resistant crops is likely to lead to insects that are immune to this natural pesticide. When this biological pesticide is rendered ineffective, other farmers will turn to increasingly toxic chemicals to deal with the

"superbugs" created by GE crops. Meanwhile, organic farmers will be out of options. (Comment Number: APHIS-2007-0044-8810-3)

Response: In regard to health effects, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3. In regard to increased use of pesticides, see the response to comment APHIS-2007-0044-0402-1 for issue 6.3.

11.9 Issue 11.9-O – Colony Collapse Disorder

Comment Excerpt Text:
I am a retired commercial beekeeper and own a farm in South Dakota. I am past president of the American Beekeeping Federation, a Nation~ Association.
My father started our beekeeping business. He acquired his frrst colony ~ twelve years ofage, in 1902. Two brothers and I helped to build the operatio up to 5,000 colonies. The business is now owned and operated by thre beekeepers· who purchased the business fOUf years ago, after they wer working with us for about 25 years.
My wife and I purchased the 800 acre farm 35 years ago. We now lease th farm on a share crop basis. Our crops are Alfalfa, sunflowers, soybeans, cor and wheat. Some Genetically Modified (GM) crops are grown on our farm. We grow alfalfa for forage. However when weather conditions are favorable For alfalfa seed production, the alfalfa plants are left to seed. This is Common practice by many farmers and many thousands of pounds of seed ar Harvested this way and this accounts for a significant portion of the US see Production. Farmers often grow their own seed and the surplus seed is sold t Other individuals and/or to local seed companies.
Since I am both a farmer and a beekeeper, I am very disturbe4 that APHIS is proposing to grant non-regulated status for GE alfalf lines J101 and J163 to Monsanto. In reality, this will &D!!! mono)!olistic control of alfalfa seed production to one Comnany.
If GE alfalfa is released into the environment, I sincerely believ problems will surface that are being overlooked at this time.
Alfalfa is a perennial! If approved, it would be the first GE perennial plat to be released into the environment! GM genes from this modified alfalfa wi spread to other conventional alfalfa by cross-pollination. Since it is perennial, GM genes from these plants will be multiplied across hills, fence~ ditches to other alfalfa on a continuous transgression for endless years t come. Any attempt to create buffer zones will be ineffective and not b practical.
If one farmer plants GE alfalfa, since bees are responsible for eros pollination, there will be a reluctance, on the part of the neighbor alfalf grower, to have bees on his farm, when he tries to grow conventional alfalf~ (I have already been given this notice by a landowner). So, at this poin1 neither alfalfa farmer could produce seed. The frrst because he signed contract with Monsanto which prohibits him from leaving the GE alfalf

bloom and/or harvesting any seed. The second farmer because he cannc
produce seed without the pollinators. And, if he decides to produce seel
anyhow (with bees) the seed produced will be contaminated with the GE gent
Then this seed cannot be sold for sprouts, organic and/or possible even a
common seed.
Colony Collapse Disorder (CCD). Just this last week, I learned of a goo
beekeeper who had 1020 colonies ofbees this last season who now lost all bu
140 colonies. There are all too many experiences like this. Many beekeeper
believe that lack of proper "nutrition" may be part of the problem. They ar
trying to supplement the diet of the bees in the colonies with a polleJ
substitute to try to maintain healthier bees. They ask, is the "Mono-culture
within agriculture that has been developed during recent years, possibly pat
of the problem? Does pollen from GE plants have less nutrition for bees
Research dollars have been limited at US Bee Labs. Research on nutrition i:
GE pollens and lack of variety of pollens from wild flowers has been on
low research priority list. What are other side effects on bees from GE plants'
Threatened and Endangered Species (T&E)_Should honey bees be place~
on to this list?
About one-third of our food supply depends upon pollination
There also is a benefit to our environment from bees in addition to our foOl
supply. I believe that bees are our "Achilles Heel"!
Migratory Beekeeping See page 38 of the "Draft Environmental Impac
Statement - November 2009"
This National map shows that most of the alfalfa that is grown in the USA i
grown in about the Northern two thirds of the country. Considering all ofth,
problems that Beekeepers have in trying to maintain healthy bee colonies,
believe that approval of GE alfalfa would be too much for them to cope witt
Beekeepers now generally keep their bees in the South during the Winter an~
in the North during the Summer. So, most bees are moved to Dod deeen.
upon ,lfalfs that is left to bloom for a verY very importagt period of time,
I sincerely request that you do not grant non-regulated status to Gl
alfalfa lines JIOI and J163.
Please do Dot associate my view about the GE perennial plant @Ifalfg wit]
sugar beets. Sugar beets do not bloom the frrst year and by the end of tb
season are fully harvested. Then new seed is again planted for the ne,
season. So, since the area of seed production for beets is limited to a vet:
small area, I hope with proper oversight, it would be manageable.
Donald R Schmidt (Comment Number: APHIS-2007-0044-12297-1)

Response: APHIS acknowledges the comment and that alfalfa is a perennial species that differs in many ways from the annual crop species such as corn and soybeans. Regarding the commenter's concern for cross-pollination of GT alfalfa and conventional alfalfa on neighboring farms, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Regarding the behaviors of bees and use of bees with respect to the possibilities for cross-pollination, see the response to comment APHIS-2007-0044-10091-1 for issue 3.1.

Regarding Colony Collapse Disorder (CCD), as discussed in response to comment APHIS-2007-0044-5338-1 under issue 4.0, the DEIS, appendix O, presents the many studies that have examined GT crops in relationship to bees, and none provided evidence that could link the CP4 EPSPS protein (which is in all glyphosate-tolerant crops) or GT-alfalfa, including its pollen and nectar, to impairment of bees and bee colonies or to CCD. There also is no scientifically plausible mechanism of toxicity of the CP4 EPSPS protein for animals (see DEIS appendix O section 1.7).
Regarding the nutritional content of pollen and nectar from GT alfalfa compared with conventional alfalfa and CCD, the DEIS appendix O also presented analyses of studies that would shed light on these concerns. Several types of information and studies were examined to see if any evidence linked any GT crop, including GT alfalfa, with CCD, and none did. Although many diseases and stresses on bee colonies have been proposed as possible candidates for CCD, at this time, the cause or causes of CCD are unknown, as stated in the DEIS appendix O, section 2.0. The U.S. Fish and Wildlife Service is responsible for listing any bee species or "distinct population units" as threatened or endangered if and when evidence meets its criteria for listing.

In regard to seed market concentration, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0.
In regard to the burden of control measures, see the response to comment APHIS-2007-0044-11689-10 for issue 9.0.
In regard to economics, see the response to comment APHIS-2007-0044-5274-1 for issue 5.0.
In regard to the concern about antitrust issues, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0.

Comment Excerpt Text:
A subclause of this concern is the effect of the uknown portion of this herbicide on bees, which as the dEIS acknowledges, commonly derive nectar from alfalfa plants. There is of course the phenomenon of colony collapse Disorder, also noted in the dEIS, but again the undisclosed chemical constituant(s) of Roundup is not addressed in relation to this. (Comment Number: APHIS-2007-0044-12319-3)

Response: APHIS acknowledges the comment. Regarding Colony Collapse Disorder (CCD) and GT alfalfa, see the response to comment APHIS-2007-0044-12297-1 for issue 11.9. Regarding CCD in relationship to constituents in addition to glyphosate in Roundup formulations, as quoted in appendix O, section 1.7, of the DEIS, after extensive review of the available data, Giesey et al. (2000) stated "Honey bees are not affected by glyphosate formulations, either by ingestion or direct overspray, at maximum use rates." Further discussion of CCD with respect to use of glyphosate formulations, which include undisclosed constituent surfactants, is provided in the FEIS section IV.I.5.b and appendix O.

Comment Excerpt Text:

We urge not only that the Request for Nonregulated Status for Glyphosate-Tolerant Alfalfa Events J101 and J163 be denied, but also that existing plantings of GT alfalfa be destroyed. About one-third of our food supply depends upon pollination, which is provided by both managed honey bee colonies as well as native pollinators. Both of these benefit from alfalfa that is left to bloom. Common alfalfa is grown by farmers in many states, and those farmers allow a significant amount of the common alfalfa to mature to bloom and produce seed, providing nectar and pollen forage for pollinators in the area.
Alfalfa is an important source of nectar and pollen for honey bees. Beekeepers need locations such as alfalfa fields to place their colonies during the pollination "off-season." Nothing prepares honey bee colonies for pollination season as does a good nectar source, such as alfalfa fields. With the pressures on the health of honey bee colonies through problems such as Colony Collapse Disorder, nectar sources such as alfalfa are vital to the health of American honey bee colonies.
Studies have shown that attempts to prevent the flow of pollen from GT alfalfa to conventional alfalfa are impractical. Even the most careful grower will inadvertently allow some GT alfalfa plants to mature to bloom occasionally. Pollen from those plants will be carried by pollinators to adjacent conventional alfalfa plants. (Comment Number: APHIS-2007-0044-9016-1)

Response: APHIS acknowledges the comment. Regarding adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1. Regarding the importance of nectar from alfalfa for bees, the DEIS appendix O examined several issues. Alfalfa fields grown for hay are harvested two to ten times per year depending on location and climate (section 1.2). Most alfalfa fields in the United States already are harvested prior to flowering to optimize forage yield and nutritional quality. Alfalfa seed production is a distinct practice from forage production (section 1.3). Harvesting prior to bloom is likely to occur with GT alfalfa grown for forage because farmers would not be developing seeds from GT alfalfa. However, only those farmers who grow alfalfa for forage only are likely to purchase GT alfalfa. Thus, there might be no net change in harvesting practices and availability of alfalfa nectar for honey bees.

11.10 Issue 11.10-Q – Alfalfa in Food and Feed (unintended presence, seed purity)

Comment Excerpt Text:
Additionally, the idea that harvesting before the ripe seed stage is possible in all but the most extreme circumstances, is disingenuous. The EIS contends that alfalfa is harvested before 10% of flower. While it is true that the prime protein level of alfalfa hay is at 10% blossom, weather conditions, haying practices and erosion controls allow that a significant number of blossoms to come to full bloom. In many areas across our region, climate does not allow for multiple harvests of alfalfa hay and full growth is often necessary for sustaining an alfalfa stand. This scenario has one more major flaw for farmers who grow alfalfa for seed. In order to combine alfalfa seed, the plant must go to full bloom in order to be combined. Therefore, this analysis of cutting alfalfa at 10% blossom is atypical at best. (Comment Number: APHIS-2007-0044-10318-4)

Response: In regard to timing of alfalfa forage harvest, see the response to comment APHIS-2007-0044-10263-7 for issue 3.1.

Comment Excerpt Text:
USDA cannot assume that there is a scenario in alfalfa production and that any model can be used to control GM contamination. In South Dakota, for example, there are a number of different methods and purposes for growing and utilizing alfalfa. It is clear that preventing contamination under any of these situations cannot be achieved.
In the area of Managed Haying and Grazing, NRCS authorizes haying and grazing no more frequently than one out of every three years after the CRP cover is fully established.
In the West it is common practice to utilize that hay by cutting one third of a field each year, allowing two thirds of the field to go to seed each year. There is no way to prevent pollination, or the spreading of seed in this or other CRP haying and grazing scenarios.
Because of weather--which is beyond a farmers control--a farmer cannot always harvest his field at the most optimal time.
Farmers in the Dakotas are crossed by an Interstate Highway system, railroads and miles of county roads as well as by private farm and ranch land. Farmers and ranchers have no control over seed that is spread through these transportation systems. In addition, many farmers combine their own alfalfa seed which requires the field to grow to full maturity.
In the SW corner of ND and the NW corner of SD it is rare to get a second cutting of hay, so ranchers leave the growth to use as range grazing. In this scenario, the re-growth is at 100% bloom before bales are even moved off the field. The prairie grasses are utilized BEFORE the cattle graze the alfalfa which puts the grazing of the alfalfa at an even later date. This practice not only leaves late summer and fall grazing for livestock, but also adds cover to the field to help in catching snow for spring moisture and cover for wildlife throughout the winter.
A common practice in some areas is to hay two cuttings of alfalfa and let the third cutting go to full bloom. Because it is used in a crop rotation, conventional farmers then spray the alfalfa field to burn down the existing plants and grow a new crop the next year. If alfalfa is contaminated with Round- up Ready traits, the burn down process is made extremely difficult. Broadleaf contact herbicide such as MCPA-Ester or Amine formulation, or 2,4-D Ester or Amine formulation which are much less effective than glysophates will have to be used. Contact herbicides are much less effective than glyphosates against mature alfalfa for stand removal. Tillage to kill out alfalfa is also not an option on most soil types and is more expensive, less effective and less environmentally friendly that no-till options. (Comment Number: APHIS-2007-0044-10318-5)

Response: In regard to timing of alfalfa forage harvest, see the response to comment APHIS-2007-0044-10263-7 for issue 3.1. In regard to gene flow due to unintentional mixing and distribution of seed, see the response to comment APHIS-2007-0044-10263-5 for issue 3.2. Seed distribution during transport and letting fields go to full bloom for the third harvest are discussed in appendix V including table V-1 V 4.5 and 5.0. In regard to stand removal practices for GT alfalfa, see the response to comment APHIS-2007-0044-11037-28 for issue 7.1.

Comment Excerpt Text:
Most of domestically produced hay that is exported is grown in Washington and California, both

states with large organic food production. These states, along with Oregon, also have high organic
production when compared with other western states. Additionally, alfalfa is primarily grown in these
states in areas where farming is reliant on irrigation. Because these areas are reliant on irrigation farming, and cross-contamination of glyphosate is facilitated through irrigation, the potential for crosspollination
of organic crops is augmented. APHIS is required by NEPA to consider effect of an action
to the "human environment," which requires APHIS to consider:
a. What are the economic costs of GE cross-pollination per acre of contaminated organic alfalfa production?
b. What are the economic costs of glyphosate contamination per acre of contaminated organic production?
Alfalfa is an open-pollination species, and cross contamination by pollinators is highly probable. Additionally, bee species specifically recruited to assist in alfalfa pollination are used in the Pacific
Northwest,[Footnote 33: Johanne Brunet & Christy M. Stewart, Impact of Bee Species and Plant Density on Alfalfa Production and
Potential for Gene Flow, USDA Agricultural Research Service (Sept. 2009) available at
http://www.hindawi.com/journals/psyche/2010/201858.html.] increasing the probability of cross crop contamination.
Recent fluctuations in bee survival rates, broadly described as colony collapse disorder, have raised concerns about whether bee populations can thrive in monoculture
environments.[Footnote 34: Cédric Alaux et. al., Diet effects on honeybee immunocompetence, Biol. Letters, published online before print
January 20, 2010, doi:10.1098/rsbl.2009.0986, available at
http://rsbl.royalsocietypublishing.org/content/early/2010/01/18/rsbl.2009.0986.abstract.] Further, bee
pollen carries traces of GE DNA, the presence of which has resulted in the rejection of honey imports.[Footnote 35: Stuart Smyth et al., Liabilities and economics of transgenic crops, Nature Biotechnology Vol. 20 (June 2002) at
537-41.]
To assess the effects of GT alfalfa on both the crucial pollinators and organics, APHIS should consider
the following:
a. What effect does periodic pollination of genetically engineered monoculture crops have on bee colony survival?
b. How many alfalfa growers currently import bees for pollination? How many organic farmers currently import bees for pollination?
c. What would it cost to pollinate an acre of GT alfalfa without the use of bees? (Comment Number: APHIS-2007-0044-11741-14)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.
In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for issue 3.1.

In regard to the economic concerns stemming from potential cross pollination, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
The issue of risks from the CP4 EPSPS gene and its corresponding protein receives no support beyond data submitted by the crop's producers Monsanto and Forage Genetics International (FGI). This
information appeared as part of a voluntary consultation with the US Food and Drug Administration
(FDA); it provides the single foundation for claims that the CP4 EPSPS gene and its corresponding
protein are chemically and functionally identical to the analogous protein in other glyphosate-tolerant
(GT) crops and are not allergenic or pathogenic. Reliance on this data by APHIS is questionable.[Footnote 39: DEIS at 61.]

(Comment Number: APHIS-2007-0044-11741-16)

Response: In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for issue 5.2.

Comment Excerpt Text:
APHIS explains that Monsanto has mandatory requirements not to allow GT alfalfa to be used for
sprouts for human consumption but offers no explanation of these requirements or how well Monsanto
is able to manage such crop use. They assert, without explanation, "human exposure to GT alfalfa
appears to be minimal."[Footnote 56: DEIS at 146.] The effectiveness of management techniques is vital to support the argument
for APHIS' preferred alternative, which is that "Best Management Practices" will prevent use of GT
alfalfa for sprouts to be consumed by humans even as deregulation leads to expansion of GT alfalfa. The
efficacy of such practices must be demonstrated. (Comment Number: APHIS-2007-0044-11741-19)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
The DEIS also fails to address the human use market for year-round greens and sprouts. While

the analysis cursorily addresses the current niche market for alfalfa seed for sprouting, it fails to consider
powerful trends in market development favoring local produce and demand for year round fresh greens
and sprouts. This market has the potential to expand dramatically as the cost of moving traditional
lettuces and micro greens across thousands of miles increases. There is great potential for a premium
niche market to develop both in conventional and organic alfalfa seed production for this sprouting
market. As noted in the DEIS, this market, because it is destined for human consumption, will have a
lower consumer tolerance for the presence of GE. In fact, it is highly likely that this market would offer
a price premium to seed that is certified GE-free, independent of an organic certification premium. This
market trend is evidenced in the growing popularity of a wide variety of foods marketed as “GE-free.”
The Non-GMO Report [Footnote 24: The Organic and Non-GMO Report, http://www.non-gmoreport.com/ (last visited Feb 10, 2010).] documents this trend and the growing consumer demand for GE-free niche
products.[Footnote 25: Other crop industries with deregulated GE versions have shown this type of niche development. For example,
increasing consumer demand for GE-free soybeans coincides with a dramatic decrease in the availability of
certified GE-free soy seed. There, demand for non-GE is outstripping supply. The potential for this market trend
to affect future human-consumption alfalfa markets is not adequately addressed in the DEIS.]
(Comment Number: APHIS-2007-0044-11741-8)

Response: The FEIS expands the analysis of alfalfa for human consumption in section IV.E.

Comment Excerpt Text:
Another concern regarding GT alfalfa and gene flow to non-GT alfalfa involves feral alfalfa. The EIS states that alfalfa grows feral sporadically throughout much ofthe U.S. The study by Hammon et. al. (2007) cited in the EIS describes GT gene flow occurring in 83% of feral alfalfa test plants harvested within 1.7 miles of a GT alfalfa field in Fruta, Colorado (Figure Q-ll, page Q56). The possibility ofGT alfalfa genes being transported by means ofpollination along "tracks" of feral alfalfa is another cause for concern and needs to be investigated further. As long as there are feral alfalfa plants within several miles ofGT alfalfa-planted fields (and feral alfalfa plants within several miles ofthose plants) the possibility ofthis type ofgene flow exists. For a number ofreasons, mostly concerning growers' costs and time, management plans that call for managing feral alfalfa are not practical to growers. Aside from gene flow issues involving feral alfalfa, the EIS also describes gene flow scenarios in which there have been few or no studies, including GT alfalfa's impact on rangeland alfalfa (Q-65) and the issue ofhay field to hay field

gene flow (Q-61). That there are under-studied aspects ofGT alfalfa and genetic flow is another reason why the USDA should not grant nonregulated status to the GT alfalfa lines in question. (Comment Number: APHIS-2007-0044-12145-3)

Response: In regard to gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
It is an open-pollinated plant, the most common pollinator being the bee. Cutter bees have a documented pollination zone of 5 miles, making buffer strips irrelevant
Alfalfa makes a hard seed which can lay in the ground for many years
90% of alfalfa seed is grown in a very tight geographic area. This makes it very improbable with the range of
the cutter bee that anything by Round-up Ready alfalfa will exist within a matter of years.
The USDA says that contamination ofhay fields is not an issue because alfalfa is "typically" harvested
before 10% ofplants reach full flower. This statement is simply not true and cannot honestly be taken
seriously by any agronomist that has ever worked with alfalfa production. I have been an agronomist in
Wisconsin for 22 years. I have personally made a living growing alfalfa for 15 ofthose 22 years. 10% bud is
ideal for cutting, but this is not an ideal world. If a field is not scouted every single day, 10% bud is not even
visible from a distance... it is not an obvious stage ofgrowth, which is suggested. 10% bud is a one day
window, at best, and weather and work schedules will never be that precise.
The EIS maintains that avoiding GE contamination is possible if I change my planting and harvest schedule
to avoid simultaneous flowering. First of all, why should the responsibility always fall to everyone accept the
contracted Monsanto grower? This is ridiculous. Secondly, as stated above, alfalfa is a perennial that is
harvested 3- 4 times per year. With GMO com it is feasible to delay planting and therefore delay germination. With a perennial crop that is continually harvested this becomes impossible.
(Comment Number: APHIS-2007-0044-12316-2)

Response: In regard to behaviors of bees and use of bees, see the response to comment APHIS-2007-0044-10091-1 for issue 3.1.
In regard to timing of alfalfa forage harvest, see the response to comment APHIS-2007-0044-10263-7 for issue 3.1.

Comment Excerpt Text:

As many growers are aware this is the second year of Roundup Ready (RR) alfalfa seed on a large scale. States with current production are Wyoming, Montana, Washington, and Idaho. According to research conducted by Forage Genetics during 2000-2002 using Leafoutier bees, the industry was assured that only 900 was needed prevent gene flow over at an acceptable level. Forage Genetics data indicated 900 feet gene flow contamination would be approximately 0.28%. At 2000 feet the gene flow contamination would be approximately 0.0%. Honeybess, bumble bees, and other pollinators were not considered in this data. (See Figure in original comment 'Pollen-distributed gene flow')

Base on this data, the industry and Idaho Crop improvement Association set the isolation distance at 900 feet between R alfalfa seeds fields and synthetic alfalfa seed fields. Industry agreed that this shold keep the gene transfer to an acceptable level of less then 1%.

At the end of the 2006 harvest, some companies began frosting genetic purity in alfalfa seed lots using standardized litmus test. Lots that showed contamination were then sent to Midwest Seed Lab to conduct grow out tests on the seeds. This independent testing agency confirmed that elevar lots of seed tested positive for the RR gene as of Nov 1 2006 (see chart below) 3. All of the contaminated field exceeded the 900 feet isolation distance as well as the predicted contamination percentages shown in Forage Genetics 2000-2002 data. The foundation field located in Idaho was approximetly 7900 feet from the nearest Roundup Ready field and tested 0.2% from the grow out test. This foundation field cannot be used as seed stock for future production.

During an alfalfa seed advisory meeting at Idaho crop improvement agency (ICIA) on November 2, 2008, industry reps were asked to explain the contamination of these seed lots. No explanation was offered.

Although some foreign countries have approved Roundup Ready technology, and Animal and Plant Health Inspection Servie (APHIS) has deregulated the production in the United States, the issue remains of how will the markets or buyers accept the technology. Industry agrees among themselves that deomestically there is not an issue except for organic markets, yet Washington State recommends that Roundup Ready technology not be planted for seed or hay production. Exposed markets such as the Eurpoean Union are also reluctant to accept the Roundup Ready technology.

Hay and Seed fields

Growers also need to be aware of issues regarding Roundup Ready hay. Industry is currently reluctant to place alfalfa seed fields next to Roundup Ready hay fields, and some companies have clauses in their contracts regarding the matter. At the ICIA meeting, this issue was discussed thoroughly as well different potential contamination scenarios. When industry reps were asked who would be liable if a hay field contaminated an alfalfa seed field, they simply responded with "check the liability with Monsanto". It was then stated by industry that they would determine if a grower to appropriate actions to prevent contamination from a neighboring hay field before buying seed showing genetic impudity.

STATE Acrea Percent Roundup Distances from RR production

Montana 16 .4 2500ft

Montana 25 .4 4000ft

Montana 25 .3 4000 ft

Montana 15 .9 1600 ft

Montana 35 .9 1400 ft

Montana 23 .3 850 ft

Montana 26 .2 1500 ft
Montana 43 .2 1500 ft
Montana 22 Trace 1 mile
Wyoming 26 .3 1700 ft
Idaho 2 .2 1.5 miles
(Comment Number: APHIS-2007-0044-12348-2)

Response: Appendix V of the FEIS has been updated based on the details in the comment.

Comment Excerpt Text:
Forage genetics 2000-2002 data states, "under recommended hay management practice it islikely that actual gene flow from hay to seed fields may be less than 0.2% at approximately 165ft squared (emphasize added). As anyone in the agricultural industry knows, management, weather, custom cutting, mechanical breakdowns, etc, can result in a field blooming during peak pollination periods, in some instances, plants may be missed during the cutting period thus resulting in seeds being produced such as in the corners of enter pivots, wet spots, and waste ditches. Considering these conditions, growers need to be aware of what your neighbor is doing since his growing and cultural practices may exclude you from growing conventional alfalfa seed on lands that you own or rent.
The growers association responsibility is to watch out for the interests of all growers and to encourage the production and sale of high quality Alfalfa and Clover seed. The association also recognizes that through new technology, agriculture is geven new tools to survive in this ever-changing world. However, this recent data creates questions as to the accuracy of the pollen flow data on Roundup Ready varieties and synthetics varieties as it relates to genetic purity. We feel that growers need to be aware of this new data and how it may affect their contracts based on genetic purity clauses. Alfalfa seed growers should look at genetic purity language in contracts, since there are a number of different tolerances ranging from 0 to 1% or more.
Our growers meeting in January 16, 2007 will offer a panel discussion relating to genetic purity and how it may affect growers and the alfalfa seed industry. Information about the Good school will be mailed after the first of the year. (Comment Number: APHIS-2007-0044-12348-3)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
MTA requiring forage to be cut at 10% bloom. They may "require" it but field conditions make it impossible. Fields can be too wet at that point. Fields can change hands during mid-season. Plants can be missed at cutting. Seeds can be accidentally dropped anywhere leading to plants not in fields to be cut. Seeds can be co-mingled with non-GE seeds and planted. I've seen all of this right here in my county and on my own farm. The EIS totally misses the real-world situation.

for instance, we let alfalfa go to full bloom or beyond at least once a year to build root reserves and make sure there is stubble left in the fall to mitigate

damage from icing. We regularly have stands last 6-8 years. This cuts down on total cost of hay because establishment cost is spread over more years. On erodible land this dramatically cuts down on soil loss. Weeds in these grass/alfalfa stands are not a problem with timely cutting. (Comment Number: APHIS-2007-0044-2308-9)

Response: In regard to timing of alfalfa forage harvest, see the response to comment APHIS-2007-0044-10263-7 for issue 3.1. In regard to the practice of letting fields go to full bloom see table Q-2 of the DEIS.

Comment Excerpt Text:
The EIS contends that it is my responsibility to prevent my crop from contamination from a neighbor's GE alfalfa and that I actually CAN do that. According to the draft EIS "Growers who wish to avoid gene flow (e.g., those who produce hay for markets that reject GM crops) should pay attention to flowering habits (avoiding simultaneous flowering) and harvest schedules, and disallow or remove commercial beekeepers' hives.

Although the hay harvest date can be delayed a week or more by wet weather or equipment failure, harvesting before the ripe seed stage is possible in all but the most extreme circumstances."

This shows negligence on the part of this Draft's authors as to the reality of alfalfa production and the many different ways it is utilized.

As a conventional farmer and sheep and cattle rancher, I do not wish to grow Roundup Ready crops and especially not Roundup Ready alfalfa. I begin haying the alfalfa as close to 10% bloom as possible, however, by the time the entire crop is hayed, much of it is much past the ideal protein and blossom levels. In the southwest corner of North Dakota it is rare to get a second cutting of hay. I leave the second growth to use as range grazing. By the time I have utilized my prairie grasses to its fullest and moved the bales off the field, and move my livestock to the alfalfa field for grazing it is late summer or early fall. Therefore, the standing alfalfa is at 100% bloom.

This practice is not only useful for fall grazing for my livestock. It also adds cover to the field to help in catching snow for spring moisture and cover for wildlife throughout the winter. This practice is encouraged by the Natural Resources Conservation Service (NRCS)—another arm of USDA. Is the right hand aware of what the left hand is proposing? (Comment Number: APHIS-2007-0044-3314-1)

Response: In regard to the burden of control measures, see response to comment APHIS-2007-0044-11689-10 for issue 9.0 (paragraph 1 of the response).
In regard to timing of alfalfa forage harvest, see the response to comment APHIS-2007-0044-10263-7 for issue 3.1.
In regard to alfalfa used in the Conservation Reserve Program, see response to comment APHIS-2007-0044-9882-12 for issue 3.4.

Comment Excerpt Text:
Bloom and Probability of Gene Flow in Hay Crops. I find the discussion on page Q-34 on maturity and tonnage to be tenuous at best. The hay quality categories that are describe are only loosely associated with bloom. APHIS estimates states that 43% of hay is harvested at 10 to 75% bloom, but this is based only upon volume estimates from these categories. Hay quality in markets is not determined by flowering, but primarily by fiber level (ADF), Crude Protein (CP), and other lab analyses, as well as weed content, condition of hay, molds, as well as stemminess, leaf attachment, rain damage and dustiness. Flowering affects fiber level to some degree, but in our research on prediction of quality in alfalfa, plant height is a much stronger predictor of forage quality than flowering. Many of the first cut forages in California have zero to a few percent flowers, but can have quality ranging from very low to premium.
However, this discussion of flowering is not highly pertinent. In order to accomplish gene flow, additional steps must happen. We have to remember that ripe seed stage occurs 4-5 weeks PAST the 10% bloom phase! In hay production systems, this stage is almost never reached, other than fields that have been abandoned or under unusual circumstances. However, even if some seed pods are produced in hay fields, only a very small fraction of those seed pods would be pollinated from a neighboring field, since the probability of pollination is the most likely from the plants nearest to the flower. But even production of seed is not sufficient to accomplish gene flow in a hay field. This seed is most likely to be removed in a harvest. But if a seed remains in the field, it still does not accomplish gene flow which affects the next crop. To complete the process, the seed must fall to the ground and germinate, and survive competition with existing plants to contribute to the dry matter of the next hay crop. These are all very low probability events.

If any of these steps go to zero (cut before substantial flowering, cut before seed set, removal of crop, or failure of a small amount of residual seed to germinate, or failure of the germinating plant to survive), gene flow is completely prevented. This is why gene flow is a very low probability event in alfalfa hay systems, as distinct from seed systems, which require isolation to prevent gene flow. Prevention of gene flow is primarily under control of the hay farmer, independent of what their neighbors do. (Comment Number: APHIS-2007-0044-4913-10)

Response: In regard to timing of alfalfa forage harvest, see the response to comment APHIS-2007-0044-10263-7 for issue 3.1. The discussion on hay quality factors in appendix V 2.1.2 has been updated to include the comment.

Comment Excerpt Text:
Timing of Alfalfa Hay Harvest

APHIS correctly identifies timing of hay harvest as one of the several factors affecting potential effective gene flow to and from hay production fields, see DEIS at 100-101, but APHIS does not fully develop the context of cutting management as a tool for mitigating gene flow from GT hay fields or preventing gene flow into non-GT hay fields.

Since more than 99 percent of the alfalfa acres planted in the United States are harvested for forage, rather than seed, FGI believes it is critical to understand the potential gene flow into hay fields and effective mitigation strategies to prevent such gene flow. Van Deynze et al. (2008) [Footnote 1: Van Deynze, A.E., S. Fitzpatrick, B. Hammon, M.H. McCaslin, D.H. Putnam, L.R. Teuber and D.J. Undersander. 2008. Gene Flow in Alfalfa: Biology, Mitigation, and Potential Impact on Production. Special Publication 28. Council for Agricultural Science and Technology (CAST), Ames, Iowa. 30 pp. (cited at DEIS, App. Q at Q-88 and App. V at V-96).] thoroughly evaluate the biological and cultural barriers to pollination and seed ripening in hay fields, and correctly conclude that although some pollination of flowers might occur, true, "effective" gene flow into or between hay fields is extremely unlikely. Furthermore, by simply planting seed that is free of the GT trait, and harvesting a non-GT hay field before the ripe seed stage, a non-GT, export or organic hay producer can guarantee that, independent of the actions of neighboring GT alfalfa hay or seed producers or the occurrence of feral alfalfa, there will be no effective gene flow into a non-GT hay field. It is important to state that the ripe seed stage is 4-5 weeks after the 10 percent bloom stage, which generally gives growers ample time to harvest hay crops before seed ripens, even in the case of temporary delays caused by rain or equipment failure at the planned harvest date. In other words, an unplanned harvest delay of up to one month would still enable a non-GT hay grower to prevent ripe seed in most cases and seasons. Therefore, APHIS may note that late-stage forage harvest would have a negligible impact on non-GT alfalfa hay producers because any resulting gene flow is highly improbable, and easily and effectively—and unilaterally—mitigated by the non-GT hay producer as a normal part of crop management.

Organic hay, just like conventional or GT alfalfa hay, is also very likely to be harvested prior to 10 percent bloom. According to a statement made by Neil Hoffman, Director of the Environmental Risk Analysis Division for the USDA/APHIS Biotechnology Regulatory Services (Hoffman, 2007) [Footnote 2: Declaration of Neil Hoffman, Geertson Seed Farms v. Johanns, No. C 06-01075 CRB (N.D. Cal. filed Mar. 7, 2007), at ¶ 28.], "The quality, and therefore the value, of alfalfa hay decreases with the onset of flowering and seed formation, and growers obtain significantly higher prices for hay cut prior to flowering as opposed to hay cut while plants are in full flower. Because of this price differential, alfalfa hay is often harvested prior to flowering and most always prior to seed set (Intermountain Alfalfa Management. UC Davis, Division of Agriculture and Natural Resources Publication 3366, Chapter 11. Harvest Management). According to statistics compiled in 2006, the price differential for high quality alfalfa was even greater for organic hay than for conventional hay, thereby encouraging mowing prior to flowering and seed set. (Alfalfa Hay 2006, CA Market Summary; [http://alfalfa.ucdavis.edu/+producing/files/CA_hay_market_summary_2006.pdf)]."

The risk of effective gene flow into non-GT hay crops is further mitigated by timely harvest of hay crops by GT hay producers. As noted in the DEIS, Monsanto's MTA requires GT alfalfa hay growers to harvest at or before 10 percent bloom. DEIS at 103. In Appendix Q, however, APHIS states that "[n]o information on farmer compliance with the MTA was found." DEIS, App. Q at Q-22. FGI notes that not only are GT alfalfa growers legally obligated to make every attempt to harvest before 10 percent bloom, their willingness to invest in GT alfalfa technology is a likely indication of their commitment to use best management practices to maximize economic return. Timely cutting management is one of the key grower management practices determining economic return from hay production.

APHIS also concludes that "it may be inaccurate to make the blanket statement that alfalfa hay is harvested at less [than] 10 percent bloom except in rare cases." DEIS, App. Q. at Q-34. APHIS has performed a crude "reverse-PEAQ" calculation to estimate the proportion of the hay crop in five western states that is cut at various stages of maturity. See DEIS, App. Q at Q-33 to Q-36. Based on June, 2008 data for the five western states listed in Table Q-5, 57 percent of the alfalfa hay sold was in the supreme and premium categories. Typically, to accomplish this level of forage quality it would be critical for the grower to have a clean alfalfa stand harvested at or before first flower. Forty-three percent of the tonnage was in the good to fair categories. Harvest at the 10 percent bloom stage in the West will often result in hay quality in the good to fair categories. Although later harvest stage is one factor that could result in lower forage quality, there are several other potential contributing factors, including: harvest of alfalfa/grass mixtures; moderate to high density of weeds in the alfalfa (especially in older stands); rain damage during harvest; heat and mold damage during hay storage; improper adjustment of baling equipment; and abiotic or biotic stress prior to hay harvest. Therefore, even hay that is cut prior to 10 percent bloom could be sold in the good to fair categories.

FGI believes that an estimation of average harvest date based on the data in Table Q-5 may also be faulty because the hay lots offered for sale at these western state hay auctions are not a representative or random sampling of western state hay production over all quality categories. The market sample includes only dry hay. Haylage and greenchop acreages (tonnage) are entirely missing from this sampling, and in California, both categories represent large acreages of high quality (less mature) hay. The vast majority of the supreme or premium quality hay is forward contracted or purchased directly from the growers by dairies so it never reaches the sale auction barn. Hay lots that do not meet the high quality standards of dairies or forward contract specifications are much more likely to be relegated to the open auction sales, especially in seasons of generous hay supplies. Hay lots for sale at auction are typically biased toward the lower cash value/lower forage quality grade lots. Therefore, the data set used in APHIS' estimate is very likely to have an oversampling bias toward lower quality hay lots.

Additionally, APHIS' estimates of the modest likelihood of alfalfa hay harvest prior to 10 percent bloom are not compatible with statements of multiple experts who have commented and written extensively on the subject and who clearly state that cutting prior to 10 percent bloom is the norm, not the exception, for producing profitable and nutritious alfalfa forage. See, e.g., DEIS, App. Q at Q-23 & Table Q-2. (Comment Number: APHIS-2007-0044-7620-23)

Response: APHIS acknowledges the comment and has updated appendix V of the FEIS to further discuss alfalfa hay harvest timing.

Comment Excerpt Text:
Most of the alfalfa in the U.S. is grown for its forage value. The likelihood for contamination of a specialty alfalfa crop from glyphosate-tolerant alfalfa due to pollen mediated gene movement is essentially zero for the following reasons. Alfalfa's feed and market value declines rapidly with the onset of the flower stage (Cash 2005, Kalu and Fick 1983, and Orloff et al. 2002). Full bloom or mature hay containing ripe seed in pods is not of acceptable quality or market value to justify

the significant handling expenses associated with off-farm sale (Cash 2005). Therefore, quality alfalfa hay fields are routinely managed by producers in such a way that flowering and subsequent viable seed maturation is intentionally and essentially entirely prevented. Alfalfa hay fields are cut- off completely very near to the ground multiple times each year at or before 10% bloom onset (i.e., <10% of the stems have developed the initial set of recently opened, non-pollinated flowers and no viable seeds). The hay harvest removes essentially all of the plant biomass, including any flower buds, open flowers and infrequent immature (nonviable) seeds that have formed. Cutting intervals are typically 28 to 36 days, depending on season, geography, market and weather conditions, and such intervals do not allow sufficient time to grow the vegetative mass, develop open flowers, undergo bee pollination and ripen viable seed. In addition, because cross-pollination is effectively carried out by only certain bee species, the particular pollinator bees must be abundant and active in the overly mature hay field. Bees and pollination per se are of no value in hay production, and therefore the bees essential for commercial alfalfa seed production are not introduced into hay fields by hay producers. Frequent in-crop insecticide applications make hay fields unattractive or harmful to the bees; therefore, the chance of pollination of hay field flowers by occasional rogue or feral bees is further minimized.

Alfalfa hay lots are priced according to forage quality (Orloff 2002). Hay lot nutritional quality is routinely evaluated by laboratory analysis for its acid detergent fiber (ADF), neutral detergent fiber (NDF), crude protein (CP) and numerous other key nutrients (USDA-ARS 2005, Dairy One 2005). Subsequently, test values may be used to calculate summative quality index values, such as total digestible nutrients (TDN) or, alternatively, relative feed value (RFV), to assign market value, predict animal performance, and to balance rations for the hay lot. Annually, commercial hay quality testing laboratories perform thousands of quality analyses for domestic and exported hay sales and ration balancing (e.g., Dairy One, Ithaca, NY, USA; www.dairyone.com). ADF (%) or TDN and RFV summative values are used by the USDA and the hay industry to group alfalfa hays into five grades. ADF will be used in this discussion because it is an empirically determined value, unlike TDN and RFV: Supreme (<27 ADF), Premium (27-29 ADF), Good (29-32 ADF), Fair (32-35 ADF) and Utility (>35 ADF) (USDA, 2005a). For the 1992-2001 commercial hay data set, “[t]he price differential—the percentage change between the highest category hay (Premium or Supreme) and Fair hay—ranged from 24.4% to 74.3% (expressed as a percent of the lower value) over the same 10-year period” (Orloff 2002). Therefore, U.S. alfalfa hay producers strive to manage field-cutting schedules (i.e., harvest interval length) to maximize dollar return per acre through optimizing both animal fodder quality and annual forage production (ton dry matter/acre) (Orloff 2002, Cash 2005). Premium and Supreme grade hays are considered “dairy quality hay,” whereas other grades are used for feeding dry cows and other nondairy classes of animals (Orloff 2002).

Indeed, a survey of the forage quality of harvested alfalfa hay confirms that alfalfa is harvested prior to extensive bloom. The hay test results of over 60,000 individual U.S. alfalfa hay samples (2000-2005) were summarized by Dairy One (Ithaca, NY), one of the major commercial feed testing laboratory services. Table 2 summarizes CP, ADF, NDF, TDN and RFV results from this independent alfalfa hay sample set (Dairy One 2005). These data indicate that U.S. hay growers normally produce hay with an average 30% ADF, 39% NDF, 60 TDN, and RFV 162, thereby confirming that mainstream hay growers manage hay for Good or Better feed quality throughout the U.S.—alfalfa hay

quality which can only be attained significantly prior to full bloom (Table 3).

Tab1e 2. Relationship of the stage of alfalfa maturity at harvest to total digestible nutrients (TDN), crude protein (CP) and acid detergent fiber (ADF)1 Values shown in boldface indicate normal range of values for Dairy One tested hay samples (see Table 3). (Comment Number: APHIS-2007-0044-7620-44)

Response: The discussion on hay quality factors in appendix V has been updated to include the comment.

Comment Excerpt Text:
Table 3. Five years of commercial forage quality test data, May 2000 through April 2005 (Source: Dairy One, 2005). (Comment Number: APHIS-2007-0044-7620-45)

Response: APHIS has evaluated the data provided and updated appendix V 2.1.2.

11.11 Issue 11.11-R – Trade

Comment Excerpt Text:
Any plantings of RR alfalfa will result in genetically engineered (GE) trait genetic contamination, which has already occurred, principally through bee cross pollination - up to 6 miles (10 km) (1). The widespread existence of feral alfalfa will greatly accelerate the spread of the glyphosate-tolerant genetic trait. This will severally compromise the ability of an organic farm to continue using a contaminated crop, especially if it is to be used for seed production and/or animal feeding. Aside from the large immediate economic losses involved, the loss of such a keystone crop to organic farming systems will undermine their options for sustainability and productivity.
As consumers and the organic farming industry will not accept any falling away from the organic standard, organic dairy and meat producing farms, which greatly depend on alfalfa, will suffer decertification and economic loss upon release of RR alfalfa and the assured dissemination of GE glyphosate-tolerant genes.
Alfalfa seed growers will be particularly damaged by release of RR alfalfa and of course, were the original plaintiffs in this issue. Farmers using alfalfa will increasingly demand certification that alfalfa seed is RR-gene free and, in the event of any extensive release of RR alfalfa, will undoubtedly turn to seed from foreign sources.
It is expected that many important foreign markets will not accept alfalfa products from RR alfalfa producers. Conventional alfalfa growers will fall under a pall of suspicion if release of RR alfalfa is allowed to go forward for any length of time, and will certainly face market disruptions. Any release of RR alfalfa that is allowed to go on for any length of time can be expected to result in progressive loss of availability to consumers of certain organic products at reasonable prices. This would include organic dairy products, certain organic meat products, organic honey, alfalfa sprouts, and possible others. (Comment Number: APHIS-2007-0044-10138-3)

Response: Regarding consumer preferences and the impact on organic certification of the unintended presence of genetically engineered material in organic alfalfa, see response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding the impacts of GT alfalfa deregulation on organic and non-GT markets, see response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the impact on U.S. trade, see response to comment APHIS-2007-0044-3404-1 for issue 5.4. In regard to gene flow and adventitious presence, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0 and the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Although the EIS report details the foreign markets for alfalfa, it does not create an actual range of trade impacts that could occur if GE alfalfa is deregulated. Although the future of trade with GE sensitive countries remains unclear, past introductions of GE crops have resulted in lost exports to GE sensitive countries. (Comment Number: APHIS-2007-0044-10172-3)

Response: In regard to impacts on international trade, see the response to comment APHIS-2007-0044-3404-1 for issue 5.4. In regard to past episodes of deregulation of genetically engineered crops and their relevance for the analysis of the potential impacts of GT alfalfa deregulation, see the response to comment APHIS-2007-0044-9936-10 for issue 11.1

Comment Excerpt Text:
Foreign Consumption and Production
The problems relating to cross-pollination and contamination also affect future exportation of American alfalfa crops because many foreign countries refuse to import GE crops. Before an adequate
analysis of GT alfalfa's impact on U.S. agriculture can be achieved, the following must be considered
concerning the export market:
a. What percentage of exported conventional and organic meat and dairy products rely on non-GT alfalfa feed?
b. What volume of exported alfalfa is organically produced? (Comment Number: APHIS-2007-0044-11741-13)

Response: APHIS acknowledges the comment. The FEIS expands the analysis of the impact of deregulation on international trade as detailed in response to comment APHIS-2007-0044-3404-1 in issue 5.4. Although trade data in organic products are not readily available, the analysis of impacts on U.S. exports in appendix R of the FEIS has been expanded to include a brief discussion of potential impacts to organic export markets with particular attention to Canada.

Comment Excerpt Text:
The analyses in the DEIS underestimate the risks of contamination and undermine the right of consumers to choose organic and conventional alfalfa, not only in the United States but also in the countries to which you export, including Japan. The DEIS states that USDA asserts that all

methods of agricultural production (conventional, organic, or the use of genetically engineered varieties) can provide benefits to the environment, consumers, and farm income, and they can and should but the deregulation of GE alfalfa will almost certainly result in irreversible harm only to organic and conventional farmers. (Comment Number: APHIS-2007-0044-4904-3)

Response: Regarding the impact on consumers who wish to consume products free of genetically engineered material, see response to comment APHIS-2007-0044-11689-2. Regarding the impact on domestic organic and non-GT alfalfa markets, see response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding impacts on international trade, see response to comment APHIS-2007-0044-3404-1 in issue 5.4. In regard to the low level presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
Export Alfalfa Hay and Seed

With respect to exports of alfalfa, APHIS concludes:

United States sales of alfalfa for forage to Japan may decrease with GT alfalfa deregulation. There is evidence of precautionary resistance from Japanese importers for GT alfalfa and the United States has already been losing market share to competitors (Australia). Exporters may have to show that any unintended presence of GT traits would fall well below Japan's one percent threshold level for presence of GM feed.

Beyond the above, there is much uncertainty surrounding the future or trade of GM products. In our Technical Report Downstream Effects to Organic Production and Marketing of Deregulation of Glyphosate-Tolerant Alfalfa (appendix T), we presented evidence that there is little information in Europe, Japan, United States, as well as in other countries, regarding GE products. To the extent that familiarity is related to acceptance (or rejection) of GE products, there is space for consumer receptivity to change or consolidate over time. Many countries do not have or must still implement their own regulatory systems for GE products (Gruère and Rao, 2007) and the analysis above is focused solely on U.S. current trading partners. Other potential future clients are not considered, although by far the main world importers are Japan and South Korea in the case of alfalfa hay and Saudi Arabia (after the United States) in the case of alfalfa seeds.

There is evidence that Japan may decrease its imports of non-GT alfalfa hay from the United States with GT alfalfa deregulation. This seems to be motivated mainly by businesses concerned with negative reactions from consumers, even in the absence of labeling requirements in downstream dairy and meat products.

DEIS, App. R at R-13; see also DEIS at 142.

FGI recommends that APHIS expand its discussion of market acceptance and more clearly describe that, with the exception of Saudi Arabia which has a categorical ban on GE crop seed imports, the five main hay export market countries importing 98 percent of United States hay exports have already approved the import of GT alfalfa. See DEIS, App. V at V-35 (Table V-7),

and V-8 (Table V-1). The countries that have approved the import of GT alfalfa include Japan, South Korea, Taiwan, Canada and Mexico. Although there is official regulatory approval for import of GT alfalfa hay in these countries, it is recognized there may currently be local markets or individual customers requiring non-GT alfalfa. Practical and effective mitigation and testing strategies for the production of non-GT hay and seeds are discussed in Section B (Practical and Effective Measures that Organic, Export or other GE-Sensitive Producers Can Use to Prevent Gene Flow and Their Costs).

One public commenter notes that, ". . . while there seems to be a lot of talk about non-acceptance of GT alfalfa, we were able to export our crop last year to both Korea and Japan; both customers knew it was GT alfalfa and we have Japanese and Korean buyers standing in line to buy this product at a premium price." DEIS, App. B at B-20. There are other alfalfa exporters and importer DEIS commenters who also support deregulation and use of GT alfalfa [Footnote 19: See C. Laub (comment APHIS-2007-044-1080) and L. Laub (comment APHIS-2007-044-1081).]. For example, the experience of soybean exporters has been that the initial reluctance to accept Roundup Ready soy imports from the United States has gradually decreased to the extent that, currently, most of the soy feed grain exported from the United States to Japan is not segregated from soy grain containing predominantly Roundup Ready soybeans. APHIS should more clearly acknowledge that gradual GT alfalfa acceptance is possible for key export hay markets (like Japan and other countries in the Pacific Rim). It is therefore not a foregone conclusion that alfalfa hay exports to countries that have approved GT alfalfa like Japan, South Korea, Taiwan, Canada and Mexico will decline. USDA FAS trade statistics for alfalfa hay exports and processed alfalfa exports clearly demonstrate that hay and hay product exports have been relatively stable since the first deregulated plantings of GT alfalfa (2005-2007). DEIS, App. R at R-7 (Table R-3) and R-8 (Table R-4).

Additionally, with respect to Japanese approval of GE foods, APHIS states:

Japan has zero tolerance for non-approved GE foods and conducts inspection and testing of cargoes arriving in Japan, inspecting up to 50 percent of all cargoes (Grueré, 2006). A 1-percent threshold for unintended, or unplanned, presence of GE content in feed is allowed as long as the GE product has been approved by the exporting country and the exporting country is considered to have safety assessments equivalent to Japan's (Grueré, 2006). Labeling is mandatory for all GE foods as long as GE material can be detected, the GE ingredient is one of the first three ingredients of a product, and the GE material accounts for more than five percent of the total weight (Grueré, 2006). Labeling requirements are based only on product content and not process (Gruère and Rao, 2007).

DEIS at 141.

FGI believes that APHIS' discussion of the Japanese regulatory status and Japanese labeling requirements is potentially misleading or incorrect, as APHIS fails to clearly state that GT alfalfa has been fully approved for import in Japan. GT alfalfa received Japanese regulatory approvals for food and feed uses in 2005 and 2006, respectively. DEIS, App. V at V-35 (Table V-7). Therefore, the 1 percent acceptance rule regarding an exporting country's safety assessment as equivalent to Japan's (i.e., exporting country approval in lieu of Japanese approval) does not

apply to GT alfalfa imported from the United States for feed use. Moreover, the 5 percent labeling threshold for labeling applies to human food products only. There is no such low level trait labeling requirement for Japanese approved feeds in Japan, so technically, neither of the Japanese labeling standards described by APHIS at page 141 of the DEIS are directly applicable to GT alfalfa hay imported for feed use.

Finally, with respect to exports to Saudi Arabia, APHIS states:

The main U.S. client for alfalfa seed, Saudi Arabia, would currently not purchase GT alfalfa seeds. Whether Saudi Arabia would continue purchasing non-GT alfalfa seeds from the United States would likely depend on the extent to which non-GT alfalfa seed producers are able to avoid unintended presence of GT alfalfa traits.

DEIS, App. R at R-12; see also DEIS at 142-43.

Data in the DEIS, however, supports the conclusion that United States alfalfa producers can maintain and grow markets regardless of GT alfalfa. In particular, the DEIS notes that the quantity of conventional alfalfa seed exports to Saudi Arabia increased 3-fold from 2005 to 2007—the period during which GT alfalfa was deregulated and widely grown in the United States. DEIS, App. R at R-6 (Table R-1). Additionally, confidence in United States exported seed quality remains high which may be due in part to self-selected RRA stewardship restrictions implemented in the Imperial Valley, California, which is the largest single seed production area for Saudi Arabia export [Footnote 20: An additional formal geographic (isolation) stewardship restriction to promote coexistence and enable non-GT seed production for export and organic markets has been implemented for the Imperial Valley of California. See the Imperial Valley Use Agreement, a supplement to the Monsanto Technology Use Agreement. This restriction was designed by Monsanto, FGI, and Imperial Valley alfalfa producers to restrict GT alfalfa usage in the region to protect alfalfa seed production destined for export markets, a predominant activity in the Imperial Valley.], [Footnote 17: Section J: Monsanto 2008 and 2009 Technology Use Guides and Associated Materials; Trait Stewardship Considerations: Seed Company/Dealer Policies; Roundup Ready Alfalfa Imperial Valley Use Agreement, in Arent Fox. 2008. Comprehensive Overview and Implementation of Stewardship Measures for Roundup Ready Alfalfa. Proceedings: Presentation to APHIS and APHIS Invitees. Riverdale, Maryland, August 28, 2008. (Unpublished, bound compilation of presentations submitted to APHIS on Sept. 17, 2008).].

These data document that coexistence is possible without imposing Federal restrictions on the planting and cultivation of GT alfalfa. APHIS should also note that there is a 2010 AOSCA program [Footnote 10: AOSCA. 2010. Chet Boruff, Chief Executive Officer, Association of Official Seed Certifying Agencies, Public Comment on DEIS for GT Alfalfa.], [Footnote 11: Lowry, G. 2010. Stewardship initiatives to protect our non-GMO seed markets. Pages 27-33, in Proceedings for the 2010 Winter Seed School Conference of the Western Alfalfa Seed Growers Association. January 17-19, 2010, Las Vegas, Nevada.] that facilitates process-based seed lot certification of non-GT status (non-detectable presence of the GT trait). This new inspection and certification program for export seed offers a straightforward mechanism for documenting non-

GT status for seed produced for sale to Saudi Arabia or any other GT-sensitive alfalfa market. (Comment Number: APHIS-2007-0044-7620-31)

Response: APHIS acknowledges the comment. The analysis of the impact on export markets of GT alfalfa deregulation was expanded in the FEIS to further consider the differing impacts for feed and seed exports and the differing levels of tolerance for unintended presence of genetically engineered material in feed and seed in various importing countries. In doing so, the standards for import in each country and applicability to GT alfalfa were revised.

Comment Excerpt Text:
Non-Biotechnology-Derived Alfalfa Seed will Continue to be Available

In response to seed industry requests, AOSCA has recently approved a new process-based certification program that assists U.S. alfalfa seed growers in producing organic, export or conventional non-biotechnology-derived alfalfa seeds using inspection of enhanced isolation, field history and testing of the planting seed stock (AOSCA, 2010; Lowry, 2010). Seed grown in compliance with the terms of this process will be highly pure, non-biotechnology-derived variety seeds. Assuming compliance with other requirements of the National Organic Plan, these seeds may also be certified as organic.

As is customary with other identity preserved or specialty product certifications, there will be reasonable, market-based fees associated with third party process inspections for organic certification and for certification for genetic purity. Growers may opt to utilize process inspections by others; however, if no third-party inspection is used, there would be only incremental costs for self-inspections. These AOSCA recognized practices and or other recommendations to avoid cross-pollination with biotechnology-derived varieties are available for alfalfa growers (e.g., NAFA, 2008 a-d). Such avoidance measures can be observed by individual growers acting alone or in voluntary, market-driven collectives of local growers. For example, per APHIS' draft EIS discussion on regional adoption rates for 2005-2007 biotechnology-derived (referred to in the draft EIS as "glyphosate tolerant" or "GT") alfalfa, GT alfalfa was not planted in Imperial Valley, CA—which is a geography wherein much conventional seed is grown for domestic and export use (see dEIS Appendix R, page R-22). A second example of voluntary collective grower decision-making is evidenced by no GT alfalfa adoption in an 8,000 acre area of south-central Washington where alkali bees are a dominant pollinating species and the local alfalfa seed production market is sensitive to the presence of the GT trait (Waggoner, 2007 and 2010). Additional non-GT grower collectives have been proposed (e.g., Price, 2007) and presumably they would not purchase GT planting seeds for hay production or accept GT seed contracts. Therefore, in the future, there will likely be multiple areas of adequate isolation from sources of GT pollen to assure genetic purity of non-GT seeds. If collective groups of non-GT seed growers are officially documented and made known publicly by a state certification service or department of agriculture, under stipulations of the NAFA Best Management Practices (NAFA, 2008a) GT seed companies have pledged that they will respect these recognized non-GT alfalfa collectives and they will not issue any contracts for GT seed production within the stipulated zone. Additionally, non-biotechnology-derived seed production will be enabled because GT seed contracts will only be issued for fields and growers that provide

the NAFA BMP-required at-planting isolation distance from conventional seed fields (e.g., 3 miles where honeybees are used) (NAFA. 2008a).

For the first time in 2009, AOSCA certified variety seeds that are also USDA organically certified were produced and sold in the U.S. (McCaslin, personal communication, 2010). This represents an improvement in the quality of seed available to growers seeking seed produced to organic certification standards and demonstrates the availability of existing and new sources of non-biotechnology-derived alfalfa varieties to meet market needs (WL Research, 2009).

In addition to domestically produced alfalfa seeds, non-biotechnology-derived alfalfa seed is currently imported to U.S. alfalfa growers. The deregulation of biotechnology-derived alfalfa in the United States will have no impact on the production of non-biotechnology alfalfa in other countries, and there is no reason to believe that this importation will not continue. (Comment Number: APHIS-2007-0044-7620-43)

Response: APHIS acknowledges the comment. The analysis of testing requirements and options in accessing GT sensitive markets has been expanded in the FEIS.

11.12 Issue 11.12-S – Organic (market)

Comment Excerpt Text:
*Tell USDA That Protecting Farmers is Its Job and That Relying Solely on Monsanto's Business as Usual "Best Practices" Ensures Widespread GE Contamination:

USDA claims that Monsanto's seed contracts require measures sufficient to prevent GE contamination, and that there is no evidence to the contrary.

- In the lawsuit requiring the EIS, the Court found that GE contamination had already occurred in the fields of several Western states with these same business-as-usual practices in place!

- The EIS itself acknowledges that GE contamination may happen and includes studies that honey bees can cross-pollinate at distances over 6 miles, and Alkali bees at 4-5 miles,[ii] much further than any distances under Monsanto's "best practices."

-In general, where other GE crops were approved without restriction, contamination of organic and conventional seeds and crops is widespread and has been documented around the world.[iii] A recent report documented 39 cases in 2007 and more than 200 in the last decade.[iv] The harms incurred by organic farmers and food companies from GE contamination are many and include: lost markets, lost sales, lower prices, negative publicity, withdrawal of organic certification, expensive testing and prevention measures, and product recalls.[v] In at least one case, pervasive GE contamination eliminated an entire organic sector. According to an article in the journal Nature Biotechnology: "[T]he introduction of GEherbicide-tolerant canola in Western Canada destroyed the growing, albeit limited, market for organic canola."[vi] (Comment Number: APHIS-2007-0044-0948-4)

Response: Regarding stewardship, see the response to comment APHIS-2007-0044-0948-4 for issue 9.1. Regarding the economic impacts to non-GT and organic alfalfa producers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.
In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
On page S-29 the document gets around to admitting the risk of measurable gene flow from GT alfalfa to conventional GT free alfalfa, but it also supposes that there will be no market with zero tolerance to GT alfalfa. These assumptions including the assumption of no market for zero tolerance are in all likelihood false. The USDA appears to be willing to sacrifice the markets of many US seed producers for the short run benefits of others. The statement on page S-30 pretty much summarizes the predicted damage, "If producers cannot avoid GT alfalfa material above those levels found acceptable by the market, any alfalfa seeds or forage previously destined for those markets will have to be shifted to salvage markets that may pay a lower price." Hence, the non-regulated status document clearly predicts the economic loss, and perhaps insolvency, created by the uncontrollable gene flow from GT alfalfa to conventional alfalfa set in motion by the non-regulation status proposed by this process. (Comment Number: APHIS-2007-0044-10157-15)

Response: The statement on page S-30 of the DEIS and cited in the comment is hypothetical and used for the sake of the analysis presented. The extent to which this would occur would depend on the level of genetically engineered content found acceptable by each specific market and on the extent of gene flow. APHIS found no evidence to support broad losses to farmers, with the possible exception of those individual growers producing for specific sensitive markets. Regarding market demand for products free of genetically modified material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding the impact to non-GT and organic alfalfa producers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to gene flow, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
One of the concerns of the public is the economic impact of GE alfalfa to organic and non-GE alfalfa growers. The draft EIS has several failings in the analysis of impacts on non-GE and organic alfalfa growers and other organic farmers and dairies.
1) On page132 of the draft EIS, APHIS reported that no economic data was reported on the possible effects of GE alfalfa introduction on organic producers. Given the complete characterization of the U.S. alfalfa market (Appendices S and V) and survey of the organic food industry (Chapter 3: pages 48 and 53), such an analysis could have been completed. A short, well-designed survey in conjunction with organic trade groups could have been completed. In addition, as a part of the 2007 USDA Census of Agriculture, an organic production survey was completed (USDA-NASS, 2010). Such available data could have been used to estimate the impacts of the introduction of GE alfalfa on the organic agriculture sector. APHIS should go back and properly inform its analysis with such a survey. (Comment Number: APHIS-2007-0044-10172-1)

Response: APHIS acknowledges the comment. The DEIS makes use of the 2007 USDA Census of Agriculture data and updated data are used in the FEIS, where available. The statement on page 132 of the DEIS cited by the commenter refers to specific data expected in response to the NOI. Despite this lack of data in response to the NOI, sufficient data are provided in the DEIS to support scenarios illustrating the potential socioeconomic impacts of GT alfalfa deregulation. Additional information received in comments to the DEIS was also incorporated in the FEIS. The statement cited in the DEIS was removed from the FEIS.

Comment Excerpt Text:
Impacts due to Testing to Maintain Organic Certification

The introduction of the GE alfalfa will necessitate that organic producers test alfalfa for genetic events J101 and J163. This is done so that a particular producer can maintain an organic certification. The standard test kit for testing GE events uses polymerase chain reaction (PCR) for detecting foreign genetic events. This testing is expensive.

In 1996, when Liberty Link rice was found in the US rice supply the PCR test was used to test every truckload of rice to insure its purity. A testing regime was implemented for 2 years to insure a GE free rice supply. A similar testing regime will have be implemented by organic alfalfa growers to insure GE free status for organic markets. The declaration by Albert Strauss details how much testing that has to be performed by the Strauss Family Creamery in order to maintain GE status. If a PCR testing regime would have to be implemented for all organic alfalfa producers the cost would be as follows: 1) Straus Family Creamery used 150 PCR tests for 5500 tons of alfalfa. This amounts to 36.67 tons of alfalfa per PCR test, 2) Based on the U.S. production of 606,242 tons of organic alfalfa, the number of PCR tests required to test all US organic alfalfa would be 16,534 PCR tests, 3) At a cost of $179 per PCR test, the total cost to test all US organic alfalfa is projected to be $2,959,563.

If the US wants to maintain its exports to countries that are GE sensitive, PCR testing will have to be completed to insure GE compliance. The U.S exports, approximately 1.070 million tons of alfalfa. Approximately 995,181 tons are exports at risk. If testing is implemented at the levels indicated in the Strauss declaration (36.67 tons per test), 27,141 tests would have to be used. At a cost of $179 per test, the total cost of trade testing would be $4,858,294. (Comment Number: APHIS-2007-0044-10172-11)

Response: In regard to requirements for organic certification, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding the impact of testing, see the response to comment APHIS-2007-0044-0693-1for issue 5.9.

Comment Excerpt Text:
Impacts on Alfalfa Sprout Market

Alfalfa is grown for direct human consumption in the form of alfalfa sprouts (Page 47, EIS). This is a very small proportion of the alfalfa seed that is used. Alfalfa sprouts account for about 75 to 80 percent of the green sprout market, or $60 to $64 million in annual sales. 125,000 to 150,000 pounds of alfalfa seed a month are used to produce about 5 to 6 million 4-ounce packages a month. A rate of 150,000 pounds of seed consumed per month by sprouters means that 1.8 million pounds of alfalfa seed are utilized per year. Base on an average production of 510 pounds per acre production total acres needed for sprout production is 3,529 acres. If GE alfalfa is introduced, the 60 to 64 million dollar sprout revenue will be at risk. It is hard to say if the entire sprout revenue would be at risk. The small number of acres needed for US sprout production could be grown in small plots at locations isolated from GE alfalfa if USDA restricted its release. Unfortunately this would likely not be possible, because USDA is not requiring any geographic restrictions on GE alfalfa in the draft EIS. (Comment Number: APHIS-2007-0044-10172-12)

Response: APHIS acknowledges the comment. The FEIS contains added analysis of an additional alternative that includes isolation distances and geographical restrictions for GT alfalfa.

Comment Excerpt Text:
Table 5 details all the impacts calculated in this document. While this is not a complete list of all the possible impacts that could occur, the impacts estimated, herein, are both important and fundamental to the discussion of the introduction of GE alfalfa.

Table 5. A summary of the estimated economic impacts arising from the introduction of GE alfalfa

Exports at Risk
Alfalfa Hay Exports at Risk:$159,229,000
Alfalfa Seed Exports at Risk: $38,075,000
Total Exports at Risk:$197,304,000

Planted Seed Revenue Loss
Loss from lost organic acres:$3,678,840
Loss from lost export acres :$3,672,000
Total Planted Seed Loss:$7,350,840

Loss of Organic Hay Acres
Sales premium loss:$11,348,850

Organic Dairy Milk Premiums
Premium loss:$225,741,802

PCR Genetic Testing to Maintain GE Free Status
Organic alfalfa:$2,959,563
Export alfalfa:$4,858,294.

Total PCR Testing Costs:$7,817,857

Alfalfa Sprout - Market Revenue
Sprout revenue at risk range $60-66 Million

In conclusion, the USDA draft EIS has failed to account for the significant negative effects of the introduction of GE alfalfa on the various sectors of the U.S. agricultural industry. The largest economic impacts arising from the introduction of GE alfalfa in the U.S. are the lost exports to GE sensitive countries and the loss of organic milk premiums. Since the export trade and organic livestock farms have high capital requirements any adjustments made in responding to the deregulation of GE alfalfa will incur huge costs.

Although the draft EIS did acknowledge that export trade with GE sensitive countries is uncertain, it downplayed the export losses that could occur with the introduction of GE alfalfa. The draft EIS overlooked the export loss history arising from the accidental release of GE rice or the introduction of GE canola.

The largest negative impact from the introduction of GE alfalfa will occur in the organic foodstuffs industry, particularly the organic dairy sector. The loss of the organic milk premium alone caused by the loss of GE free alfalfa amounts to $225,741,802.

The export trade and organic milk premium impacts alone amount to $423,045,802. This impact assumes that all organic alfalfa disappears once GE alfalfa is introduced – a very strong possibility.

The negative impacts arising from the introduction of GE alfalfa were not accounted for in the USDA draft EIS. The inclusion of these impacts in the final EIS will present a truer picture of the costs of introducing GE alfalfa and are necessary to properly inform USDA's final recommendation on GE alfalfa and deregulation decision.

Finally, based on these significant and foreseeable negative impacts to crucial sectors of U.S. agriculture, I recommend that USDA not approve for deregulation, GE alfalfa. (Comment Number: APHIS-2007-0044-10172-13)

Response: APHIS acknowledges the comment; however, the analysis done in the DEIS does not support your conclusions. APHIS does not expect GT alfalfa to displace organic production, nor for the organic premiums to remain the same with GT alfalfa deregulation (they might increase or decrease, depending on shifts in supply and demand.

Comment Excerpt Text:
Alfalfa Hay Supply – Loss in Organic Premium

Alfalfa grown for forage is the third-ranked crop in the U.S. by value and fourth ranked by total acreage. In the U.S. alfalfa is grown on 21 million acres. The total production was 69.6 million tons of alfalfa and alfalfa mixtures. The average production per acre is 3.32 tons per acre

(USDA-NASS, 2009). In terms of tonnage, alfalfa comprises 47.8 percent of total hay production.
Organic alfalfa production comprises 0.92% of total U.S. acreage (204,380 acres) (Page 37, EIS).
The total estimated U.S. organic alfalfa production in 2005 was about 606,242 tons based on differences in organic and conventional alfalfa yield from Long et al. (2007), (page 48, EIS).

Most of the organic alfalfa is fed to livestock for organic food production with a small amount sold as seed sprouts and food supplements. Most of the organic alfalfa is fed to livestock for organic food production with a small amount sold as seed sprouts and food supplements.

The production of organic alfalfa has been shown to have a lower yield but a higher price. The organic premium more than offsets the lower yield. The end result is that total revenue per acre from organic production is higher than conventional production. In the draft EIS, Table 3-5 (Page 37) Long et al. (2007) demonstrates the differences between conventional and organic alfalfa production. In that table, the 2005 organic value premium is $18.25 per ton over the conventional alfalfa. If GE alfalfa totally displaces all alfalfa production, the total organic hay premium loss based on 606,242, tons or organic alfalfa, would be $11,348,850. (Comment Number: APHIS-2007-0044-10172-9)

Response: APHIS acknowledges the comment. APHIS does not expect GT alfalfa to displace organic production, nor for the organic premiums to remain the same with GT alfalfa deregulation (they might increase or decrease, depending on shifts in supply and demand).

Comment Excerpt Text:
The responsibility for preventing contamination of conventional and organic production falls on the organic or conventional producer, rather than on the manufacturer of this alfalfa variety or the farmers who grow it. Second, it fails to make any provisions for segregation of genetically modified alfalfa from conventional alfalfa.
the EIS did not analyze any realistic measures organic or conventional alfalfa farmers would have to take to prevent their crops from being commingled with unwanted, unintended, or unexpected glyphosate tolerant alfalfa; or the cost of commingling and contamination, to the extent that it is not or cannot be prevented. By refusing to provide workable solutions to prevent contamination, the EIS falsely implies that there will be no contamination and ignores the costs of that contamination.
The EIS maintains that avoiding contamination is the conventional or organic farmers responsibility. According to the draft EIS Growers who wish to avoid gene flow (e.g., those who produce hay for markets that reject GE crops) should pay attention to flowering habits (avoiding simultaneous flowering) and harvest schedules, and disallow or remove commercial beekeepers hives. Although the hay harvest date can be delayed a week or more by wet weather or equipment failure, harvesting before the ripe seed stage is possible in all but the most extreme circumstances.
This claim is absurd on the part of the EIS because it fails to recognize that an alfalfa producer cannot require set backs of bee colonies from their fields and cannot prohibit the placement of hives and apiaries on others private property. Furthermore, producers have no way of controlling

wild pollinators, wind, water and other natural forces that move seed and pollen from field to field. (Comment Number: APHIS-2007-0044-10318-3)

Response: The analysis done in the DEIS recognizes that economic losses might occur depending on sensitivity levels in niche markets. Regarding the economic impacts on non-GT and organic alfalfa producers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.
The analysis done in the DEIS does not conclude that no gene flow or comingling will occur. In regard to gene flow and comingling, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0 and the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
The organic industry in the United States continues to grow at unprecedented rates. APHIS quotes figures on U.S. organic food sales as being $16.67 billion in 2006 (EIS pg. 56); yet, such figures continue to growing notably. Organic products have become ubiquitous in the United States and are now available in 82% of retail food stores as of 2007 (Food Marketing Institute 2008). Simultaneously the organic industry offers excellent business opportunities in the United States: new organic private label products increased from 35 in 2003 to 540 in 2007 (Driftmier 2009).

According to the Organic Trade Association (OTA), organic sales in the United States reached $24.6 billion in sales in 2008 and 93% of this was from the sale of organic food products. Further, the growth rate for organic food products in 2008 from 2007 was 15.8% and organic food now accounts for 3.47% of all food products sold in the U.S. In fact, in every year since 1997, when data was first collected by OTA, the organic industry has consistently grown in both absolute dollars and as a percentage of the total food market. Of the total amount of organic food sales, dairy represented the second largest category of organic sales totaling 14% (OTA 2009a).

At the same time that the organic food industry was burgeoning, organic farmland was also increasing. During the 1990s and early 2000s, organic acreage increased but often not quickly enough to keep up with demand. APHIS reports organic figures from the USDA ERS for alfalfa dry hay from 2005 as being 204,380 acres. Total organic hay acreage represented 411, 342 acres (USDA ERS 2005), indicating that alfalfa hay represented nearly half of all organic hay production at the time. Recent organic data from the 2008 U.S. Organic Survey indicate that organic hay acreage in the U.S. continues to increase. While individual acres of alfalfa hay are not reported, overall organic hay acreage increased to 415,476 acres by 2008, showing that the demand for organic haylage, including alfalfa, continues to climb (USDA 2010).

Among the fastest growing sectors of the organic industry was meat and dairy (Figure 1). Organic dairy has had annual growth rates ranging between 16 and 34 % from 1997 to 2007. Similarly, organic meat sales have increased by a factor of 46 between 1997 and 2007. Of this, beef made up 24 % of the 2007 meat sales and resulted in an average 20 % annual increase in sales between 2000 and 2005 (Dimitri and Oberholtzer 2009). Clearly U.S. consumers are demanding organic dairy and beef products in the United States at unprecedented levels.

[See original submission letter for Figure 1]

(Comment Number: APHIS-2007-0044-11018-3)

Response: APHIS acknowledges the comment. The analysis done in the DEIS supports your conclusion of a growing demand for organic products.

Comment Excerpt Text:
Organic agriculture provides multiple benefits to society at this critical moment when solutions to address the global and economic crisis are so desperately needed. Notable benefits of organic include: the production of healthy, nutritious, and abundant food; economic opportunities for family, small-scale, and young farmers; increasing contributions to local and regional economies; increases in U.S. exports; and enhancements to environmental quality, climate change mitigation, biodiversity conservation, and the life opportunities of future generations. Moreover, organic is the fastest growing sector of U.S. agriculture, and it has continued to steadily increase by 15% and 20% annually for over a decade. [Footnote 23 Domestic sales of organic food sales are estimated at $23 million annually (2008), according to the Organic Trade Association (OTA), http://www.ota.com/pics/documents/01a_OTAExecutiveSummary.pdf (accessed 28 January 2010).] To risk tainting organic with GE contamination is irresponsible government policy, particularly in light of USDA Secretary Vilsack's recent commitment to allocate $234.5 million to "help promote American food and agriculture products overseas" as a way to better our economy. [Footnote 24 United States Department of Agriculture. (Jan. 26, 2010) "Agriculture Secretary Tom Vilsack Announces Millions to Promote U.S. Food and Agricultural Exports," Washington, DC, Press Release No. 003310. http://www.usda.gov/wps/portal/usdahome (accessed 28 Jan. 2010).]

In Europe, Japan, and elsewhere, GE contamination is prohibited not only because of strict EU regulations but also because of widespread consumer rejection of GE agriculture and food. Consumers in the U.S. do not want to eat GE food either. In fact, there has not been one U.S. consumer survey that demonstrates a strong consumer demand for GE food. On the contrary, existing polling data suggests that the opposite is true. (Comment Number: APHIS-2007-0044-11689-12)

Response: APHIS acknowledges the comment. Regarding the preference of organic producers and consumers for products free of genetically modified material, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. The mission of APHIS is to protect the health and value of U.S. agricultural, natural and other resources. While carrying out its diverse protection responsibilities, APHIS makes every effort to address the needs of all stakeholders involved in the U.S. agricultural sector. APHIS maintains that all methods of agricultural production (conventional, organic, or the use of genetically engineered varieties) can provide benefits to the environment, consumers, and farm income.

Comment Excerpt Text:

In cases where GE crops were approved in the past, contamination of organic and conventional seeds and crops has been widespread and this has been documented around the world. [Footnote 9 See, e.g., New Study Finds GM Genes in Wild Mexican Maize, New Scientist, Feb. 21, 2009; Rex Dalton (2008) Modified genes spread to local maize: findings reignite debate over genetically modified crops, Nature, 456 (7219), 2000, at 149; The Institute for Nutrition and Food Technology (INTA), Chile enters the list of countries contaminated with GMOs: A report from INTA has detected transgenic contamination of maize in the fields of central Chile, Oct. 22, 2008; Graeme Smith, Illegal GM Crops Found In Scotland, Herald, Sept. 13, 2008; Elizabeth Rosenthal, Questions on Biotech Crops with No Clear Answers, N.Y. Times, June 6, 2006; Gene Flow underscores growing concern over biotech crops, Associated Press, Sept. 22, 2004; Andrew Pollack, Can Biotech Crops be Good Neighbors?, N.Y. Times, Sept. 26, 2004; Lyle F. Friesen et al., Evidence of contamination of pedigreed canola (Brassica napus) seedlots in Western Canada with genetically engineered herbicide resistance traits, 95 Agron. J., 1342-1347 (2003); Simon Jeffery, Rogue genes: An unauthorised strain of GM crops has been found across England and Scotland. Guardian, Aug. 16, 2002; Alex Roslin, Modified Pollen hits organic farms: Genetically altered strains spread by wind, Toronto Star, Sept. 30, 2002; Fred Pearce, The Great Mexican Maize Scandal, New Scientist 2347, June 15, 2002.] A recent study of GE contamination described 39 cases of contamination in 2007 alone, and more than 200 within the last decade. [Footnote 10 Greenpeace International. GM Contamination Register Report 2007, February 28, 2008. http://www.greenpeace.org/international/press/reports/gm-contamination-register-2007 (accessed 10 Feb. 2010).] Harm incurred by organic farmers and food companies from GE contamination include: lost markets, lost sales, lower prices, negative publicity, withdrawal of organic certification, expensive testing and prevention measures, and product recalls, among other things. [Footnote 11 See, e.g., K.L. Hewett, The Economic Impacts of GM Contamination Incidents on the Organic Sector, 16th IFOAM Organic World Congress, Modena, Italy, June 16-20, 2008.] In at least one case —canola — pervasive GE contamination eliminated an entire organic sector in Canada. According to an article in the journal Nature Biotechnology: "[T]he introduction of GE herbicide-tolerant canola in Western Canada destroyed the growing, albeit limited, market for organic canola." [Footnote 12 Smyth et al. (2002) Liabilities and Economics of Transgenic Crops, 20 Nature Biotechnology, June 2002, at 537-541.] (Comment Number: APHIS-2007-0044-11689-7)

Response:
In regard to cases of deregulation of other genetically engineered crops and their relevance for the analysis of the potential consequences of GT alfalfa deregulation, see response to comment APHIS-2007-0044-9936-10 for issue 11.15.

Comment Excerpt Text:
APHIS admits that organic demand may increase as consumers are become concerned with the presence of GE in alfalfa.[Footnote 29: DEIS, App. T, at T-2] Even as demand may increase, the potential for contamination events and
gene flow into organic alfalfa products will limit the ability of the market to satisfy that demand. Discerning consumers are increasingly sensitive to the failure of the USDA National Organic Program

(NOP) to require certified organic products to be tested as GE free. This is resulting in a market trend
toward local production and consumption, and the benefits derived from knowing the farmer where
one's food is produced include the ability to inquire into the GE status, or likelihood of GE contamination of crops.
Much of the consumer demand analysis in the DEIS is based on consumer studies that provided
inaccurate information to consumers as they were polled. The DEIS cites the Chern and Rickertsen
(2002) study showing that consumer willingness to eat GE foods increased "when it was explained that
GE foods could include benefits such as the reduced use of pesticides."[Footnote 30: DEIS at 59.] Conclusions about consumer
preference should not be based on unproven or baldly false allegations about the use of pesticides in GE
crops. It is well documented that in many cases the increased use of GE crops actually increases
herbicide use, especially after the first few years of GE crop commercial availability. Additionally, any
consumer choice data from the US is fatally flawed without systemic labeling of foods containing GE
products. The consumer choice analyses used as a basis for market potential evaluations chronically
underestimate the demands of consumers for GE free foods. Thus, the market impact conclusions are
also implicated as inadequate. (Comment Number: APHIS-2007-0044-11741-11)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
APHIS fails to appreciate the subtleties of the economic interplay between conventional and
organic markets. Many of the interactions between these markets are not discussed in the DEIS. A
thorough analysis of the relationship between the two markets and the impact that deregulation will have
on these market interactions is necessary to any complete economic analysis of deregulation.

For example, some segment of the demand for conventional alfalfa seed comes from organic
farmers who cannot access certified organic seed. If GE alfalfa is deregulated and its use widely
adopted, the inevitable contamination of the conventional seed market will prevent organic farmers from
purchasing conventional alfalfa seed without first demanding testing to establish the GE content of the
conventional seed. A discussion of the effect of the increased cost of such testing, the presence of such

contamination, and its effect of the use of conventional alfalfa seed for organic production are absent
from this economic analysis.
The impacts of the contamination and subsequent market collapse[Footnote 23: Contamination of non-GE crops in other contexts have lead to market failure, see e.g., Greenpeace, PAPAYA: THE FAILURE OF GE PAPAYA IN HAWAII at 4 (May 2006) available at http://www.greenpeace.org/international/press/reports/FailureGEPapayainHawaii.] are likely to be felt most
strongly in states such as Oregon with significant seed production industries. The industry cannot effectively be protected from this negative impact if deregulation occurs. As APHIS's own discussion
indicates, the potential for growth in the organic and non-GE market segment is high, making its loss
particularly problematic for seed producers interested in targeting this burgeoning market who will be
unable to avoid gene flow from neighboring GE populations. The impact of deregulation on these
developing markets is not discussed in the DEIS. (Comment Number: APHIS-2007-0044-11741-7)

Response: The analysis conducted in the DEIS does not support the conclusion that an organic "market collapse" will occur. The potential impact of unintended presence of genetically modified material in organic production is analyzed in appendix S of the DEIS. Section 2.1.5 of appendix S of the DEIS recognizes the use of non-organic seeds in the absence of organic certified seeds and the analysis of testing for GT alfalfa content as a requirement or option for accessing GT sensitive markets is expanded in appendices R and S of the FEIS.
In regard to the low level presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
It is essential that the USDA's Environmental Impact Statement (EIS) clearly acknowledge the extensive and deep economic impact that the loss of the organic market would have to the entire organic supply chain – seed to plate. GMO contamination impacts millions of consumers that purchase organic products because they want the integrity that organic certification offers – foods grown without synthetic chemical and without genetically modified ingredients. It is also essential that the EIS calculate the impact that GMO contamination has on future organic farmers. By contaminating a crop like organic alfalfa, the future possibilities for conventional alfalfa farmers – and conventional dairy and livestock producers– are reduced or eliminated. This cuts off their future business opportunities to participate in the organic marketplace, the fastest growing sector of the food industry.

GMO contamination of the organic supply chain not only limits the ability of organic growers and food manufacturers like Clif Bar and Company to operate in the U.S. but has a huge impact on current and future exports of organic products to the growing markets in Europe and Japan. GMO contamination will also impacts all of the retail and wholesale businesses that sell organic

foods including Walmart, Target, Safeway, Albertsons. 37% of all organic food is sold in grocery stores, with Walmart the leader in sales.

GMO contamination in the organic food supply chain will hurt the very businesses and markets that the USDA national organic standards help create and grow over the past decade. The USDA has a responsibility to protect these farms as well as the organic food and fiber companies that follow and uphold the USDA organic standards. The USDA must also protect the integrity of the NOP standards that consumers look to as a guarantee. Nonetheless, the EIS submitted by the Department of Agriculture (USDA) does not report on or account for the foreseeable economic damages that will result from the proposed deregulation and release of GE alfalfa. Additionally, because this is the first such study by the USDA on a GE crop, we are extremely concerned that the USDA will view such contamination and damage to the organic integrity of other foods and to organic fibers in a similar manner.

Clif Bar and Company was deeply affected by last year's peanut recall. The experience made us extremely aware of the severe impact that supply chain contamination can have on the industry at large. Contamination events would erode consumer confidence in the organic brand, and cost millions of dollars in damages throughout this rapidly growing sector of the organic food and organic fiber industry. (Comment Number: APHIS-2007-0044-11788-2)

Response: The analysis conducted in the DEIS does not support the conclusion that the organic market will be lost. In regard to the economic impacts on non-GT and organic alfalfa producers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
The organic food industry continues to grow faster than most food sectors, and is now a $23 billion industry, experiencing nearly 16% growth between 2007 and 2008.[Footnote 1: Organic Trade Association. 2009. "U.S. organic sales grow by a whopping 17.1 percent in 2008," May 4.] Alfalfa is
an essential component of this burgeoning industry. The total number of certified organic livestock, especially beef cattle and dairy cows, increased by a startling 572 percent between 1997 and 2003.[Footnote 2: U.S. Department of Agriculture, Economic Research Service. 2006. Data sets: organic production,
http://www.ers.usda.gov/Data/organic/] And demand is growing. Implicit in the demand for more
organic meat and dairy products is the need for more organic feed, especially alfalfa. Because alfalfa is an open-pollinated crop, markets for alfalfa seed and hay that reject genetically engineered (GE) material in seeds and feed risk acquiring the Roundup Ready trait through gene flow. The USDA National Organic Program does not allow the use of agricultural biotechnology in certified organic farming systems, so cross-pollination of Roundup Ready alfalfa with organic crops will increase production costs, reduce profits and eliminate markets for organic alfalfa producers.
1. The draft EIS admits that GE crops, such as corn, soybeans, and canola, accidentally end up in organic products but says there's no evidence that this is impeding the development of the organic sector (pp. 135 – 136). APHIS asserts there is no evidence

that organic consumers demand products free from the unintended presence of GE traits (p. 135).

Yet it is clear that consumers who purchase organic foods expect these products be free of GE material. Therefore, there exists an implied “zero tolerance” for GE material in organic products. [Footnote 3: Ronald, P. & Fouche, B. 2006. Genetic engineering and organic production systems, www.indica.ucdavis.edu/publication/reference/r0602.pdf] Polls show that the number of consumers who know that genetically engineered foods cannot be labeled “organic” under the organic standards is growing. In 2002, two polls showed that 68% of consumers who bought organics agreed they were purchasing products without GE organisms.[Footnote 4: Carolyn R. & Grobe, D. 2005. Consumer knowledge and perceptions about organic food [Electronic version], Journal of Extension, 43(4), http://www.joe.org/joe/2005august/rb3.shtml; Whole Foods Market. 2003. One year after USDA organic standards are enacted more Americans are consuming organic food, http://www.wholefoods.com/company/pr_10-14-03.html] In 2003, one of these polls showed that the number had grown to 76%.[Footnote 5: Whole Foods Market. 2003. One year after USDA organic standards are enacted more Americans are consuming organic food, http://www.wholefoods.com/company/pr_10-14-03.html]

Polls also indicate that consumers are willing to pay more for food that is not genetically engineered. A USDA study showed that in general consumers discount GE food “by an average of 14%.”[Footnote 6: Tegene, A., Huffman,W., Rousu, M. & Shogren, J. 2003. The effects of information on consumer demand for biotech foods: Evidence from experimental auctions, U.S. Department of Agriculture, Economic Research Service, www.ers.usda.gov/Publications/tb1903] U.S. consumers are willing to pay an extra two to three dollars per pound for beef that is from cattle not fed GE feed. [Footnote 7: Lusk, J.L., Roosen, J., & Fox, J. 2003. Demand for beef with growth hormones and fed genetic corn, American Journal of Agricultural Economics, 85(1), cited In U.S. Department of Agriculture, Economic Research Service. 2006. The first decade of genetically engineered crops in the United States, http://www.ers.usda.gov/publications/EIB11/] And other polls show that consumers are willing to pay 5% more for non-GE potatoes.[Footnote 8: Loureiro, M.L., & Hine, S. 2002. Discovering niche markets: A comparison of consumer willingness to pay for local (Colorado grown), organic, and GMO-free products. Journal of Agricultural and Applied Economics, 34(3), cited In U.S. Department of Agriculture, Economic Research Service. 2006. The first decade of genetically engineered crops in the United States, http://www.ers.usda.gov/publications/EIB11/.]

Furthermore, many organic farmers and businesses know their customers well, and they know these customers expect their products to be free of GE traits. Any and all presence of such traits will cause their customers to lose confidence in their products. The EIS dismisses the reality that consumers view organic products as GE-free and demand zero tolerance for GE material – they purchase organic products to avoid GE ingredients in

food. Indeed, the organic community fought hard for the complete exclusion of GE products in certified organic products when the NOP was first created.
In the U.S. District Court for the Northern District of California's 2007 decision to require a full EIS on Roundup Ready alfalfa, Judge Charles Breyer wrote that to "farmers and consumers organic means not genetically engineered, even if the farmer did not intend for his crop to be so engineered." Judge Breyer understood well that contamination of organic products by GE alfalfa removes choice from organic farmers and consumers alike. (Comment Number: APHIS-2007-0044-12044-1)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
The EIS states that the supply of organic alfalfa hay and organic alfalfa seeds would not be directly affected by adoption of GE alfalfa (p. 133). APHIS said it did not have economic data or other related information to demonstrate economic ramifications to organic producers regarding loss of markets and increased production costs for protecting the integrity of products from GE crop gene flow (p. 132).
Keeping unwanted material out of organic fields can be a costly investment. Organic farmers currently have no recourse for recouping economic and agronomic damages caused by transgenic contamination, except perhaps the courts. Organic farmers are left with the economic and agronomic costs of detecting and eradicating GE material; losing the genetic integrity of seed on which they rely; taking measures to avoid future contamination; and selling contaminated products into the conventional market, receiving a lower price for organically produced products. Sending contaminated products to the organic market threatens consumers' trust in the credibility of this non-GE, high-value market. (Comment Number: APHIS-2007-0044-12044-3)

Response: See the response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
1. Alfalfa is much more important to organic producers than to their conventional counterparts. Thus not having organic alfalfa available because of contamination would have a dramatic and negative cost impact. Factors that make alfalfa more valuable for organic producers are:
? The study focuses on dry matter yield, quality and market price of alfalfa hay as main parameters for evaluation of trends and markets. (Pp 48-51) This approach looks at alfalfa primarily as a cash crop. Organic production and conventional grass based pasture models approach alfalfa and other crops in a system of production with the saleable product being meat or milk or milk products. An important cost difference for hay grown in an animal system versus as a cash crop is the availability of animal manure as a nutrient source. A cash crop system usually depends on purchased nutrient inputs - in the case of alfalfa this is usually potash. Organically approved sources of purchased potash are, on average, double conventional sources. By careful use of animal

sources, the cost of producing hay on our farm is about the same as hay production on non-organic farms in our area. Yields since we became certified are no different than when we used conventional practices. The conclusion on pp 48 and 49 that “value” or “price” of organic alfalfa is 15-20% more expensive than conventional is confused. The study mixes the concepts of price, value and cost. Price comes from the dynamics of the supply and demand of hay in a market. This has only slight relationship to cost. If you don’t purchase alfalfa hay then cost is the cost of production and not the market price.
? Alfalfa is high in protein (20% or so if harvested right) and with hay costs about equal to conventional hay this provides forage protein at conventional costs. Protein from organic grain sources is 2.5 to 3 times more expensive than conventional protein. For example, early last year our local price for conventional 44% soy meal was $325/ton while organic meal was $960. Therefore, using protein from alfalfa is an important cost containment practice. (Comment Number: APHIS-2007-0044-2308-2)

Response: APHIS acknowledges the comment. However, the input offered (that organic producers often do not use alfalfa as a cash crop) does not invalidate or negate any of the analysis and conclusions of the DEIS.

Comment Excerpt Text:
Chemical and petroleum based nitrogen fertilizer is not available to organic producers. Nitrogen is available in the form of animal manure but often not in sufficient quantity on a self-contained animal farm. Legumes like alfalfa are a good source of nitrogen for crops following alfalfa and accompanying it as in mixed hay and pasture. (Comment Number: APHIS-2007-0044-2308-3)

Response: In regard to alternative usage of crop products, see the response to comment APHIS-2007-0044-6769-5 for issue 3.4.

Comment Excerpt Text:
Because alfalfa is a perennial it has the potential through management to persist as a hay crop. The same is true of grasses grown with it. On our farm,
? On selling seed. Good practice but exactly how is it detected and contract terms enforced? In addition, this subject brings up something that was mentioned in the input comments to the EIS but not addressed by the EIS. A seed producer asked what action from the patent holder would follow if the producer had planted a non-GE alfalfa for seed and it was significantly contaminated (his question used 10% as an example) through no fault of his own. This question should have a second part: if the producer sells the seed it will be contaminated. He has nothing to force him to test for the genes. Will the sale be contested by the patent holder? The EIS is deficient in not addressing these questions. (Comment Number: APHIS-2007-0044-2308-4)

Response: APHIS acknowledges the comment. In regard to the legal liability for unintentional presence of GE content in non-GE crops, see the response to comment APHIS-2007-0044-6376-1 for issue 5.1.

Comment Excerpt Text:
In recent years, it is becoming more expensive to cover the costs of identity preservation and testing for our non-GE crops as the planted area of GE increases. That is why we welcome the decisions of the United States District Court in California and the United States Court of Appeals for the Ninth Circuit to ban the planting of GE alfalfa. The Courts determined that the planting of GE alfalfa can result in potentially irreversible harm to organic and conventional varieties of crops, damage to the environment, and economic harm to farmers. (Comment Number: APHIS-2007-0044-4904-1)

Response: APHIS acknowledges the comment. Regarding testing, see the response to comment APHIS-2007-0044-0693-1 for issue 5.9.

Comment Excerpt Text:
Estimation of GE-Sensitive Markets.
While the EIS states "We found no information on the possible size of the GE sensitive segment of the market for organic products." In 2005, and later in 2007, I estimated the GE sensitive markets for alfalfa hay to be between 3 and 5% of total production or acreage (Putnam, 2005, Putnam 2007). Nobody has since challenged this number. This is a combination of those who are philosophically opposed to GE, and hay importers who find GE alfalfa to be a logistical problem for them, and primarily consists of export growers and organic growers. The exporters already use hay lot segregation in most cases. Conventional dairy producers, which are likely to consume greater than 70% of national alfalfa, are definitely NOT highly sensitive to GE presence, having adapted a range of GE crops already, including GE corn, soy, cottonseed, BST, and GE rennet. It was clear then (as now) that the majority of the GE-sensitive market is export hay, not organic, especially in our western states, and particularly in specific regions, such as the Imperial Valley of California, and the Columbia Basin of WA-OR. This sensitivity is higher in these specific regions than in others. The EIS should acknowledge the potential size of the GE sensitive markets and the differentiation between export, domestic, organic, and seed markets. These impacts are also outlined clearly in the NAFA coexistence documents on these issues (see NAFA website).
In terms of export markets, Japan, the largest customer for US alfalfa, does not prevent the importation of GE alfalfa, and a few exporters have imported some alfalfa hay into Japan. However, export markets are one of the important GE sensitive groups. (Comment Number: APHIS-2007-0044-4913-5)

Response: APHIS acknowledges the estimates of GE sensitive markets for alfalfa hay and the sources referred to by the commenter were reviewed in the DEIS, as shown in the references for appendix S. Putnam (2005)[1] seems to understand market sensitivity as markets that "wish to maintain crops which are considered 'free' of biotech traits" and considers the entire organic market as being GE sensitive. The DEIS distinguishes between consumer's stated preferences

and market demand (as reflected in sales and prices), and found no evidence that organic sales would be eliminated under the possibility of unintended presence of genetically engineered material (see the response to comment APHIS-2007-0044-11018-5 for issue 5.6). However, in recognition of the importance of producer and consumer stated preferences, the FEIS expands this discussion and includes Putnam's estimates in discussing preferences for products free of genetically engineered material.

1. Putnam, Daniel. 2005. Market Sensitivity and Methods to Ensure Tolerance of Biotech and Non-Biotech Alfalfa Production Systems. Proceedings, 35th California Alfalfa & Forage Symposium, Visalia, CA 12-14 December, 2005. UC Cooperative Extension, Agronomy Research and Extension Center, Plant Sciences Department, University of California, Davis.

Comment Excerpt Text:
Social Aspects of Organic Farming. "The analysis found no GE-Sensitivity in domestic sales of organic alfalfa". I found this section to be curious, since it is abundantly clear that organic producers clearly do not want GE alfalfa to be present in their system. While GE detection per se does not disqualify their crop from certification per-se, according to NOP, growing non-GE crops is both a requirement of certification, and a strong preference of their consumers. If nothing else, the hundreds of comments reacting to the draft EIS should be used by APHIS to acknowledge this fact. The key issue is not whether the sensitivity is there, but whether simple steps can be taken to make sure that the introduction of a GT-crop by their neighbors would not significantly impact their ability to farm in the manner of their choosing – to maintain their organic certification, and to satisfy their customers that they are growing non-GE alfalfa. It's also curious why APHIS didn't consider the social aspects of export hay or export seed growers (which are a greater sensitive market than organic). (Comment Number: APHIS-2007-0044-4913-8)

Response: See the response to comment APHIS-2007-0044-4913-8 for issue 5.6.

Comment Excerpt Text:
The DEIS rationalizes the deregulation of glyphosate tolerant alfalfa by assuming that organic alfalfa growers will not be significantly affected by low levels of glyphosate tolerant DNA contamination in their crops. The authors of the DEIS incorrectly posit that organic certifiers, will allow the sale of alfalfa seed and hay crops known to be contaminated with glyphosate tolerant DNA because, "USDA organic certification is a process-based certification only; organic seeds or products are not certified according to genetic purity (p. 33)," and "… there is no policy regarding the unintended presence of GE material in organic products or food (p. 60)".
But from my experience working for an organic certifier, when the National Organic Program regulation is vague and does not explicitly lay out a policy, it is up to the organic certifier to make decisions based on the intent of the Organic Foods Protection Act, which ultimately guides organic producers to maintain the organic integrity of their products. I know that if an organic alfalfa hay or seed crop were to test positive for genetically modified DNA, it is likely that the organic certifier would work to prohibit the marketing and sale of the contaminated alfalfa hay or seed as organic. The certifier

would be within its legal right to block the sale of the contaminated crop and could face adverse action from the National Organic Program if it did not.
Organic Farmers cannot knowingly feed genetically modified forage crops to livestock or knowingly plant seed that is contaminated with genetically modified, glyphosate tolerant DNA because this violates the ethos of what it means to be an organic farmer—we are trying to grow pure food, forage, and fiber crops. Also, knowingly planting seed contaminated with genetically modified DNA violates the National Organic Program rule §205.105(e) that explicitly states that an organic farmer cannot produce organic products
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using excluded methods. Excluded methods has been defined in the National Organic Program regulation as "a variety of methods used to genetically modify organisms or influence their growth and development by means that are not possible under natural conditions or processes and are not considered compatible with organic production." Additionally, if the organic producer knowingly sold a contaminated crop as organic, he could be in violation of §205.100(c)(1) and be subject to a $10,000 penalty per violation. He also could get his organic certification suspended or revoked.
The DEIS states that, "although the probability is low, GT alfalfa genes may be found in non-GT alfalfa but cannot be considered a significant impact because, among other factors, contractual "best practices" have been found to produce non-GT alfalfa seed with >99.5 percent purity." Its impressive that "best practices" have been found to produce non-glyphosate tolerant alfalfa seed with >99.5 percent purity, but even 0.5% contamination with a prohibited material or excluded method can void the value of a certified organic hay or seed crop. Growing crops that can't be sold as organic is a significant impact for an organic farmer. Cross contaminated alfalfa crops would have zero value to organic buyers—no organic dairyman or organic seed buyer will buy alfalfa products known to be contaminated with genetically modified DNA, because it could put their organic certification at risk.
It is clear that if genetically modified alfalfa is deregulated, there could be serious economic consequences to organic growers unfortunate enough to have their organic alfalfa crops contaminated with nearby glyphosate tolerant pollen. But this was not seriously addressed by the DEIS because of the incorrect assumption that low levels of genetic pollution will have no serious impact to organic growers and would be tolerated by organic certifiers and organic consumers. There are more than 50 domestic organic certification agencies in the United States with practical experience working with the National Organic Program. If APHIS wants to have an accurate discussion of the potential socioeconomic impacts of deregulation caused by the inevitable crosscontamination of organic alfalfa with genetically modified DNA, then it should survey organic certifiers (www.accreditedcertifiers.org) about the potential consequences organic growers face if they knowingly sell crops contaminated with genetically modified DNA as organic. (Comment Number: APHIS-2007-0044-6769-2)

Response: See the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:

I am writing to express my objection to the APHIS Draft Environmental Impact Statement (DEIS) decision to allow deregulation of glyphosate tolerant (GT) alfalfa. The DEIS fails to adequately account for the adverse impacts deregulation will inflict on organic farmers. The DEIS rationalizes the deregulation of GT alfalfa by assuming that organic alfalfa growers will not be significantly affected by low levels of GT DNA contamination in their crops. Nothing could be further from the truth. The authors of the DEIS incorrectly posit that organic certifiers, will allow the sale of alfalfa crops known to be contaminated with GT DNA because, USDA organic certification is a process-based certification only (p. 33) and there is no policy regarding the unintended presence of GE material in organic products or food (p. 60). But from my experience, if an organic alfalfa hay or seed crop were to test positive for genetically modified DNA, it is likely that the organic certifier would work to prohibit the marketing and sale of the contaminated alfalfa hay or seed as organic. The certifier could face adverse action from the NOP if it did not. Organic Farmers cannot knowingly feed genetically modified forage crops to livestock or knowingly plant seed that is contaminated with GT DNA because this violates the ethos of what it means to be an organic farmer, and also violates the NOP rule 205.105(e) that explicitly states that an organic farmer cannot produce organic products using excluded methods. Additionally, if the organic producer knowingly sold a contaminated crop as organic, he could be in violation of 205.100(c)(1) and be subject to a $10,000 penalty per violation. He also could get his organic certification suspended or revoked. (Comment Number: APHIS-2007-0044-6769-8)

Response: Regarding the impact of unintended presence of genetically modified material in organic products under the National Organic Policy, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding the impact of testing, see the response to comment APHIS-2007-0044-0693-1 for issue 5.9.

Comment Excerpt Text:
In the draft Environmental Impact Statement (Docket No. APHIS-2007-0044) on genetically engineered (GM) alfalfa, the U.S. Department of Agriculture (USDA) has not taken the concerns of non-GM alfalfa farmers, like me, seriously. The preliminary determination to deregulate GM alfalfa without any limitations or protections of farmers, their markets or their ability to sow the crops of their choice, is irresponsible. (Comment Number: APHIS-2007-0044-6811-1)

Response: See the response to comment APHIS-2007-0044-11741-4 for issue 1.0.

Comment Excerpt Text:
Market Sensitivity

Organic Alfalfa Hay

APHIS notes that its “analyses found no GE-sensitivity in domestic sales of organic alfalfa; however, this does not mean that GE products are necessarily welcome by organic consumers or producers. It is difficult to empirically quantify GE-sensitivity in the domestic sales of organic alfalfa and by-products in the marketplace because: there are no governmental standards for GE content in organic products; organic standards are process-based, not product-based (organic

processes do not require a GE-free product); and researchers cannot quantify real-world preferences as consumers do not have the means to accurately discern between GE and non-GE products." DEIS at xvii; see also DEIS at 59-60, 131.

FGI notes that public comments submitted in this docket demonstrate that there is a segment of the domestic alfalfa market that is GE-sensitive. Sensitivities vary, ranging from zero tolerance to greater levels of tolerance.

(1) Zero tolerance: Comments in the record suggest that at least some organic consumers and producers have a very low tolerance for low level presence of GE traits and NOP prohibited pesticide residues. However, none of these commenters acknowledge the process-based organic certification process, or the inability to substantiate marketing claims of nil GT trait presence in non-GT alfalfa. Based on examples of other crops, extremely precautionary mitigations have prohibitively expensive costs that cannot scientifically document absolute purity claims needed to support nil tolerance market claims for any pesticide or other contamination. As noted earlier, the cost of effective organic hay producer mitigations are nominal (i.e., GT testing of planting seeds and routine hay harvesting prior to ripe seed stage). Hay testing to demonstrate that organically certified hay is without any detectable adventitious presence of GT alfalfa is possible and testing costs per lot are nominal; such testing could be easily provided to customers should this specific market opportunity arise for the organic hay producer.

(2) Other tolerance levels: Based on public comment and data on organic consumer and producer buying habits in the United States and globally, in the future, U.S. organic markets could adopt similar functional formal or informal market tolerance standards to those in Japan or the European Union (e.g., 0.9 to 5 percent tolerance). There is ample data to support the conclusion that U.S. organic alfalfa producers will be fully-enabled to grow crops of their choice with no to minimal (e.g., less than 0.5 percent) GT trait presence.

FGI recommends that APHIS also note in its discussion of GE-sensitivity, that both APHIS and Putnam (2005) have estimated that only 1 percent of the U.S. alfalfa hay market is organically grown, and that this total is used entirely as livestock feed; it is not directly consumed as an organic whole food by humans. Seed production for alfalfa sprouts is a very small specialized market channel, a subset of which is organic. According to Putnam (2005), organic hay is part of the approximately 3-5 percent of the U.S. alfalfa market that may be GE-sensitive. (Comment Number: APHIS-2007-0044-7620-30)

Response: APHIS acknowledges the comment. The EIS discusses GE sensitive markets both organic and conventional. APHIS agrees with the commenter that if "zero tolerance" means certainty of no GT-alfalfa presence in nonGE alfalfa that this standard is not verifiable. When both types of alfalfa are grown it is likely that in some cases cross-pollination, mechanical mixing, or seed dispersal could result in low levels of adventitious presence. The EIS does discuss production practices that can be used to reduce the likelihood of these types of events occurring and make it possible to produce seed for sensitive markets, even those that require testing for the presence of GE material.

Comment Excerpt Text:

Licensing GE alfalfa will likely cause greatest risk of financial loss to organic alfalfa and organic alfalfa seed producers. Since alfalfa sativa occurs in the wild in all state of the US, and is pollinated by bees which travel several miles in pollinating crops, pollen from GE alfalfa will be carried by bees to wild alfalfa in adjacent fields. The GE alfalfa genes will be spread most rapidly in warm California, Washington and Oregon, which have long growing seasons and produce a high percentage of US alfalfa and all its exported alfalfa. this wild alfalfa will become increasingly resistant to glyphosate, and therefore spread and persist as a long term weed(minimal life time 3 years, but often longer lived). The risk to organic growers in the west and midwest of contamination by bee and wind carried pollen from GE alfalfa will increase over time and be most significant in the west. Monsanto's analysis of the potential damage of this occurence on organic alfalfa growers is very faulty. Monsanto recognizes only the federal regulations affecting organic certification, not the more powerful market influence of known purity of crops. Organic growers have integrity about their production process, and would not knowingly sell GE contaminated alfalfa to organic dairy farmers. Many organic growers, and all organic seed growers, go beyond the federal regulations and pay to test their own alfalfa hay and alfalfa seed for GE contamination. My seed supplier, FEDCO, in Waterville, Maine, takes out of stock any GE contaminated seed, being too responsible to sell seed which might cause loss of product quality and potential product marketability to their customers. Any alfalfa hay producer, who tested his/her hay for GE alfalfa genes, would no longer be able to sell his hay as organic. This 40% loss in market value would be born by an ever increasing number of organic hay farmers, radiating out from the sources of GE alfalfa seed. This contamination issue alone, causing increasing economic loss to the fastest growing segment of agriculture, organic produce and hay, is the most powerful reason why GE alfalfa should never be licensed. The rights of organic farmers, who practice a greater discipline than conventional farmers, and are generally, through their reliance on ecology, organic matter, and micoorganisms to provide field fertility, model environmental stewards, would be stolen by use of GE alfalfa technology. Monsanto's argues it's GE alfalfa will increase profitability of conventional alfalfa hay producers three fold, by reducing the percentage of weeds in GE alfalfa hay, thus increasing it's price about 50%. This is highly doubtful, since other factors than weed percentage in the hay affect hay price, such as time of harvest, moisture level and field fertility. Why should conventional hay producers profits be increased at the high risk of decreasing, and possibly putting out of business entirely organic alfalfa hay producers? Many organic producers would not choose to produce conventional hay if their organic hay is contaminated, so they would lose their

occupation, since ethically and philosophically conventional
agriculture isn't an acceptable option for them. (Comment Number: APHIS-2007-0044-8725-4)

Response: Regarding the impact of unintended presence of genetically modified material in organic products, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding the economic impacts on non-GT and organic alfalfa producers, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In response to gene flow to and from feral alfalfa, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0. In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
Furthermore, there will be significant adverse economic impacts in the alfalfa hay markets. As indicated in the EIS (p. 37), over 204,000 acres of organic hay are grown in the U.S. Given an organic price premium of over $18 for organic hay (DEIS at p. 49 (common place for organic feed stuff to sell for at 10 to 30 percent premium)), once GE alfalfa contaminates and therefore displaces organic hay production, lost organic hay premiums will exceed $11 million. (Comment Number: APHIS-2007-0044-9936-15)

Response: APHIS acknowledges the comment; however, the analysis reported in the DEIS does not support your conclusions. APHIS does not expect GT alfalfa to displace organic production, nor for the organic premiums to remain the same with GT alfalfa deregulation (they might increase or decrease, depending on shifts in supply and demand).

11.13 Issue 11.13-T – Downstream Markets

Comment Excerpt Text:
Impact on Livestock Farmers

Since most of the organic alfalfa is fed to livestock the impact of the introduction of GE alfalfa will have a substantial impact on livestock producers. The loss of organic alfalfa will have the following impacts, 1) growers will lose the 18-20 percent organic premium, 2) the price of organic hay will go up, 3) livestock farmers feeding organic hay will lose organic certification on livestock products, 4) growers will be forced to genetically test every lot of crop – which is expensive, 5) livestock producers will lose organic markets and be forced to go out of business or make adjustments which will reduce income.

Loss in Organic Dairy Premium

A majority of the organic alfalfa goes into organic livestock production, particularly dairy operations. The introduction of GE alfalfa will have severe economic repercussions for the organic livestock industry particularly the organic dairies and organic dairy cooperatives. One of the largest organic cooperatives in the U.S., The CROPP Cooperative has 941 farms, 699 of which are dairy farms. The rest are organic meat or pork operations. In 2006, CROPP Cooperative marketed $287 million in dairy products and $7.8 million in organic meat products. Lastly, farmer members of the CROPP Cooperative received $28.47 per hundredweight for milk in 2006. In 2006, the average milk price was $13.04 (see Siemon declaration).

The USDA 2008 Organic Production Survey (USDA-NASS, 2010) details organic milk production of the U.S. Table 4 details some of the dairy numbers that are presented in the survey.

Table 4. Organic Dairy Production of the United States, 2007.

Dairy farms number:2,012
Milk production (cwt):27,571,355
Milk sales ($):$750,148,971
Revenue per farm:$372,837
Organic milk price per cwt:$27.21
Conventional milk price*:$19.02
Diff. In milk price:$8.19
Percent difference:43%
Total organic milk premium $225,741,802
* Note - The average 2007 US producer mailbox price for milk was taken from the Cleveland Federal Milk Order.

Table 4 shows that the average organic milk premium in 2007 was $8.19 per cwt (or 43%) over the conventional price of $19.02. The introduction of GE alfalfa into the US dairy sector would place all organic milk premiums at risk. At 2007 organic premium levels, the total organic premium is $225,741,802. Since most organic alfalfa is an input organic livestock particularly the dairy sector, the $255 million dollar figure captures the lost value of the organic alfalfa. (Comment Number: APHIS-2007-0044-10172-10)

Response: APHIS acknowledges the comment; however, the analysis done in the Draft EIS does not support your conclusions. Regarding impacts of unintended presence of genetically engineered material in feed on organic certification of dairy and meat, see response to comment APHIS-2007-0044-11689-2 for issue 5.6. Regarding impacts on organic and downstream markets, see response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding the need for testing for presence of GT alfalfa material for access to sensitive markets, see response to comment APHIS-2007-0044-0693-1 for issue 5.9.

Comment Excerpt Text:

Consuming milk and meat from animals fed crops that are genetically engineered is also risky. In a survey of milk products sold in stores in Italy, results from the screening of 60 samples of 12 different milk brands demonstrated the presence of GM maize sequences in 15 (25%) and of GM soybean sequences in 7 samples (11.7%). (Comment Number: APHIS-2007-0044-11034-4)

Response: APHIS acknowledges the comment. In regard to human health impacts, see the response to comment APHIS-2007-0044-11034-2 for issue 6.1.

Comment Excerpt Text:
Alfalfa is a particularly useful rotation for organic hay producers, particularly dairy farmers,

because of its beneficial crop rotation properties, including its ability to fix nitrogen. The effect of
deregulation of GT alfalfa in terms of contamination potential will remove this critical tool from the
toolbox of organic producers. The use of alfalfa in organic systems demands that organic farmers have
confidence in their ability to keep their crops GE free. When growing alfalfa becomes a high-risk for
GE contamination of crops and fields, as it surely will given its long distance cross-pollination potential,
organic farmers in areas within three miles or less of conventional alfalfa production will be more likely
to eliminate alfalfa from their rotation, increasing their production costs, and decreasing the
sustainability of their operations. Alfalfa is critical winter forage for many organic dairy
producers and its loss as a part of a balanced homegrown ration on small family organic dairy farms has the potential to
drive many of these farms out of business. Much of the dairy industry is at a critical threshold right now
and the loss of even a few small farms in certain geographic areas could lead to localized industry
collapse. Dairy farms represent major sources of local food security and their loss will impact the
landscape, local economy and food production capacity of their regions immensely, but none of this is
explored in this economic analysis.

Additionally, the calculations of organic dairy and beef demand for alfalfa fail to take into
account farmers in transition to organic production practices. The trend in organic production is steeply
upwards,[Footnote 26: DEIS at 57, Table 3-16.] even without reflecting the acreage in transition.
(Comment Number: APHIS-2007-0044-11741-9)

Response: APHIS acknowledges the comment. The analysis done in the Draft EIS supports
your comment of a growing organic market. However, the analysis does not support your finding
regarding the impact of GT alfalfa deregulation on organic dairy markets. Regarding this issue,
see response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Organic dairy has been one of the leading sectors of growth in organic foods for the past two
decades. Alfalfa is the main forage for the dairy industry including organic dairy products. The
USDA's proposed deregulation of GE alfalfa will have significant consequences for the entire
organic industry. It would also eliminate the future possibilities for food service companies in
universities, schools, and hospitals to serve organic dairy or certified sustainable dairy products
that do not use GMO feed (for example, see the work of the Food Alliance in the Oregon. They
work with certified sustainable farmers who are verified for their sustainable farming practices
including the exclusion of GMO seeds or feed.) (Comment Number: APHIS-2007-0044-11788-

3)

Response: APHIS acknowledges the comment. The analysis done in the Draft EIS supports your comment of a growing organic market. However, the analysis does not support your finding regarding the impact of GT alfalfa deregulation on organic dairy markets. Regarding this issue, see response to comment APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
Nowhere in the EIS is there mention of producer preference per se for non-GE feed for his cattle – that is, not solely driven by market or the NOP. This would include anyone not convinced of the safety of the modified proteins found in GE feed/food. (See page 33 of EIS.) There is a long list of studies that say it's no different than other proteins found in foods but there is a list (shorter) of compelling studies that say differently. With the emergence of epigenetic research the whole subject becomes even more important. Therefore, some elect to stay with traditional feed/food and avoid the risk. With approval of GE alfalfa this choice will be taken away as conventional alfalfa is significantly contaminated. (Comment Number: APHIS-2007-0044-2308-12)

Response: APHIS acknowledges the comment. Regarding the demand for conventional alfalfa, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
The EIS discussion of organic alfalfa seed doesn't fit with reality. On pp 53, T12 & T13, the study implies that there are so few sources of organic seed that organic farmers use non-organic seed free of prohibited coatings. (The EIS leaves out a crucial proviso: there can be no GMO's in such seed.) I have four local sources of organic alfalfa seed. I have purchased certified organic alfalfa seed for six years without difficulty. Attachments 1 and 2 are lists of seed producers and suppliers who have alfalfa seed. Of course there are few suppliers; only 3,000 acres of organic alfalfa were seeded last year. And it is true that there are fewer varieties available than for non-organic alfalfa. However, the most important attributes from variety differences are winter hardiness, pest resistance and disease resistance; there is an array of these attributes that along with good management make these seed varieties quite sufficient for organic systems.
I am extremely concerned that if Glyphosate-Tolerant GE alfalfa is de-regulated that American and Canadian alfalfa seed sources will be contaminated so much as to mean alfalfa can no longer be certified organic and, for that matter, anyone electing to use non-GE alfalfa will no longer have that choice. I will be faced with some very painful alternatives. One alternative is to keep alfalfa in our system but give up organic certification. This means a 30% reduction in revenue with the same cost – not really a solution. Another alternative is to move to other forage legumes that can be certified organic. This will result in our needing about 40% more land to keep the same revenue (the difference in yield from alfalfa to the next best: red clover.) It would also result in

more establishment events and increased possibility of erosion because these other higher yielding legumes are not perennials. (Comment Number: APHIS-2007-0044-2308-13)

Response: APHIS acknowledges the comment. Regarding the impacts on organic alfalfa markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0 and note that the analysis of seed markets is expanded in the FEIS. In regard to erosion, see the response to comment APHIS-2007-0044-11037-28 for issue 7.1.

11.14 Issue 11.14-U – Alfalfa Traits (Monsanto data)

11.15 Issue 11.15-V – Marketing and Seed Purity

Comment Excerpt Text:
Roundup Ready gene. We know there is a lot of alfalfa that is contaminated out there and it is being sold and you're going to be planting it on the farm. So when you experience the problems with it, who are you going to sue? Who's responsible for that? The only law we can use on that is the general trespass law. That definitely is a trespass in the area of dominion when you get something on your farm that you don't want."
This same issue happened to canola and the worst thing happened. Monsanto took over these small companies that were producing canola seed because they got that genetic Roundup Ready in their seed from blowing off their trucks. How are you preventing this from happening to the hay grower? I don't want to lose an independent seed producer because I want to be able to buy seed from somebody other than Monsanto. I don't want to buy expensive seed if I can buy cheaper seed from a little guy without the advertisement or television. (Comment Number: APHIS-2007-0044-0933-22)

Response: APHIS acknowledges the comment. In regard to seed market concentration, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0. Regarding legal liability for unintended presence of genetically engineered content in alfalfa fields, see response to comment APHIS-2007-0044-6376-1 for issue 5.1.

Comment Excerpt Text:
Monsanto versus Farmers
Institute of Science in Society
April 28,2005
http://www.i-sis.org.uk/MonsantovsFarmers.php
Odds stacked against farmers
Feudalism has returned to farming in the US and Canada, according to the US Center for Food Safety's report detailing the domination over American staple crops by the corporations and their ruthless prosecution of farmers.
Once the ink is dried on the "technology agreements" signed by the farmers buying genetically modified (GM) seed, they enter into contracts that effectively relinquish to Monsanto their right to plant, harvest and sell the GM seed. From that moment on, they are also vulnerable to harassment such as having their property investigated, litigations and out of court settlements that are part and parcel of licensing a Monsanto patented product.

No grower is safe from this onslaught as third generation Canadian farmer Percy Schmeiser discovered when he lost to Monsanto in court for failing to pay royalties on GM canola seed that had contaminated his non-GM canola crop. "The corporations are becoming the barons and lords, which are what my grandparents thought they had escaped." Schmeiser said.
Contamination of conventional seed stock
Researchers at the University of Manitoba, Canada tested 33 samples of certified canola (oilseed rape) seed stock and 32 were contaminated with GM. The Union of Concerned Scientists tested traditional US seed stocks of corn, soy and canola and found 50% corn, 50% soy and 83% canola contaminated by GM.
One hundred percent purity is no longer achievable, and even if non-contaminated seed could be purchased, some contamination can take place in the field either by transfer of seed by wind, animals or via farm equipment.
Monsanto dominates the sale of seed stocks yet puts the onus of finding markets for crops on the farmer. Within their contract is the "Technology Use Guide" which gives directions on how to find grain handlers willing to accept crops not approved for use in the EU. While Monsanto acknowledges that pollen flow and seed movement are sufficient to contaminate neighbouring non-GM fields their implicit rule is that "the growers of the non-GM crops must assume responsibility and receive the benefit for ensuring that their crops meet specifications for purity." (Comment Number: APHIS-2007-0044-0933-23)

Response: APHIS acknowledges the comment. In regard to legal liability for unintended presence of genetically engineered content in alfalfa fields, see the response to comment APHIS-2007-0044-6376-1 for issue 5.1.

Comment Excerpt Text:
As a sales manager for a major California forage seed company for over 21 years, I am personally responsible for about 50 alfalfa growers (about 14,000 acres) in three major alfalfa growing counties. I am not a scientist, nor do I wish to be one. However, I have sold dormant and non-dormant RR alfalfa seed and monitored its profitability. Aside from a couple growers who think spraying their alfalfa fields 3-4 times a year with Roundup will cure all their ills; well over 90% of my growers are not interested in using RR alfalfa and are afraid of weeds becoming Roundup tolerant such as the pig weed in the southern cotton states. The main demands of my customers are No.1) yield, No.2) quality, and No.3) persistence. I have not seen any advantage evidence of these in any RR alfalfa variety. In the wishes of my customers, I believe we can be good stewards of our valley soils with the excellent tools available now. Hopefully; if Roundup Ready Alfalfa is approved, seed producers will be able to maintain conventional and organic production without a lot of extra costs and hurdles. Perhaps this is a better question for consumers of the end product; milk and beef. If RR alfalfa is marketed in the future, I feel it would be my responsibility to make growers aware of all possible negative effects on that crop. (Comment Number: APHIS-2007-0044-0933-26)

Response: APHIS acknowledges the comment. In regard to the impact on conventional and organic alfalfa markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to impacts on beef and dairy markets, see the response to comment APHIS-2007-0044-

9882-1 for issue 5.0. In regard to the evolution of glyphosate-resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for issue 3.6.

Comment Excerpt Text:
Additionally, USDA acknowledges that GE alfalfa may contaminate organic and conventional alfalfa, but claims that Monsanto's seed contracts require measures sufficient to prevent such contamination, and that there is no evidence to the contrary. But in the lawsuit requiring the EIS, the Court found that GE contamination had already occurred in the fields of several Western states with these same business-as-usual practices in place. In fact, contamination of organic and conventional seeds and crops is widespread and has been documented around the world. A recent report documented 39 cases in 2007 and more than 200 in the last decade. The harms incurred by farmers and food companies from GE contamination are many and include: lost markets, lost sales, lower prices, negative publicity, withdrawal of organic certification, expensive testing and prevention measures, and product recalls. Looking to Monsanto to protect farmers from contamination by their own product is a complete abdication of USDA's duties, akin to leaving the fox to guard the hen house. (Comment Number: APHIS-2007-0044-10002-2)

Response: In regard to the impact of the unintended presence of genetically engineered material in non-GT alfalfa on conventional and organic alfalfa markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. In regard to the impact of adventitious presence on organic certification, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to adventitious presence in seed stock, see the response to comment APHIS-2007-0044-9936-7 for issue 3.3.

Comment Excerpt Text:
The draft EIS states that the supply of organic alfalfa hay and seeds would not be directly affected by the adoption of GE alfalfa by non-organic producers of GE alfalfa (Chapter IV, page 133). In addition, the EIS on page 60 states that there is no policy regarding the unintended presence of GE material in organic products or food. The draft EIS assumes that the alfalfa industry is segregated into two separate subparts – forage growers and seed growers. As such, it is assumed that genetic contamination would be limited. The reality is that a majority of alfalfa growers grow both forage and seed. In addition, the report assumes that borders and area boundaries will be sufficient to prevent genetic contamination of organic alfalfa. These statements overlook the fact that when GE canola was introduced to Canada that the organic canola market disappeared. The transgenic contamination of crop plants causes market rejection in the organic food industry. (Comment Number: APHIS-2007-0044-10172-2)

Response: In regard to past episodes of adventitious presence, see the response to comment APHIS-2007-0044-9936-10 for issue 11.15. In regard to the low level presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response). In regard to the impact of adventitious presence on organic certification, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to the impact on conventional and organic alfalfa markets, see the response to APHIS-2007-0044-9882-1 for issue 5.0.

Comment Excerpt Text:
The immediate impact of the introduction of GE alfalfa would be the seed supply. In the draft EIS, Section 2.2 detailed the possible consequences of genetic contamination. In addition, the loss of pure seed will result in loss of certification and reduced prices. Many growers have expressed concern about the economic losses that would accrue to their operations should GE alfalfa be approved (see Asumendi, Holtz, Schmaltz, Briggs, Baxter, Nichols, Meyer, Makegard, and Johnson declarations).

In the U.S., alfalfa seed was grown on 121,467 acres (2007 Census of Agriculture) producing approximately 62 million tons of seeds at an average productivity of approximately 510 lbs/ acre. A majority of the alfalfa seed is grown in California, Washington State, and Idaho.

If GE alfalfa is approved, pure GE free alfalfa seed would be harder to procure. If widespread genetic contamination occurs then all export and organic alfalfa hay acres would be severely impacted and likely disappear. In 2006, organic alfalfa was grown on 204,380 acres. The exported alfalfa hay market represents the equivalent production of approximately 204 thousand acres (page V-15, EIS).

Assuming that 12 pounds of seed per acre is planted and assuming $1.50 per pound for cost of seed, the loss in seed revenue for seed to be planted on organic and export alfalfa acres is shown in Tables 2 and 3.

Table 2. Planted Seed Revenue Loss Due to Loss in Organic Alfalfa Acres

Organic Acres: 204,380
Seeding Rate (lbs/acre):12
Total Pounds:2,452,560
Seed Cost ($/lb):$1.50
Revenue Loss ($):$3,678,840

Table 3. Planted Seed Revenue Loss Due to Loss in Export Alfalfa Acres

Export Alfalfa Acres: 204,000
Seeding Rate (lbs/acre):12
Total Pounds:2,448,000
Seed Cost ($/lb):$1.50
Revenue Loss ($):$3,672,000

The loss of planted seed revenue on organic acres and export trade acres as a result of GE alfalfa introduction will result in economic impacts of $3,678,840 and $3,672,000, respectively. (Comment Number: APHIS-2007-0044-10172-8)

Response: APHIS acknowledges the comment. The analysis reported in the DEIS does not support the statement that unintended presence of genetically engineered material in non-GT alfalfa would lead to the disappearance of organic and export alfalfa hay.

Comment Excerpt Text:
Consumer Preferences and Marketing Standards
While gene flow and associated mitigation measures are discussed in the DEIS, the Agency has chosen to not include an alternative that would attempt to restrict gene flow. Such an alternative would not be a realistic or practical alternative for operations in a farmer's field or any other biological system. In other words, gene flow from cultivated crops is a natural phenomenon that does not have a significant environmental impact and a "zero tolerance" standard can not be supported legally or scientifically—whether plants being grown are conventional, organic or genetically engineered. While it may be appropriate to discuss consumer preferences and marketing standards in an EIS, it would not be appropriate to include an option to address these issues. In fact, such a fully developed alternative would be inconsistent with the Agency's preliminary determination of non-regulated status for alfalfa genetically engineered for tolerance to glyphosate.
The Federal Seed Act and state laws govern seed purity standards in the U.S. and are intended to assure purchasers that the seed they buy will meet designated levels of purity. Recognizing the reality of growing crops in a biological system, none of these standards attempt to guarantee absolute purity. The decision to market seed according to a standard more stringent than federal and state law is a purely economic, marketbased choice, not one required by statute or based on environmental impact.
Those growers who believe it will be in their economic interests to maintain a more stringent standard will take the necessary steps to meet the demands of their alternate markets. This is not an environmental impact and once a genetically engineered plant has successfully completed the necessary federal regulatory requirements, there is no environment, health or other safety basis for restrictions for the movement of these plants. The preference that some have for crops produced without the use of modern biotechnology may arise from a personal choice or perceived unrealized risks to human health or the environment. Notwithstanding years of intensive governmental, academic and commercial oversight, there is no evidence to suggest that such risks have been realized. Accordingly, such risks are wholly speculative. The fact that a market exists for personal choice or for those who are concerned about such risks does not bring those risks within the realm of the physical environment that NEPA was intended to address. (Comment Number: APHIS-2007-0044-10725-3)

Response: APHIS acknowledges the comment. See response to comment APHIS-2007-0044-10866-7

Comment Excerpt Text:
The EIS states that stewardship practices laid out in organic system plans and Monsanto's "best practices" are sufficient to minimize cross-fertilization between organic and GE crops (p. 103).

This statement regarding cross-fertilization places the burden of protecting the integrity of organic seeds, agricultural products, and markets solely on the shoulders of organic producers. This is an imbalanced and unfair burden. There needs to be mandatory regulation and enforcement of "best practices" for growers and patent holders of GE crops. The extent to which organic and non-GE seed is contaminated by GE material is unknown because it has not been comprehensively examined.

Roundup Ready alfalfa can enter a farmer's field through several routes. Not only can transgenic material travel from a neighboring farm via wind or pollinating insects, volunteer plants – crops that persist without deliberate cultivation – can show up in fields a year or more after the original crop was grown. Alfalfa seed has a high percentage of "hard seed" which can remain dormant in the ground for years before germinating. The perennial nature of alfalfa makes containing the Roundup Ready trait even more difficult.

The EIS assumes that commercial growing and harvesting of Roundup Ready alfalfa will always occur under ideal conditions, and contends that alfalfa is "typically" harvested before 10% bloom. Yet several factors keep farmers from harvesting at this ideal time, including poor weather. Farmers cannot always avoid hay stands going to bloom and producing viable pollen. Instead, the burden of protecting alfalfa plants and sensitive markets from transgenic traits, such as planting buffer areas, is completely transferred to the producer of organic and non-GE alfalfa. Tests already reveal contamination of non-GE alfalfa. In these cases, segregation distances have proven ineffective. In December 2006, just over a year after Roundup Ready alfalfa was commercialized, the Idaho Alfalfa and Seed Clover Association reported that Roundup Ready alfalfa traits were found in conventional alfalfa seed in Montana, Wyoming, and Idaho, including foundation seed, which contained enough transgenic material to deem it useless as seed stock. This foundation seed was two miles
from the nearest Roundup Ready field. Also in 2006, the Colorado State University Extension tested feral alfalfa plants at 23 sites in Mesa County along roadsides, abandoned fields, and edges of active hay fields
within two miles of Roundup Ready alfalfa seed fields. Transgenic gene flow was found at 83% of the collection sites. (See Hammon study attached below.) Complete segregation of Roundup Ready and organic and other non-GE alfalfa varieties is simply unlikely.

Most recently, Cal/West Seeds reported significant Roundup Ready alfalfa gene flow, including in areas where there was no seed production. The article (attached below) says this testing shows how easily the gene can spread, including hay-to-seed transmission. Given this evidence, APHIS should comprehensively examine the extent to which contamination has already occurred. At least 200,000 acres of Roundup Ready alfalfa planted commercially before the court's ruling, as well as a number of experimental field trials. Once seed is contaminated, contamination expands along the entire chain of
production, from seed to crop to final product. Collecting this data would inform this decision-making process and provide useful information to conventional and organic alfalfa producers.

The EIS should analyze the economic costs of contamination to producers of organic, natural, and conventional alfalfa seed, hay, sprout, honey, livestock, meat, milk, and other foods. The impact of widespread contamination of organic alfalfa hay by GE alfalfa must take into effect the availability of organic feed for dairy cattle (and other organic livestock producers), the costs to organic dairy farmers and the organic dairy industry, as well as the price of organic milk to consumers. (Comment Number: APHIS-2007-0044-12044-2)

Response: In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.
In regard to hard seed in alfalfa, see the response to comment APHIS-2007-0044-10157-4 for issue 3.2.
In regard to adventitious presence in seed stock, see the response to comment APHIS-2007-0044-9936-7 for issue 3.3.
In regard to the burden of control measures, see the response to comment APHIS-2007-0044-11689-10 for issue 9.0 (paragraph 1 of the response).
In regard to the impact on conventional and organic alfalfa markets, see the response to APHIS-2007-0044-9882-1 for issue 5.0. In regard to impacts on downstream markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0.
Discussion of the CalWest and Dairyland data have been added to the FEIS in appendix V 5.1.1.

Comment Excerpt Text:
The EIS also says USDA organic certification would not be affected given that organic certification does not require testing for GE content and focuses on the process used to grow the product rather than on the content of the product (p. 133).
This statement completely dismisses organic farmers and consumers' demand for non-GE seed and food. When organic farmers purchase organic seed they expect it to be free of all GE material since GE traits are specifically excluded from the National Organic Program (USDA NOP 7CFR 205.105(e) and 205.204). Knowingly planting seed with GE traits could threaten certification, as well as further contaminate organic farmers' crops.
In fact, USDA's own Inspector General and the U.S. Government Accountability Office have both published reports noting that the current regulatory framework for GE crops fails to contain and segregate GE and non-GE crops. [Football 9: USDA, Office of Inspector General. 2005. Audit report: Animal and Plant Health Inspection Service controls over issuance of genetically engineered organism release permits, www.usda.gov/oig/webdocs/50601-08-TE.pdf] This means the entire burden of protecting the integrity of organic products will continue to be on the shoulders of organic farmers. The conclusions of the EIS do not provide adequate protection from seed contamination, and sets a dangerous precedent that would undermine the integrity of the organic seed supply of all types of crops for which there are GE crop counterparts.
The EIS completely ignores organic farmers and consumers' desire – and right – to grow GE-free agricultural products, and poses a conflict with the National Organic Program's federal regulations excluding GE by creating conditions in which organic seed, free of any and all GE contaminants, will increasingly become difficult if not impossible to source.
In the event an organic farmer detects GE material in his organic products, he must choose between maintaining the integrity of the organic market by sending it to the conventional market or knowingly sending the GE product to the organic market. Both options place this farmer in a vulnerable and awkward position. In the first scenario, he loses a premium price for his product. In the second, he further risks the credibility of the organic label. (Comment Number: APHIS-2007-0044-12044-4)

Response: In regard to consumer preference for products with no genetically engineered content and the National Organic Program, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6. In regard to the burden of control measures, see the response to comment APHIS-2007-0044-11689-10 for issue 9.0 (paragraph 1 of the response).

Comment Excerpt Text:
The NOFA website highlights
USDA findings that GE alfalfa will cause production to shift to larger farms
that can afford built-in isolation distances [Footnote 3: Northeast Farming Association.
http://www.nofa.org/policy/alfalfa.php]. As organic and small farms
are essential to our communities, our health and our country, they
need the protection from the USDA to support their farming decisions
to farm without GE crops or feed. They need the USDA to create laws
that protect them from big seed companies like Monsanto and the
inevitable cross-pollination from GE seeds that would take place.
Next we need to consider the impact of GE crops to the consumer.
Consumers buying organically labeled foods should be confidant that
GE products were at no stage introduced in the cultivation of the crop
or animal. If the natural seeds were contaminated, the end product
would still be tainted and completely undesirable to consumers
choosing non-GE products. I, like so many consumers, would not buy
products that at any stage were GE contaminated. (Comment Number: APHIS-2007-0044-12261-2)

Response: APHIS acknowledges the comment. In regard to the impact on small farms, see the response to comment APHIS-2007-0044-4913-7 for issue 5.1. In regard to consumer concern for adventitious presence in organic products, see the response to comment APHIS-2007-0044-11689-2 for issue 5.6.

Comment Excerpt Text:
As harvest is coming to a close and equipment is being winterized, growers finally have a chance to sit down and review the year as well as put a pencil to how the crops did in 2006. This Idaho Alfala/Clover seed growers association thought this would be a good opportunity to bring growers up toe speed on the latest developments in the Alfalfa Seed Industry.
The Association of Official seed certifying Agencies (AOSCA) is currently aiding a recommendation under advisement that would change the genetics purity level of Certified alfalfa seed. Certified alfalfa seed isolation distance is currently set at 185 feet with expacted purity being 99.0%. Due to some recent research conducted by Dr. Lany Taurber at University of California Davie, it indicates that this level of purity is not practical and should be change dto 98.5%. This change would give the consumer better representation of the seed that is being purchased but should not have any effect for seed growers regarding cleanouts. The only exception to this would be genetic purity relating to Roundup Ready contamination in a non-Roundup ready alfalfa seed.
[Distance Gene Flow table] (Comment Number: APHIS-2007-0044-12348-1)

Response: APHIS acknowledges the comment. The FGI-BMP require isolation distances much larger than 185 feet. APHIS includes this stewardship plan as well and the 2010 AOSCA recommendations for growing seed for GE sensitive markets in our analysis. In addition, APHIS has included an additional alternative, which uses isolation distances and geographic restriction to segregate GT alfalfa and conventional alfalfa seed production. Each of these are designed to meet different thresholds for GT alfalfa offtypes in other alfalfa varieties.

Comment Excerpt Text:
The Nevada Organic Advisory Council has a long interest in GE (genetically engineered) crops, and in 2008 had written a letter to the Nevada Department of Health, requesting them to initiate a study of the safety of such crops. Please refer to the attached letter, which effectively states our position on the matter.
Since the 2008 letter, we have continued to follow various scientific and economic research studies on GE crops, further adding to our convictions in the following areas:
1) In December, 2009 the Organic Center published a study entitled, "The Magnitude and Impacts of Biotech and Organic Seed Price Premiums," in which they conclude that GE seeds will result in "markedly higher costs with little or no impact on crop yields and income in most years. The biotech premium is much larger than the organic seed premium, and is likely to grow larger still, in step with the steep upward trajectory of GE seed prices." (Comment Number: APHIS-2007-0044-6353-2)

Response: APHIS acknowledges the comment. The DEIS compared costs and returns of GT and non-GT alfalfa in appendix K, based on existing studies. As explained in appendix K of the DEIS, these comparisons were illustrative and not applicable to all situations, but were useful in informing the analysis of potential scenarios under deregulation of GT alfalfa. The analysis of impacts of GT alfalfa deregulation on seed markets was done in appendix S of the DEIS and expanded in the FEIS to include references provided by comments, when applicable.

Comment Excerpt Text:
Organic Hay Production

As discussed in Section A (Timing of Alfalfa Hay Harvest), and in Putnam (2006) [Footnote 8: Putnam, D. 2006. Methods to Enable Coexistence of Diverse Production Systems Involving Genetically Engineered Alfalfa. Agricultural Biotechnology in California Publication 8193. University of California. http://anrcatalog.ucdavis.edu/Alfalfa/8193.aspx (cited at DEIS, App. V at V-94).], by simply using planting seed that is free of the GT trait, and harvesting an organic or non-GT hay field before the ripe seed stage, an organic or non-GT hay producer can guarantee the non-GT status of a hay crop independent of the actions of neighboring GT alfalfa hay or seed producers or the presence of feral alfalfa. Many organic livestock and crop producers are already planting non-GE planting seeds for their organic corn and organic soybean feed crops so this is an effective, reasonable cost and familiar practice for organic producers.

By routinely cutting hay before the ripe seed stage or earlier, when it is nutritious for livestock, there will be no effective gene flow into the organic or non-GT hay field because gene flow is not possible when the non-GT plant does not produce seed. The effort required by an organic producer to mitigate all possibility of gene flow from GT alfalfa is simple: routine timely hay cutting. The practice of harvesting hay at 10 percent flower and prior to the ripe seed stage is recommended for all alfalfa forage producers, including organic producers. Therefore, there would be no incremental cost to harvesting before the ripe seed stage because harvest of nutritious forage is already factored into the organic farm plan. In comparison to other organic plan mitigations, such as plans to avoid pesticide drift from neighbors, cutting hay prior to ripe seed stage is simpler and has zero or nominal incremental costs.

Most seed companies providing alfalfa seed to organic hay producers will routinely conduct analysis for the low level presence of the GT trait and provide that information to the producer on request. The means are also available for grower testing for the presence of the GT trait in planting seed. APHIS has correctly stated that third-party seed testing costs are approximately $25 to $250 per sample depending upon the type of test procedure. A more economical alternative (approximately $2 per sample) is self-testing using a small coffee grinder to process a seed sample in conjunction with one of the manufactured CP4 protein test strips, which detect the GT trait [Footnote 9: Protein-based detection kits for alfalfa tissues are simple to operate and commercially available from Strategic Diagnostics, Inc. (www.sdix.com) and Envirologix, Inc. (www.envirologix.com). Seed and hay testing protocols have been developed and validated by the manufacturers and third-parties as follows. For seed test kits, see: Teuber, L., S. Mueller, A. Van Deynze, S. Fitzpatrick, J. Hagler, and J. Arias, 2007. Seed-to-Seed and Hay-to-Seed Pollen Mediated Gene Flow in Alfalfa. Pages 12-13, in Proceedings of the Gene Flow Symposium of the North Central Weed Science Society Annual Meeting, Dec. 12-13, 2007, St. Louis, Missouri (cited at DEIS, App. V at V-95). For hay kits, see: Woodward, W.T.W. 2006. Roundup Ready alfalfa test kits and influence on the marketplace. Proceedings of the Washington State Hay Growers Association Annual Conference, January 18-19, 2006, Kennewick, Washington, and, Woodward, W.T.W., D.H. Putnam and P. Reisen. 2006. A solution for Roundup Ready Alfalfa in sensitive export markets (Poster) Proceedings of the Washington State Hay Growers Association Annual Conference, January 18-19, 2006, Kennewick, Washington. (cited at DEIS, App. V at V-97). The accuracy of the hay test method has been validated using both cored and ground forage samples from hay that was grown with different levels of adventitious presence. See Putnam, 2006; see also DEIS, App. V at V-46, V-71.]. (Comment Number: APHIS-2007-0044-7620-25)

Response: APHIS acknowledges the comment. References provided in comments to the DEIS were revised and incorporated to the FEIS when containing new and relevant information relevant to the analysis.

Comment Excerpt Text:
Export Hay Production

Although GT alfalfa has been deregulated for hay import in Japan, Taiwan and South Korea (the countries with the largest import of U.S. produced hay) there may be individual customer

preferences that sometimes dictate testing of exported hay for low level adventitious presence. Most hay sold for export is above average quality, and therefore, it is typically harvested before the ripe seed stage, eliminating the potential for gene in-flow from neighboring GT hay, feral or seed field sources [Footnote 6: NAFA. 2008. Coexistence for Alfalfa Hay Export Markets. NAFA Coexistence Document. Adopted June 2008. Available at http://www.alfalfa.org/pdf/CSExportHay.pdf (accessed Feb. 24, 2010).].

As discussed above, export hay producers should plant non-GT seeds and harvest their hay before the ripe seed stage. Hay exporters have historically segregated their hays by lot. Hay is not a fungible commodity. Each sale lot is separately tested for forage quality, including color, presence of weeds, rain damage, dirt or mold. See DEIS, App. V at V-9. Therefore, there would be nominal new costs related to lot segregation or identification following the deregulation of GT alfalfa because hay exporters already incur these costs for non-GT exported hay.

In addition to the seed testing options and costs discussed above, protocols for testing for the presence of the GT trait in alfalfa hay have been developed; the test strips are commercially available and are currently widely used by hay exporting companies. As discussed above, these test kits are available for approximately $2 per sample [Footnote 9: Protein-based detection kits for alfalfa tissues are simple to operate and commercially available from Strategic Diagnostics, Inc. (www.sdix.com) and Envirologix, Inc. (www.envirologix.com). Seed and hay testing protocols have been developed and validated by the manufacturers and third-parties as follows. For seed test kits, see: Teuber, L., S. Mueller, A. Van Deynze, S. Fitzpatrick, J. Hagler, and J. Arias, 2007. Seed-to-Seed and Hay-to-Seed Pollen Mediated Gene Flow in Alfalfa. Pages 12-13, in Proceedings of the Gene Flow Symposium of the North Central Weed Science Society Annual Meeting, Dec. 12-13, 2007, St. Louis, Missouri (cited at DEIS, App. V at V-95). For hay kits, see: Woodward, W.T.W. 2006. Roundup Ready alfalfa test kits and influence on the marketplace. Proceedings of the Washington State Hay Growers Association Annual Conference, January 18-19, 2006, Kennewick, Washington, and, Woodward, W.T.W., D.H. Putnam and P. Reisen. 2006. A solution for Roundup Ready Alfalfa in sensitive export markets (Poster) Proceedings of the Washington State Hay Growers Association Annual Conference, January 18-19, 2006, Kennewick, Washington. (cited at DEIS, App. V at V-97). The accuracy of the hay test method has been validated using both cored and ground forage samples from hay that was grown with different levels of adventitious presence. See Putnam, 2006; see also DEIS, App. V at V-46, V-71.]. (Comment Number: APHIS-2007-0044-7620-26)

Response: APHIS acknowledges the comment. The analysis of testing for GT alfalfa content as a requirement or option for accessing GT sensitive markets has been expanded in appendices R and S of the FEIS.

Comment Excerpt Text:
Growers who wish to avoid biotechnology-derived alfalfa may do so by planting seed of known genetic purity, timing their harvest to minimize bloom and minimizing commingling of harvested alfalfa. Agricultural practices that maximize forage quality also minimize bloom and preclude the opportunity for cross pollination. These harvest practices are well known and adhered to due to the desire to maximize forage quality. Thus, the introduction of glyphosate-

tolerant alfalfa will have little, if any, impact on a grower's ability to produce specialty alfalfa free of biotechnology-derived material. Alfalfa is typically harvested and the majority of it is used on the farm, allowing for exceptional control by growers of their harvest. Alfalfa sold in the market may be stored in the same field or warehoused in large bales, lending itself easily to identity preservation and minimizing commingling of harvested material. (Comment Number: APHIS-2007-0044-7620-46)

Response: In regard to coexistence of GT alfalfa and organic farming, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

Comment Excerpt Text:
I have reviewed the EIS and feel that although a lot time effort was put into the document, it seems to be like most bureaucratic documents and clearly points out that they do not understand the issue. In reviewing the documents, I do not see any data or consultation of Alfalfa seed companies that produce seed other than Forage genetics, which is growing the RR seed. At the Northwest Alfalfa seed growers meeting in Las Vegas this last January 2010, several companies commented on contamination of certified and foundation seed crops, and expressed concerns they were not contacted by USDA for data in regards to the EIS..
I am an Alfalfa seed farmer in south western Idaho and have a large amount of acres planted to alfalfa hay around me which is grown for local dairies. I would like to state that I am not against RR alfalfa or biotech crops. They have a benefit in agriculture in a given situation. However it needs to be grown in a manner that does not cause harm to another farmer.
In the EIS document it states that contamination of a seed field by a hay field is a non issue. I would take issue with this statement due to the fact that during the growing season of 2009 I had a neighbors alfalfa hay field which was in full bloom during the first week in July, which is when my bees were pollinating my seed field directly across the road (100 feet). This occurred because of rainy weather in May resulting in a 2.5 week delay and then another weather delay in June, resulting in a delayed cutting. This is a real life scenario that occurred this last year as well as the year before.
The question I poise is this. If my field is established first, who is responsible when another farmer plants RR hay with in the established boundarys that I have to abide by?
It appears that USDA is working to protect the hay grower, and is not concerned about the growers which are producing the seed under item specific conditions for seed companies. USDA should take measures to assure that I can produce a RR or Biotech free seed crop, without me legal action taken against my neighbor.
In reviewing the EIS, it puts the burden of any issue on the parties that will be damaged; Such as the seed grower destroying feral plants, and taking other preventative issues to prevent his seed crop from external factors. Even though hay growers have a best practices document it does not address liability issue for an affected party. If this was a perfect world, Monsanto/USDA would not have had to do an EIS. We are talking about real life scenarios in an imperfect world. USDA should make rules to protect all parties, and not just protect deep pocket corporate interests. (Comment Number: APHIS-2007-0044-8121-1)

Response: APHIS acknowledges the comment. In regard to liability for unintended presence of genetically engineered material, see response to comment APHIS-2007-0044-6376-1 for issue

5.1. An additional alternative has been added to the FEIS that was not considered in detail in the DEIS. This alternative is intended to more fully examine the potential impacts on non-GE farmers. Imposing a testing requirement was not analyzed in detail. Full descriptions of this added alternative and alternatives rejected from further consideration are included in chapter 2 of the FEIS. In addition, chapter 4 of the FEIS has been updated per this new alternative.

Comment Excerpt Text:
Past contamination episodes from GE crops provide cautionary tales for why contamination is an impact that must be considered here. For example, the Star Link corn contamination showed how much damage a GE-crop can do to the agricultural economy. StarLink is a variety of corn genetically engineered to produce the Cry9C insecticidal toxin to kill certain corn pests. [Footnote 38 For the following discussion of StarLink, see Freese, B. (2001). "The StarLink Affair," Friends of the Earth, July 2001. www.foe.org/safefood/starlink.pdf.] Due to the concerns of leading allergists advising the EPA that this toxin might cause food allergies, the EPA approved StarLink in 1998 only for animal feed and industrial uses such as ethanol production, but not for human consumption. The EPA had a binding agreement with the developer of StarLink, Aventis CropScience. According to this agreement, all Aventis-affiliated seed dealers would sell StarLink corn seed to farmers only if the farmers would agree to the following conditions: 1) Plant a buffer strip 660 feet wide around StarLink corn plots to mitigate cross-fertilization of neighboring corn fields; and 2) Segregate StarLink corn and buffer strip corn for distribution only to non-food channels. [Footnote 39 EPA Cry9C Fact Sheet (2000). "Biopesticide Fact Sheet: Bacillus thuringiensis subspecies tolworthi Cry9C Protein and the Genetic Material Necessary for Its Production in Corn (006466)," Issued November 2000.] Aventis CropScience assured the EPA that with these measures it could keep StarLink out of the human food supply.

StarLink corn was grown for only three years, from 1998 to 2000, on at most 341,000 acres, or 0.43% of total U.S. corn acreage (year 2000). [Footnote 40 SAP StarLink (2001). "Assessment of Additional Scientific Information Concerning StarLink Corn," FIFRA Scientific Advisory Panel to the EPA, SAP Report No. 2001-09, from meeting on July 17/18, 2001.] Despite the limited acreage planted to StarLink, and the conditions attaching to its cultivation, testing initiated by public interest groups and subsequently conducted by the U.S. Food and Drug Administration (FDA) found that over 300 corn products in grocery stores around the country were contaminated with StarLink. The USDA found StarLink contaminating 9-22% of grain samples. [Footnote 41 Shadid, A. "Genetically engineered corn appears in one-tenth of grain tests," Boston Globe, May 3, 2001. Shadid, A. "Testing shows unapproved, altered corn more prevalent than thought," Boston Globe, May 17, 2001.]

The extent of the contamination is startling when one considers that StarLink never represented more than 0.43% of U.S. corn acreage. While post-harvest mixing was responsible for much of the contamination, there is also abundant evidence that popcorn, sweet corn, white corn and seed corn stocks were also contaminated with StarLink. [Footnote 42 USDA News Release (2001). "USDA purchases Cry9C affected corn seed from seed companies," June 15, 2001. Formerly accessible at: www.usda.gov/news/releases/2001/06/0101.htm; Hovey, A (2001). "StarLink protein found in other crops," Lincoln Star Journal, March 29, 2001.] These latter findings

strongly suggest that StarLink pollen blown by the wind fertilized conventional corn, despite the 660-foot border strip requirement. In fact, the a USDA-sponsored testing program for seed companies that had never been licensed to grow StarLink found that nearly one-fourth of these seed firms (71 of 288) had some corn lines that tested positive for StarLink. USDA had to buy back nearly 450,000 units of StarLink-contaminated seed corn at a cost of several million dollars to prevent further spread of StarLink in future years. Tainted seed dated anywhere from production year 1997 to 2001. [Footnote 43 Freese, B. (2001). "The StarLink Affair," Friends of the Earth, July 2001, p. 12.]

Recent contamination events in other crops illustrate how difficult it is to prevent contamination at detectable and economically important levels. Of particular interest is the recent contamination of rice by the unapproved GE LL601 "Liberty Link" rice. This type of GE rice was grown only in limited-acreage field tests, rather than on a commercial scale, and under the regulatory auspices of APHIS, which includes confinement recommendations. It had not been grown at all for several years, but contamination of the US rice supply was detected several years later at low levels that have nonetheless caused economic harm to the US rice industry. At least one identified source of contamination by LL601 occurred at Louisiana State University (LSU), where one of the scientists in charge has claimed that they exceeded APHIS confinement recommendation considerably, but still experienced contamination. [Footnote 44 G. Vogel, "Tracing the transatlantic spread of GM rice," Science, 2006, vol. 313, p. 1714.]

By one estimate, rice farmers lost $150 million due to rejection of LL601-contaminated rice shipments by countries in Europe and elsewhere, and the consequent sharp drops in rice prices. [Footnote 45 Weiss, R. (2006). "Gene-altered profit-killer," Washington Post, Sept. 21, 2006.] Affected rice farmers were forced to sue Bayer CropScience, the developer of LL601, in an effort to recover their losses. In response to a petition from Bayer CropScience, APHIS subsequently deregulated LL601, but did nothing to redress the economic harms to rice farmers. Rather than accept responsibility for the episode, Bayer CropScience blamed farmers and an "Act of God" for the contamination episode. [Footnote 46 Weiss, R. (2006). "Firm Blames Farmers, 'Act of God' for Rice Contamination," Washington Post, Nov. 22, 2006.] At least one identified source of contamination by LL601 occurred at Louisiana State University (LSU), where LL601 had been grown in small-scale field trials. One of the scientists in charge of the field-testing stated that LSU had grown LL601 under conditions that met and exceeded APHIS confinement recommendations considerably, but still experienced contamination. [Footnote 47 Vogel, G. (2006). "Tracing the transatlantic spread of GM rice," Science, 2006, vol. 313, p. 1714.] Just months later, still another unapproved GE rice variety developed by Bayer CropScience, LL604, was found contaminating a popular variety of conventional rice sold to farmers as seed rice (Clearfield 131). APHIS responded by issuing several emergency action notifications to distributors of Clearfield 131 to halt sales of the contaminated seed rice. [Footnote 48 USDA APHIS (2007). "Statement by Dr. Ron DeHaven regarding APHIS hold on Clearfield CL131 long-grain rice seed," March 5, 2007. http://www.aphis.usda.gov/newsroom/content/2007/03/content/printable/gericeseed_statement.doc.] As a result, rice farmers in the South experienced a severe shortage of seed rice for the 2007 season. [Footnote 49 Bennett, D. (2007). "Arkansas' emergency session on CL 131 rice," Delta Farm Press, March 1, 2007.] APHIS conducted an investigation into the contamination episodes,

but was unable to determine precisely how they occurred. [Footnote 50 USDA (2007). "Report of LibertyLink Rice Incidents," October 2007.]

Furthermore, there is substantial variation in the results from different experiments when measuring biological contamination through pollen transfer. This has been seen for virtually every crop studied. Many factors affect gene flow frequencies, including weather conditions (precipitation, wind, temperature, humidity), which will affect bee behavior, pollination levels, and the duration of pollen viability. The relative size of the pollen recipient and pollen production fields also has a very big impact on the distances and frequencies of gene flow. As one example, a field trial of creeping bentgrass containing 286 plants revealed contamination at up to about 1400 feet, while one of 400 acres had cross-pollination at 13 miles. [Footnote 51 (JK. Wipff and C. Fricker, "Gene flow from transgenic creeping bentgrass (Agrostis stolonifera L.) in the Willamette Valley, Oregon," International Turfgrass Society Research Journal, 2001, vol. 9, p. 224;LS Watrud et al., "Evidence for landscape-level, pollen-mediated gene flow from genetically modified creeping bentgrass with CP4 EPSPS as a marker," 2004, PNAS.] Small canola field trials (a bee pollinated crop) often have significant cross pollination at several hundred to several thousand feet, while a study in Australia at the commercial scale observed contamination at up to about 3 kilometers. [Footnote 52 MA Rieger et al., "Pollen-mediated movement of herbicide resistance between commercial canola fields," Science, 2002, vol. 296, p. 2386-2388.] (Comment Number: APHIS-2007-0044-9936-10)

Response:
APHIS acknowledges that there have been past episodes of gene flow with other GE crops. The comment cites LLP cases with StarLink corn and Liberty Link rice as causing significant economic harm. In the case of StarLink, the variety was only approved for animal and industrial uses and was not permitted in the human food supply at any level.. The economic damage in the case of StarLink corn was due to the need to ensure that the Cry9C protein was not present in food for humans because such presence is illegal in the U.S. .
Liberty Link rice 601 and 604 were field tested under APHIS authorization. The economic damage was due to the need to ensure that shipments to certain export markets did not contain these varieties because these varieties were not authorized in these rice export markets. Subsequent to the discovery of LLRICE 601 at low levels in the commercial rice suppyy, both USDA and FDA reviewed the available scientific data and concluded that there is no human health, food safety, or environmental concerns associated with Liberty Link rice.
The situation with StarLink corn and LLRICE 601 and the 600 series is different that that of GT alfalfa. In the case of GT alfalfa, prior to marketing Monsanto and Forage Genetics completed a consultation with FDA in which FDA had no question about Monsanto and Forage Genetics' conclusion that food and feed derived from alfalfa varieties J101 and J163 are not materially different in composition, safety, and other relevant parameters from food and feed derived from alfalfa varieties currently on the market, and that the genetically engineered alfalfa varieties do not raise issues that would require premarket review or approval by the FDA.

Based on the safety and nutritional assessment Monsanto and Forage Genetics have conducted, it is our [FDA] understanding that Monsanto and Forage Genetics have concluded that food and feed derived from the new alfalfa varieties are not materially different in composition, safety, and other relevant parameters from food and feed derived from alfalfa varieties currently on the

market, and that the genetically engineered alfalfa varieties do not raise issues that would require premarket review or approval by the FDA.
(http://www.fda.gov/Food/Biotechnology/Submissions/ucm155589.htm)
The economic impact of adventitious presence of GT alfalfa in non-GT alfalfa cannot be directly compared with cases cited above because GT alfalfa is approved (hay) in the major export markets, and the developers have completed an FDA consultation on the product . e

APHIS evaluated the references regarding gene flow differences as a result of field size and has expanded the discussion on pollen-mediated gene flow in appendix V of the FEIS.

Comment Excerpt Text:
Marketing standards in agricultural biotechnology have primarily been developed by state and regional bodies to protect the economic interests of consumers, but these measures are not designed to protect against health, safety or environmental risks. While it may be informative to discuss marketing standards and consumer preferences in an EIS, it is not be appropriate to focus a NEPA analysis on these issues and order some measures to stop "contamination" to crops with an intended purpose.
While there are consumers who prefer food with an absolute absence of genetic material from GE crops, markets have been established for these consumers based on this preference. There is nothing to suggest that this market impact is so closely related to the physical impacts caused by deregulation of a GE crop that it should be the subject of NEPA review. USSEC represents a range of growers – including organic, non-GMO, export-bound, specialized food use, etc., and from this broad base of representation, it can state that USDA should resist the calls from various organic, non-GMO or export-bound growers for prevention of so-called "contamination".
As is noted above, there is simply no justification for extensive federal intervention to regulate the economic impacts to exports or intended-purpose crops. The US and global marketplace can and does provide any consumer who is concerned about "GMOs" with alternatives to consuming the products of genetic engineering --- ever pervasive personal preferences should not give rise to a potential environmental impact that is appropriate for NEPA review. To the extent that courts see such "interrelated" impacts, they need to also understand the tools for identity preservation that are available and obviate the need for federal intervention.
The Federal Seed Act and state laws govern seed purity standards in the U.S. (e.g., those enforced by AOSCA, cited by various other commenters) help assure purchasers that seed meets designated levels of purity. Recognizing the variability of growing crops (or any biological system), seed purity standards do not attempt to guarantee absolute purity (the International Seed Federation floor for purity is 1%). The decision to market seed according to a more stringent standard is a purely economic, market-based choice. Those growers who believe it will be in their economic interests to maintain a more stringent standard will have to take the necessary steps to meet the demands of their premium markets.
A small percentage of US farmers of soybeans and alfalfa have elected to adopt a marketing standard developed under the Organic Food Production Act of 1990 ("OFPA"); in many cases, the same grower will maintain other fields in biotech, non-GMO or specialty food crops. Coexistence between various fields is determined by growers and their neighbors, by reference to applicable community standards. The regulations implementing the OFPA, known as the

National Organic Program ("NOP"), prohibit the deliberate use of genetic engineered seed in organic production. The NOP is a process-based standard, however, not a product-based standard. Organic products sold in the US under the NOP do not have to comply with any tolerance (zero, 0.9% etc.) unless they seek access to an overseas (e.g., the EU) or domestic (e.g., Whole Foods) market with such tolerances in place.
In implementing the NOP, USDA has clearly acknowledged that some level of genetic material from GE plants may be present in organic crops without affecting the organic nature of the crop or the farm. In short, the NOP provides no guarantee of "zero tolerance" for the presence of genetic material from GE plants.
The preference that some have for crops produced without GE technology may arise from perceived unrealized risks to human health or the environment. Notwithstanding years of intensive governmental, academic and commercial oversight, there is no evidence to suggest that such risks have been realized. Accordingly, such risks are wholly speculative. The fact that a market exists for those who are concerned about such risks does not bring those economic risks within the realm of significant environmental impact that NEPA was intended to address. (Comment Number: APHIS-2007-0044-9968-15)

Response: APHIS acknowledges the comment. In regard to impacts on conventional and organic alfalfa markets, see the response to comment APHIS-2007-0044-9882-1 for issue 5.0. Regarding human health impacts, see the second paragraph of the response to comment APHIS-2007-0044-0278-1 for issue 6.0.

Comment Excerpt Text:
A second point for background – biotech soybeans are the first-launched and most widely adopted biotech crop, with a long history of sound stewardship for economic impacts. USSEC urges USDA to take notice of the value provided by industry stewardship for such economic impacts, whether for organic, non-GMO or export-bound crops. USSEC and ASA International Marketing have participated in joint industry stewardship that protects export markets from soybeans that lack approval in major overseas markets, as part of comments submitted for particular biotech soybeans presented for regulatory approval to USDA. This includes markets for organic and non-GMO soybeans, at home and abroad. While soybean involve much larger export flows, these are not "significant" inter-related economic or environmental impacts, given the proactive industry and grower stewardship at work.
These massive impacts thereby fall outside the regulatory authority of USDA, provided the seed industry, in cooperation with the grain trade and USSEC and ASA International Marketing, ensure that these issues are not ignored by companies selling biotech soybean seed to U.S. growers. In this respect, the marketing of soybeans in the US can provide a model for industry stewardship that manages economic impacts, rendering them insignificant under the National Environmental Policy Act. Soybeans and alfalfa share markets in both animal feed (their primary use) and specialized food products, including many found in "natural food" marketplace. With similar stewardship in RR Alfalfa, no significant environmental impacts need occur in these specialized markets. (Comment Number: APHIS-2007-0044-9968-2)

Response: APHIS acknowledges the comment. The DEIS discussed industry stewardship programs. This discussion was expanded in the FEIS. See chapters 2, 3, and 4. .

Comment Excerpt Text:
APHIS asserts that GE organisms are only subject to their oversight if they have the potential to pose a plant pest risk as defined in the regulations at 7 Code of Federal Regulations part 340. According to this definition, a plant pest is:

"Any living stage (including active and dormant forms) of insects, mites, nematodes, slugs, snails, protozoa, or other invertebrate animals, bacteria, fungi, other parasitic plants or reproductive parts thereof; viruses; or any organisms similar to or allied with any of the foregoing; or any infectious agents or substances, which can directly or indirectly injure or cause disease or damage in or to any plants or parts thereof, or any processed, manufactured, or other products of plants" (7 CFR 340.1)

However, APHIS also notes, "A GE organism is also regulated under part 340 when APHIS has reason to believe that the GE organism may be a plant pest or APHIS does not have sufficient information to determine if the GE organism is unlikely to pose a plant pest risk." (EIS pg 2).

NCGA believes that APHIS' determination that GE alfalfa does not pose a plant pest risk is misguided and does not adequately consider the potential for GE alfalfa to pose irreparable harm to conventional and organic growers of alfalfa. We believe that existing evidence suggests that GE alfalfa can and will be a plant pest risk to conventional and organic forms of alfalfa, and further we believe that APHIS has the duty to continue to regulate GE alfalfa because " it does not have sufficient information to determine if the GE organism is unlikely to pose a plant pest risk." Indeed, throughout the EIS, APHIS notes significant areas of their analysis that are incomplete given the lack of data available. Without adequate information to accurately determine whether GE alfalfa is a plant pest risk, APHIS does not have the authority to deregulate such a crop. (Comment Number: APHIS-2007-0044-11018-1)

Response: APHIS disagrees with the assertion that there is insufficient information on which to base a determination on the petition for nonregulated status. The comment also states that there is existing evidence to suggest that GT alfalfa will be a plant pest in conventional and organic alfalfa; however the comment does not provide that evidence. APHIS does not consider adventitious presence of a GE plant in a conventional crop field to be a plant pest risk. Gene flow between and mechanical mixing of different varieties of any given crop occur naturally. The likelihood of these occurrences are no more likely with GT alfalfa than any other variety. Appendix W contains a risk assessment which characterizes the hazards that APHIS has considered. It outlines the available information on the biological characteristics of GT alfalfa. There are no indications that GT alfalfa is biologically different than conventional alfalfa with the exception of expressing the glyphosate resistant form of the epsps allele.

Comment Excerpt Text:
Increasing Disease Potential in Plants

Emerging research suggests that glyphosate resistant crops may have the potential to drive changes in disease persistence and virulence. Johal et al. (2009) found that glyphosate may be driving changes in nutrient efficiency and disease severity in crops. They note, "A significant increase in disease severity associated with the widespread application of the glyphosate herbicide can be the result of direct glyphosate-induced weakening of plant defenses and increased pathogen population and virulence." Such research is seminal and warrants considerable attention. Since glyphosate resistant crops are the driving force behind the massive increase in glyphosate use throughout the United States, and glyphosate may cause changes in diseases in plants, this suggests that GM crops could be categorized as a plant pest risk (Young 2006). NCGA recommends that APHIS strongly consider this research and recognize that if it does not believe it has sufficient evidence to prove otherwise, it should deem GM alfalfa a plant pest risk based on its potential for disease increase. (Comment Number: APHIS-2007-0044-11018-11)

Response:
The FEIS expands the discussion of glyphosate and plant susceptibility to disease in sections IV.C.3 and IV.G.1 and appendices J and N.

Comment Excerpt Text:
In fact, NCGA believes that gene flow from GE alfalfa and the subsequent contamination of conventional and organic alfalfa will directly and indirectly injure and cause damage to such plants, as well as the products that also result from alfalfa production and consumption including certified organic dairy, meat and honey products. This contamination can cause direct economic harms to the organic industry and to consumers of organic products, which we will demonstrate, clearly choose organic products as a result of them being GE free.

Further, NCGA will present evidence that the gene found in GE alfalfa and other GE crops engineered for resistance to glyphosate, CP4 EPSPS, has the potential to persist in soils, and transfer DNA to other organisms associated with a GE agricultural system. This transfer of DNA and its persistence within ecological systems poses unprecedented plant pest risks. Additional evidence will show that glyphosate, the active ingredient such GE crops are engineered to resist, will also cause direct and indirect harm to non GE crops, particularly in the form of glyphosate resistant weeds. (Comment Number: APHIS-2007-0044-11018-2)

Response: APHIS acknowledges the comment. In regard to gene flow of GT alfalfa in conventional and organic alfalfa, see response to comment APHIS-2007-0044-12026-7 for issue 3.0. In regard to the adventitious presence of GT-alfalfa in non-GE or organic alfalfa, see the response to comment APHIS-2007-0044-9936-9 for issue 3.1 (paragraph 1 of the response).

The horizontal gene transfer (HGT) between unrelated organisms is one of the most intensively studied fields since 1940, and the issue gained extra attention with the release of transgenic plants into the environment (Dröge et al. 1998). HGT has been implicated as a major contributor to the spread of antibiotic resistance amongst pathogenic bacteria and the emergence of increased virulence in bacteria, eukaryotes, and viruses; and has contributed to major transitions in evolution. Gene exchange has been documented for nearly all types of genes and between

unrelated organisms (Gogarten et al. 2002, W. F. Doolittle, J. G. Lawrence, Mol. Biol. Evol. 19, 2226 (2002)). For example, recently, Yoshida and colleagues (Yoshida et al. 2010) through a comparative genomics analysis implicated HGT for the presence of a similar genetic sequence between the parasitic plant purple witchweed (Striga hermonthica), which infests cereal fields (monocots), and sorghum (Sorghum bicolor).

Although there are many opportunities for plants to directly interact with fungi, bacteria, and parasitic plants (e.g., as commensals, symbionts, parasites, pathogens, decomposers, or in the guts of herbivores), so far there are no reports of significant horizontal gene transfer between sexually incompatible or evolutionarily distant organisms (as reviewed in Keese 2008). Accumulated evidence show that there are universal gene-transfer barriers, regardless of whether transfer occurs among closely or distantly related organisms (Kaneko et al. 2000, Koonin et al. 2001, Wood et al. 2001, Kaneko et al. 2002, Brown 2003, Sorek et al. 2007). Many genomes (or parts thereof) have been sequenced from bacteria that are closely associated with plants including Agrobacterium and Rhizobium (Kaneko et al. 2000, Kaneko et al. 2002, Wood et al. 2001). There is no evidence that these organisms contain genes derived from plants. In cases where review of sequence data implied that horizontal gene transfer occurred, these events are inferred to occur on an evolutionary time scale on the order of millions of years (Koonin et al. 2001, Brown 2003), so also the case with the recent report about of HGT between sorghum and purple witchweed. According to authors (Yoshida et al. 2010), the incorporation of a specific genetic sequence occurred between sorghum and purple witchweed before speciation of purple witchweed (S. hermonthica) and related cowpea witchweed (S. gesnerioides), a parasitic plant of dicots, from their common ancestor. In other words, HGT is an extremely rare event, and most of those rare events occur over millions of years.

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Comment Excerpt Text:
GT Alfalfa is a plant pest risk

APHIS has determined that GT alfalfa does not pose a plant pest risk.[Footnote 3: DEIS at 14.] As commonly construed
under the PPA, most plants, with the exception of some parasitic plant species, are not considered plant
pests.[Footnote 4: Mary Ann Liebert, Inc. Importation, Interstate Movement, And Release Into The Environment Of Certain
Genetically Engineered Organisms [Excerpts], 28 BIOTECHNOLOGY L. REP. 382, 384 (June, 2009).] However, language defining plant pests in the regulation includes “any infectious agents or
substances, which can directly or indirectly injure or cause disease or damage in or to any plants or parts
thereof, or any processed, manufactured, or other parts of plants.”[Footnote 5: 7 CFR § 340.1.] Damage that will result to agriculture
due to gene flow and feral propagation of GT alfalfa as detailed below in section II from the substance
contained in GT alfalfa make it a plant pest risk.
The bacterial gene added to the alfalfa genome with the goal of conferring glyphosate resistance

is a substance that will both directly, through gene flow, and indirectly, through feral populations, injure
valuable plant crops and agricultural products. As detailed in section II (B), (C) below, the inevitable
movement of this genetic agent and its products into neighboring agricultural lands will cause economic
and physical damage to plant crops. APHIS's finding that GT alfalfa is not a plant pest risk is in error.
APHIS's preferred alternative of deregulation should not be adopted. (Comment
Number: APHIS-2007-0044-11741-1)

Response: In regard to plant pest risk determination, see the response to comment APHIS-2007-0044-11018-1for issue 11.16.

Comment Excerpt Text:
Draft EIS at xiii, 1 and 2. As part of this mission, APHIS is directed to grant any petitions for the deregulation of GE organisms if it can be demonstrated that they are "unlikely to pose a plant pest risk." Draft EIS at 11; 7 C.F.R. § 340.6. The record here clearly demonstrates that RRA poses no plant pest risk, and the full deregulation of RRA will lead to the availability of safe, higher quality alfalfa with reduced environmental impacts and, at the same time, would be compatible with conventional and organic alfalfa production practices.

The plant pest risk assessment is a comprehensive evaluation of the alfalfa lines comprising RRA, performed pursuant to the requirements of the Plant Protection Act ("PPA") and its implementing regulations, which mandate that APHIS only regulate GE organisms that are plant pests. See 7 U.S.C. § 7711 (authorizing APHIS to regulate the movement of plant pests); 7 C.F.R. §§ 340.0 and 340.1 (restricting the introduction and movement in commerce of GE organisms meeting the definition of plant pest). As discussed below, this comprehensive evaluation demonstrates that there are no biologically meaningful differences between alfalfa populations that contain events J101 and/or J163 and the nontransformed alfalfa control or alfalfa reference variety populations. This key scientific finding then informs, as it must, [Footnote 5: See 7 U.S.C. § 7701(4) (providing that "decisions affecting imports, exports, and interstate movement of products regulated under [the PPA] shall be based on sound science").] APHIS' assessment of potential plant pest risk under the PPA and potential environmental impacts under NEPA. (Comment Number: APHIS-2007-0044-7620-6)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the comment.

Comment Excerpt Text:
By statute, "plant pest" is defined as: "any living stage of any of the following that can directly or indirectly injure, cause damage to . . . any plant or plant product." [Footnote 104 7 U.S.C. § 7702(14).] APHIS's regulations defined a "plant pest" as "[a]ny living stage (including active or dormant forms) of . . . bacteria [among other organisms] . . . or any organisms similar to or allied with any of the foregoing . . . which can directly or indirectly injure cause disease or damage in

or to any plants or parts thereof, or any processed, manufactured, or other products of plants." [Footnote 105 7 C.F.R. § 340.1.] The regulations further reference with regard to plant pest analyses: "indirect plant pest effects on other agricultural products." [Footnote 106 7 C.F.R. § 340.6(c)(4).]

APHIS concludes that "[d]ue to the lack of plant pest risk from the inserted genetic material, the lack of weediness characteristics of alfalfa events J101 and J163 alfalfa, the lack of atypical responses to disease or plant pests in the field, the lack of deleterious effects on non-targets or beneficial organisms in the agro-ecosystem, and the lack of horizontal gene transfer, APHIS concludes that Events J101 and J163 alfalfa are unlikely to pose a plant pest risk." (DEIS at W-11).

As a general matter, GT alfalfa and associated glyphosate use of Roundup Ready crops systems must be considered together as a system and will foster increased plant disease affecting both alfalfa and other important agricultural crops, in violation of the PPA's plant pest provisions. APHIS has not considered the impacts of the crop system together, as they will be used in the field. Such an assessment is necessary in order for the determination to be based on sound science.

An assessment of the crop system based on sound science would necessarily include the "deleterious effects" of glyphosate from the GT alfalfa crop system on numerous "non-target" and "beneficial organisms", see supra, which would change the conclusions to significant impacts.

Similarly, an assessment of the crop system based on sound science would include the "weediness potential" in light of the massive amounts of glyphosate the deregulation will bring about and with it, the concomitant increase/creation of glyphosate-resistant weeds. For a detailed analysis here, see separately submitted CFS comments.

Furthermore, the language defining plant pests in the regulation includes "any infectious agents or substances, which can directly or indirectly injure or cause disease or damage in or to any plants or parts thereof, or any processed, manufactured, or other parts of plants." As the record will show, gene flow and feral propagation of GT alfalfa is likely if deregulation happens. And, as the record will show, such transgenic contamination will "directly or indirectly cause [] damage in or to" conventional and organic alfalfa, resulting in massive damage to important sectors of the agricultural economy, including organic farmers and dairies and exporters of conventional alfalfa. This physical and economic harm will be directly and/or indirectly attributable to GT alfalfa's plant pest impacts. APHIS' current conclusion is not based on sound science.

Finally, we note that APHIS's PPA conclusion in Appendix W is slightly different in language and specific findings than the explanation under the PPA that the agency provided with the original EA in this case, although the overall conclusion is the same. In the original determination, 70 Fed. Reg. 36918-19 (June 27, 2005), as compared to the above conclusions, see supra, APHIS made six findings, that GT alfalfa

(1) Exhibits no plant pathogenic properties; (2) are no more likely to become weedy than the nontransgenic parental line or other cultivated alfalfa; (3) are unlikely to increase the weediness potential of any other cultivated or wild species with which it can interbreed; (4)will not cause damage to raw or agricultural commodities; (5) will not harm threatened or endangered species or organisms that are beneficial to agriculture; and

(6) should not reduce the ability to control pests and weeds in alfalfa and other crops.

We request the agency to clarify: are these findings equivalent or different from the current version in Appendix W? If they are different, please explain why and on what basis, and how that difference, or lack thereof, is based on sound science. (Comment Number: APHIS-2007-0044-9936-37)

Response: Throughout the EIS APHIS analyzes the effects of GT alfalfa used with glyphosate as per the label directions..
Appendix W contains the plant pest risk assessment. This assessment identifies a set of hazards related to plant pest risk. It characterizes GT alfalfa with respect to these hazards. The hazards considered in this risk assessment are consistent with those hazards analyzed by APHIS prior to the determination in 2005. Appendix W is a risk assessment; it is not a determination on the petition. For additional information, see the response to comment APHIS-2007-0044-11018-1 for issue 11.16 With regard to sound science see the response to comment APHIS-2007-0044-9936-38 for issue 11.16.

Comment Excerpt Text:
Under the current regulations, no existing regulation prohibits APHIS from regulating GE crops that do not pose a plant pest risk. In fact, the PPA gives APHIS broad statutory power to prohibit or regulate not only plant pests, but "noxious weeds":

The Secretary may prohibit or restrict the importation, entry, exportation, or movement in interstate commerce of any plant, plant product, biological control organism, noxious weed, article, or means of conveyance, if the Secretary determines that the prohibition or restriction is necessary to

prevent the introduction into the United States or the dissemination of a plant pest or noxious weed within the United States. [Footnote 107 7 U.S.C. § 7712(a) (emphasis added).]

The statutory definition of "noxious weed" is very broad:

The term "noxious weed" means any plant or plant product that can directly or indirectly injure or cause damage to crops (including nursery stock or plant products), livestock, poultry, or other interests of agriculture, irrigation, navigation, the natural resources of the United States, the public health, or the environment. [Footnote 108 7 U.S.C. § 7702(10) (emphasis added).]

Thus APHIS has much more authority over GT alfalfa than the DEIS acknowledges, which repeatedly cabins itself to the Plant Pest Determination. It clearly has the statutory authority to

"prevent" and "restrict" any plant if necessary to prevent the dissemination of a plant pest or noxious weed. In fact, APHIS itself recognizes that its statutory authority is broader than it claims in this DEIS in its currently proposed revised regulations. In the new proposed regulations APHIS points out:

The PPA grants the Secretary authority to regulate … noxious weeds.

…In order to best evaluate the risks associated with these GE organisms and regulate them when necessary, APHIS needs to exercise its authorities regarding noxious weeds and biological control organisms, in addition to its authority regarding plant pests. … We propose to better align the regulations with the PPA authorities in order to ensure that the environmental release, importation, or interstate movement of GE organisms does not pose a risk of introducing or disseminating plant pests or noxious weeds. … [T]echnological advances have led to the possibility of developing GE organisms that do not fit within the plant pest definition, but may cause environmental or other types of physical harm or damage covered by the definition of noxious weed in the PPA. Therefore, we consider that it is appropriate to align the regulations with both the plant pest and noxious weed authorities of the PPA. [Footnote 109 73 Fed. Reg. 60008, 60011 (Oct. 9, 2008) (emphasis added).]

A noxious weed is defined to include many of the types of harms noted in these comments from biological contamination to other crops from GT alfalfa: public health risks, damage to crops, the environment, and the interests of agriculture, for example.

Given APHIS's current rulemaking process (APHIS Docket 2008-0023), it is clear that APHIS intends to broaden the scope of how it regulates GE crops, in particular to implement its noxious weed authority, which will give APHIS broader authority to address the full range of adverse agricultural, public health, and environmental impacts associated with GE crops, [Footnote 110 7 U.S.C. § 7702(10); 73 Fed. Reg. 60013 (stating that "evaluation of noxious weed risk expands what we can consider.")] in order to fulfill the PPA's purpose to "protect[] the agriculture, environment, and economy of the United States." [Footnote 111 7 U.S.C. § 7701(1).] Therefore, APHIS's intent to more broadly construe its PPA authority in its regulations demonstrates its broad statutory authority. Its overly narrow application of that statutory authority here violates the statutory and regulatory scheme put into place to give APHIS regulatory authority over GE crops. [Footnote 112 American Paper Institute, Inc. v. American Electric Power Service Corp. et al., 461 U.S. 402, 413 (1983) (failure to consider relevant factors in its decision making violates the PPA); 5 U.S.C. § 706.] For APHIS to deregulate GT alfalfa without analyzing the noxious weed risks involved, would be contrary to its current rule-making process. APHIS should at a minimum delay any decision under the PPA on GT alfalfa and any other GE crop until it finalizes its new regulations

Further, the approval of Roundup Ready alfalfa and associated glyphosate use with the Roundup Ready crop system will promote the rapid evolution and spread of noxious weeds tolerant of or resistant to glyphosate herbicide, in violation of the PPA's noxious weed provisions. RR crop systems have triggered the rapid emergence of glyphosate-tolerant and glyphosate-resistant noxious weeds by fostering near exclusive reliance on glyphosate for weed control – and by doing so on a massive and growing scale, and in ever more frequent and heavy applications. If

introduced and widely adopted, GT alfalfa will have this same noxious weed-promoting effect, both independently and cumulatively with pre-existing Roundup Ready crop systems. Glyphosate-resistant weeds are noxious because of their manifold negative impacts on the interests of agriculture, human health, the environment, and farmers' welfare. Because GT alfalfa will directly and indirectly foster and cause these significant negative noxious weed impacts, APHIS must apply its noxious weed authority to GT alfalfa. (Comment Number: APHIS-2007-0044-9936-38)

Response APHIS acknowledges the comment. Under the current regulations, 7 C.F.R. part 340, APHIS only uses the plant pest authority of the Plant Protection Act (PPA) of 2000, as amended. Thus, pursuant to Part 340, APHIS may grant nonregulated status to an organism if it makes the determination that the organism does not pose a potential plant pest risk. It is true that APHIS has undertaken rulemaking to amend the regulations at 7 C.F.R. part 340 and is considering whether or not to include the PPA's noxious weed authority as part of the Part 340 regulations. However, this rulemaking process is not yet complete and it would be inappropriate for APHIS to speculate as to the final result and outcome of that rule making process. Apart from Part 340, under the current APHIS noxious weed regulations, if a party wishes to petition the agency to designate a plant as a noxious weed, it may so petition APHIS in accordance with regulations contained at 7 C.F.R. part 360.

12.0 Summary of Submissions Filed to General Folder (Issue 12) for Docket APHIS-2007-0044 (Roundup Ready Alfalfa)

12.1 Issue 12.1 General - For the Deregulation Alternative

Regulatory Process:

- The EIS is adequate.
- Comment period - 60 days is long enough for comments. Please do not extend comment period longer.
- It is imperative that USDA complete the process and bring the product back on the market for producers to plant in 2010.
- Another consideration is the future of other traits that might be introduced to alfalfa. There could be traits such as drought tolerance that might be of benefit in the future. If USDA withholds deregulation in this case, I fear that no desirable future traits will ever reach the marketplace.

Gene Flow:

- 10% bloom: Hay is generally cut at the bud stage with no bloom. The one thing that might interfere with this is a weather event.
- For areas that do not harvest seed, the 10% bloom standard is sufficient.
- Hay growers intentionally avoid flower and seed development because feed quality drops rapidly after the initiation of flowering.
- Spread of RR genes to non-RR varieties can be easily contained using existing regulation of standard seed production in the industry using somewhat larger isolation distances.

Glyphosate Use and Impacts (including human health):

- Use of a much less dangerous chemical which hay has no residual in the soil
- Smaller carbon footprint due to spraying fewer tons of chemical
- Improved safety to workers through reduced exposure and minimized handling
- Glyphosate has little, if any, activity in soil. Therefore, its less likely to impact water resources. Reduce environmental impacts by reducing run-off (compared to other chemicals) and groundwater contamination.
- Glyphosate provides no or low mobility and non-persistence in soil and is compatible with no-till, reduced-till, and long-rotation crop systems.
- Some of the other chemicals threaten groundwater causing safety concerns for human populations and individuals.
- Personal safety is also an issue. With fewer applications of herbicide I can control noxious and even poisonous weeds without handling chemicals that are more hazardous than glyphosate.
- Development of Roundup-resistant weeds will be a major problem regardless of commercialization of RR alfalfa. Integrated Pest Management dictates that a variety of methods be used to control any pest. In fact, it is in the best interest of the chemical industry to promote Integrated Pest Management to increase the commercial life of any pesticide.

Human and Animal Health (alfalfa quality):

- Along with the quality of the alfalfa stand, the feed quality will also increase, resulting in healthy feed, healthier animals, and higher quality food for consumers.
- Feed quality presented to the cows is high and safer for the cows (no toxic weeds).

Socioeconomic Impacts, co-existence:

- The delay of nearly 3 years has deprived many farmers of the benefits of RR alfalfa. RR alfalfa could have helped many farmers reduce costs and maintain a competitive edge to survive through recent periods of severe market volatility, especially in the dairy industry.
- Improved production efficiencies - This technology will reduce production costs through reduced fuel and labor usage. There is also an energy savings in growing, bailing, and hauling hay, not weeds.
- Provides dependable, cost-effective weed control.
- Consistent, high-quality, weed-free hay.
- Yields are high.
- Increased dollar value for each ton of hay sold.
- Costs are reduced because of economically controlling invasive weeds (lower herbicide costs).
- Reduces weed competition and allows the hay to fully utilize the fertility and water resources.
- The milk (animal products) from bio tech crop fed livestock is exactly the same as that from conventional crops. Those products are also cheaper to produce because of feed quality issues from weeds.
- Organic and non-organic alfalfa, corn, soy, and other producers can and do co-exist, especially when prudent and well-designed grower stewardship is practiced.
- Glyphosate tolerant alfalfa can co-exist in our environment with little or no negative impact. (We have customers producing genetically modified crops near a neighbor's organic crop production and customers who have organic crop production near neighboring genetic modified crop production. It is our observation that these producers and neighbors and their crops co-exist amicably.)
- Looking forward to adding this management tool to their production of weed free alfalfa.
- Even if genes are spread to non-RR varieties, alfalfa is not directly consumed by humans and organic growers can seek reparation through the tort system, as they do now with pesticide contamination issues.

Production Practices (including weed control):

- Better quality hay - It improves the opportunity for high quality and Certified Weed-Free hay.
- Alfalfa is a key contributor to sustainable agriculture through its ability to fix nitrogen, improve soil tilth (physical condition, aggregation), reduce soil erosion, and sequester carbon.
- This technology provides consistent, comprehensive weed control for alfalfa growers currently struggling to control many perennial, biannual, and noxious weeds.

- RR alfalfa allows producers far greater “in season” weed control with decreased preharvest interval.
- A benefit is seeding timing flexibility. With the ability to control weeds, producers can have some flexibility with the seeding window.
- Tillage options increase. The ability to no-till alfalfa has been limited because of hard-to-control weeds.
- Length (longer stand life) and quality of alfalfa stands improves with the ability to keep alfalfa stands weed free.
- It makes it possible to produce hay that is less likely to be contaminated by weeds. This is important to the purchasers of that hay.
- RR alfalfa will spread significantly less weed seed. (Less likely to spread unwanted weeds to other states where hay might be shipped.)
- Examples of other chemicals used:
- “Presently we utilize the chemicals Valpar and Treflan for weed and grass control and it takes at least 3 different applications to try to control the weeds and grass. This regime does not effectively control pig weeds as they continue to grow and our third, fourth, and fifth cuttings are contaminated (sometimes very badly) with the pig weeds in addition to many other weeds.”
- No rotational restrictions for Roundup. (For Velpar, which has a relatively long soil half-life, the rotational interval for field corn can be up to 2 years after application rates that exceed 3 pt/A of Velpar L, and the labeled rate ranges from 2 to 6 pt/A.)
- No run-off encourages increased use of RR alfalfa in weedy or erosion-prone fields. Glyphosate stays in place and is not a risk to move offsite.

Other:

- Education of producers - Through education we can keep the producers in line. APHIS may wish to address education issues more in the EIS.
- Roundup Ready trait in crops is a proven, safe, effective, and well-accepted technology that delivers proven benefits to farmers.
- Global population threatens adequate food supplies. New technologies can help increase food production (another Green Revolution). Many countries continue to have food shortages.
- Increased hay yields means fewer acres are needed to produce the hay needed by the beef and dairy industry worldwide. The less acres needed for crop production the more acres we can keep in rain forests, rangelands, natural forests, and natural native ecosystems. The more acres of undisturbed land in the world, the healthier our environment for wildlife, birds, fish, plants, etc.

Response: APHIS acknowledges the comments received in support of the Deregulation Alternative analyzed in the Draft EIS.

12.2 12.2 General – Against the Deregulation Alternative

Regulatory Process:

- Extend the comment period. 2 months is not long enough to review such a long document

- Would like more independent analysis
- Release of a perennial would be irreversible.
- RR alfalfa would compromise the integrity of the USDA Organic Seal and consumer confidence in it.
- The organic certification is the only way consumers can choose not to buy GMO products. Organic consumers want choice.
- Labeling should be required. Consumer rights are inhibited by no labeling.
- Genetically, engineered foods are required to be labeled in the 15 European Union nations, Russia, Japan, China, Australia, New Zealand, and many other countries around the world
- Government officials are corrupted by Monsanto lobbying money.
- The EIS is inadequate (e.g., lack of systems analysis; the authors of this EIS appear to have made no effort to consider the full range of biological, socioeconomic, human health and safety, land use, and environmental impacts of transgenic alfalfa varieties that are documented in the statement.)

Gene Flow:

- GE alfalfa contamination has already occurred in several states, and demonstrates GE alfalfa's ability to colonize and spread into neighboring fields.
- There is no way to ensure complete protection from contaminating natural seed stocks.
- Alfalfa is uncontrollable as it is openly pollinated, perennial, blows in the wind, eaten by numerous animals and its deep rooting system enable it to last for years.
- Bees can travel for miles, allowing for cross-pollination.
- GE alfalfa will escape into feral populations.

Glyphosate Use and Impacts (including human health):

- Roundup Ready crops have led to a very large increase in herbicide use.
- As more farms depended on Roundup Ready crops, more weeds adapt to become Roundup resistant. Now, increased amounts of toxic herbicides are used to eliminate the resistant weeds.
- Deregulation would further the proliferation of resistant weeds and farmer dependence on toxic chemicals for agricultural processes.
- Herbicides can leach into water supplies, compromising the safety of drinking water, as well as the health of natural ecosystems.
- Herbicides have been shown to combine with other synthetic chemicals in the environment, creating more hazardous substances, some of which have been documented as endocrine disruptors
- Bees who quenched their thirst first thing in the morning on leaves and flowers, from crops sprayed with Roundup died from ingesting glyphosate
- Glyphosate is bad for the environment, wildlife (plants and animals), livestock, and human health.
- RR alfalfa has bad climate change effects - Carbon cycle in herbicide treated fields is disrupted (e.g., Glyphosate has negative impacts on soil microbes and changes the carbon sequestering ability of the plants grown in the field.)
- Glyphosate is a health risk to farm workers.

- Proprietary mixtures of glyphosate are much more hazardous than generic glyphosate and deserve separate analysis.

Human and Animal Health (alfalfa quality):

- There has been a large increase in the number of people suffering from food related allergies (due to GMOs)
- There is no way to ensure that RR alfalfa that is eaten by animals has no detrimental long-term impact on the animals.
- There is no way to know definitively what the long-term human health impacts could be to people who eat animals that have been fed GMOs.
- GMOs are an experiment on the American public
- The American Association of Environmental Medicine called for a moratorium on GE crops due to evidence of serious harm done to major organ systems of mammals
- Health effects of RR gene on pollinators and other wildlife that visit alfalfa were not addressed by the EIS

Socioeconomic Impacts, co-existence:

- The unregulated use of GE alfalfa could damage/ruin the thriving American organic industry, including animal feed, meats, eggs, milk, cheese, and grass.
- It will shut out small organic farmers to large corporations.
- The demand for organic products is increasing.
- No reasonable measures are possible that will prevent contamination.
- Controlling cross-contamination is financially impossible. Prevention of cross-contamination will push organic growers out of the business.
- Consumers have the right to choose organic food that is free of GMOs.
- Organic consumers do care whether GMOs are in food and feed.
- Deregulation will cause significant economic harm to small conventional and organic family farmers, not only forcing many of them out of business, but further increasing farm size and consolidating agriculture into the hands of fewer individuals
- Monsanto will control the organic market through lawsuits when cross-contamination happens (e.g., Monsanto canola oil lawsuits). Legal threats from patent owners like Monsanto drive the loss of locally developed seed varieties, and decrease important biodiversity. If a small farmer's saved seed is contaminated, legal action can result in his losing that seed permanently, at great personal cost.
- Alfalfa cultivar diversity will be threatened.

Production Practices (including weed control):

- I cannot alter my planting cycle to not be synchronized with a large factory farm.
- Crop rotation becomes difficult. Alfalfa is often killed with Roundup to allow for clean planting of row crops. This seed threatens the ability of farmers to rotate crops, and encourages the spread of weedy alfalfa (volunteer RR alfalfa).
- There will be increased weed resistance to glyphosate.

- RR alfalfa stand removal requires the use of herbicides that are environmentally damaging. Deep till practices that destroy soil may also be required for RR alfalfa stand removal.

Other:

- Monsanto is a monopoly and Monsanto is taking over the food market.
- More research is needed on GE and GMO food, including long term studies.
- Mark McCaslin's studies were used in the EIS and he has a vested interest in the release of this product (conflict of interest).
- Risks of monoculture - We have no food supply safety net if Monsanto's crops fail.
- Public should be educated on the consequences of deregulating RR alfalfa.
- GMO crops are more drought-prone than conventional ones.
- Genetic engineering is playing God.
- Transgenes can escape their hosts and pollute the environment.

Other not related to for or against:

- The state tab doesn't work on the docket website.

Response: APHIS acknowledges the comments received expressing concerns about the DeregulationAlternative analyzed in the Draft EIS. See response to comments for Issues 1, 2, 3, 4, 5, and 6.

13.0 Issue 13 – Genetic Engineering Technology - General

Comment Excerpt Text:
I am so confused as to how our legislature could allow a company to patent a biological product. The company I am referring to would be Monsanto. I am ashamed to know that small farmers are being sued by this massive multi-billion dollar company. While Monsanto may have a good products, their crude, money grabbing ways have left a bad taste. (Comment Number: APHIS-2007-0044-0311-1)

Response: In regard to lawsuits from Monsanto, see the response to comment APHIS-2007-0044-6376-1 for issue 5.1.

Comment Excerpt Text:
The biotech industry now wants us to believe it can do nature one better, and that genetic engineering is just an extension or superior alternative to natural breeding. It's unproved, indefensible pseudoscience mumbo jumbo, and that's the problem.
From The British Medical Association Report:
Members of the GM jury project were briefed on various aspects of genetic modification by a diverse group of acknowledged experts in the relevant subjects. The GM jury reached the conclusion that the sale of GM foods currently available should be halted and the moratorium on commercial growth of GM crops should be continued. These conclusions were based on the precautionary principle and lack of evidence of any benefit.

The Jury expressed concern over the impact of GM crops on farming, the environment, food safety and other potential health effects.
In addition, there should be an end to assumptions that GM crops are necessary to feed the starving, given the complex food distribution, social and economic factors that lie behind such hunger.
Union of Concerned Scientists:
http://www.ucsusa.org/food_and_environment/genetic_engineering/
Toxins, Allergic reactions,Lack of safety testing,Increased pesticide use, biological pollution,The industrialization and monopolization of agriculture, Ethical problems.
Plant Geneticist Doreen Stabinsky
Super weeds, non-target impacts, horizontal gene transfer
Assessing the Risks of Genetic Engineering - An Interview with Doreen of Genetic Engineering - An Interview with Doreen Stabinsky - Rural America / In Motion Magazine ... Doreen Stabinsky: Risk assessment means assessing the risks
http:// www.inmotionmagazine.com/nztrip/ ds1.html -
Center for Food Safety
Why is genetically engineered food dangerous?
Genetic engineering uses material from organisms that have never been part of the human food supply. Without long-term testing no one knows if these foods are safe. Genetically engineering plants and animals for food is risky and unsafe. (Comment Number: APHIS-2007-0044-0313-1)

Response: In regard to GE crops generally and the scope of this EIS, see the response to comment APHIS-2007-0044-10725-2 for Issue 13. In regard to hortizontial gene transfer see response to comment number APHIS-2007-0044-11018-2 for issue 11.16. In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for issue 5.2.

Comment Excerpt Text:
Biotechnology is too young of a science to be able to fully assess or understand the potential problems that can come from altering the genes of living creatures.There is numerous potential for problems on many different levels. From the unpredictable occurrence of toxins and allergens, to environmental hazards, to ethical issues, biotechnology poses a serious threat.
Professor Richard Lewontin, professor of genetics, Harvard University, "We have such a miserably poor understanding of how the organism develops from its DNA that I would be surprised if we don't get one rude shock after another."
Professor Norman Ellstrand, ecological geneticist at the University of California, "within 10 years we will have a moderate to large-scale ecological or economic catastrophe, because there will be so many products being released."
South Africa had a smaller corn crop after a genetically engineered variety from Monsanto that was planted by 400 farmers on 75,000 hectares failed to pollinate.
US agronomist Dr Charles Benbrook warned last year: "
Australia should avoid the problems and market losses that the US experienced with GM."
What the environmental groups predicted would happen--did happen:
Killer Pigweeds Threaten Crops
The Weed Is No Longer Controlled with RoundUp herbicide.

Scientists blame farmers for excessive use of the herbicide.
Hundreds of thousands of acres of cotton and soybean fields are infested with Pigweed that is resistant to RoundUp herbicide.
Commercial herbicides, such as RoundUp, can be three times more toxic than pure glyphosate.
Erwin Chargoff, often referred to as the father of molecular biology, warned that all innovation does not result in "progress." Chargoff referred to genetic engineering as "a molecular Auschwitz" and warned the technology of genetic engineer. (Comment Number: APHIS-2007-0044-0314-1)

Response: APHIS acknowledges the comment. In regard to the genetic engineering process and unintended plant traits in GE crops, see response to comment APHIS-2007-0044-7620-38 for Issue 13. In regard to the evolution of glyphosate-resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for issue 3.6. In regard to the toxicity of glyphosate herbicide, see the response to comment APHIS-2007-0044-0352-1 for issue 6.3.
In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for issue 5.2.

Comment Excerpt Text:
Erwin Chargoff, often referred to as the father of molecular biology, warned that all innovation does not result in "progress." Chargoff referred to genetic engineering as "a molecular Auschwitz" and warned the technology of genetic engineering poses a greater threat to the world than nuclear technology.
"I have the feeling that science has transgressed a barrier that should have remained inviolate," he wrote in his autobiography. Noting the "awesome irreversibility" of genetic engineering experiments, Chargoff warned that; "...you cannot recall a new form of life... It will survive you and your children and your children's children. An irreversible attack on the biosphere is something so unheard-of, so unthinkable to previous generations, that I could only wish that mine had not been guilty of it." (Comment Number: APHIS-2007-0044-0315-2)

Response: . APHIS acknowledges the comment.

Comment Excerpt Text:
Genetic manipulation is fraught with danger

We are confronted with the most powerful technology the world has ever known, and it is being rapidly deployed with almost no thought whatsoever to its consequences."
Dr Suzanne Wuerthele, U.S. Environmental Protection Agency (EPA) toxicologist...

Nobel Laureate in Medicine, George Wald, Professor of Biology, Harvard University, warned against genetic engineering:
Recombinant DNA technology faces our society with problems unprecedented not only in the history of science, but of life on Earth. It places in human hands the capacity to redesign living organisms, the products of three billion years of evolution. Such intervention must not be

confused with previous intrusion upon the natural order of living organisms: animal and plant breeding..... All the earlier procedures worked within single or closely related species....Our morality up to now has been to go ahead without restriction to learn all that we can about nature. Restructuring nature was not part the bargain...this (new) direction may be not only unwise, but dangerous. Potentially, it could breed new animal and plant diseases, new sources of cancer, novel epidemics.

Michael Antoniou, a molecular geneticist involved in human gene therapy, explains that genetic modification "technically and conceptually bears no resemblance to natural breeding." The reproduction process works by both parents contributing thousands of genes to the offspring. They, in turn, get sorted naturally, and plant breeders have successfully worked this way for thousands of years.
Genetic manipulation is different and so far fraught with danger. It works by forcibly inserting a single gene from a species' DNA into another unnaturally.
"A pig can mate with a pig and a tomato can mate with a tomato. But there is no way that a pig can mate with a tomato and vice-versa." This process transfers genes across natural barriers that "separated species over millions of years of evolution" and managed to work.
The biotech industry now wants us to believe it can do nature one better, and that genetic engineering is just an extension or superior alternative to natural breeding. It's unproved, indefensible pseudoscience mumbo jumbo, and that's the problem.

From The British Medical Association Report:
Members of the GM jury project were briefed on various aspects of genetic modification by a diverse group of acknowledged experts in the relevant subjects. The GM jury reached the conclusion that the sale of GM foods currently available should be halted and the moratorium on commercial growth of GM crops should be continued. These conclusions were based on the precautionary principle and lack of evidence of any benefit.
The Jury expressed concern over the impact of GM crops on farming, the environment, food safety and other potential health effects.
In addition, there should be an end to assumptions that GM crops are necessary to feed the starving, given the complex food distribution, social and economic factors that lie behind such hunger.

Union of Concerned Scientists:
http://www.ucsusa.org/food_and_environment/genetic_engineering/
Toxins, Allergic reactions,Lack of safety testing,Increased pesticide use, biological pollution,The industrialization and monopolization of agriculture, Ethical problems.

Plant Geneticist Doreen Stabinsky
Super weeds, non-target impacts, horizontal gene transfer
Assessing the Risks of Genetic Engineering - An Interview with Doreen of Genetic Engineering - An Interview with Doreen Stabinsky - Rural America / In Motion Magazine ... Doreen Stabinsky: Risk assessment means assessing the risks
http://www.inmotionmagazine.com/nztrip/ds1.html

Center for Food Safety

Why is genetically engineered food dangerous?
Genetic engineering uses material from organisms that have never been part of the human food supply. Without long-term testing no one knows if these foods are safe. Genetically engineering plants and animals for food is risky and unsafe.
Biotechnology is too young of a science to be able to fully assess or understand the potential problems that can come from altering the genes of living creatures.There is numerous potential for problems on many different levels. From the unpredictable occurrence of toxins and allergens, to environmental hazards, to ethical issues, biotechnology poses a serious threat.

Professor Richard Lewontin, professor of genetics, Harvard University, "We have such a miserably poor understanding of how the organism develops from its DNA that I would be surprised if we don't get one rude shock after another."

Professor Norman Ellstrand, ecological geneticist at the University of California, "within 10 years we will have a moderate to large-scale ecological or economic catastrophe, because there will be so many products being released."

South Africa had a smaller corn crop after a genetically engineered variety from Monsanto that was planted by 400 farmers on 75,000 hectares failed to pollinate.

US agronomist Dr Charles Benbrook warned last year: "
Australia should avoid the problems and market losses that the US experienced with GM."

What the environmental groups predicted would happen--did happen:
Killer Pigweeds Threaten Crops
The Weed Is No Longer Controlled with RoundUp herbicide.
Scientists blame farmers for excessive use of the herbicide.

Hundreds of thousands of acres of cotton and soybean fields are infested with Pigweed that is resistant to RoundUp herbicide.

Commercial herbicides, such as RoundUp, can be three times more toxic than pure glyphosate. You are poisoning our food and the environment. I'll side with the environmental groups that GOT IT RIGHT!

Erwin Chargoff, often referred to as the father of molecular biology, warned that all innovation does not result in "progress." Chargoff referred to genetic engineering as "a molecular Auschwitz" and warned the technology of genetic engineering poses a greater threat to the world than nuclear technology.
"I have the feeling that science has transgressed a barrier that should have remained inviolate," he wrote in his autobiography. Noting the "awesome irreversibility" of genetic engineering experiments, Chargoff warned that; "...you cannot recall a new form of life... It will survive you and your children and your children's children. An irreversible attack on the biosphere is something so unheard-of, so unthinkable to previous generations, that I could only wish that mine had not been guilty of it." (Comment Number: APHIS-2007-0044-0339-1)

Response: In regard to agricultural approaches and the scope of this EIS, see the response to comment APHIS-2007-0044-10725-2 for Issue 13. In regard to hortizontial gene transfer see response to comment number APHIS-2007-0044-11018-2 for issue 11.16. In regard to the evolution of glyphosate-resistant weeds due to more glyphosate use, see the response for comment APHIS-2007-0044-9936-19 for issue 3.6. In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for issue 5.2.

Comment Excerpt Text:
Monsanto Agrees to Change Ads and EPA Fines Northrup King. January 10, 1997.
Pesticide Action Network North America
(PANNA), San Francisco, CA.
Monsanto Agrees to Change Ads
Monsanto Co. agreed to change its advertising for glyphosate- based products, including Roundup, in response to complaints by the New York Attorney General's office that the ads were misleading. Based on their investigation, the Attorney General's office felt that the advertising inaccurately portrayed Monsanto's glyphosate-containing products as safe and as not causing any harmful effects to people or the environment. According to the state, the ads also implied that the risks of products such as Roundup are the same as those of the active ingredient, glyphosate, and do not take into account the possible risks associated with the product's inert ingredients.
As part of the agreement, Monsanto will discontinue the use of terms such as "biodegradable" and "environmentally friendly" in all advertising of glyphosate-containing products in New York state and will pay $50,000 toward the state's costs of pursuing the case. The Attorney General has been challenging the ads since 1991.
Monsanto maintains that it did not violate any federal, state or local law and that its claims were "true and not misleading in any way." The company states that they entered into the agreement for settlement purposes only in order to avoid costly litigation.
According to a 1993 report published by the School of Public Health at the University of California, Berkeley, glyphosate was the third most commonly-reported cause of pesticide illness among agricultural workers. Another study from the School of Public Health found that glyphosate was the most commonly reported cause of pesticide illness among landscape maintenance workers. (Both studies were based on data collected between 1984 and 1990.)
In the first nine months of 1996, Monsanto's worldwide agrochemical sales increased by 21% to US$2.48 billion, due largely to increased sales of Roundup.
Pesticide Action Network North America (PANNA)
Phone: (415) 541-9140
Fax: (415) 541-9253
email: panna@panna.org
http://www.panna.org/panna/ | panna-info@igc.apc.org. (Comment Number: APHIS-2007-0044-0620-2)

Response: . Section IV.E of the DEIS, Appendices L and M also provides an extensive analysis of glyphosate herbicide use—which might increase in response to the availability of GT alfalfa—and concludes that the use of this herbicide does not appear to result in adverse health effects.

Comment Excerpt Text:
Dear Sirs,
I went to Dartmouth College and have expressed concerns to President Kim, and classmates(biologists, nuclear physicists, lawyers, and so fourth) about non-access by independent researchers to Monsanto's research, which violates US Academy of Sciences protocol for replicating research by corporations. Since Monsanto donates money to every university that is genetic research competent, they can not publish conflicting research. Monsanto has transferred executive scientists into FDA positions who rubber stamp Monsanto products. All this is unethical. FDA employees should have no career affiliation with genetic engineering companies, but be from universities only. (Comment Number: APHIS-2007-0044-0702-1)

Response: APHIS acknowledges the comment.

Comment Excerpt Text:
Genetically engineered foods are poison foods! Consumers oppose genetically engineered foods and history has shown superweeds will develop. Ban gmo alfalfa and other gmo crops!
We are confronted with the most powerful technology the world has ever known, and it is being rapidly deployed with almost no thought whatsoever to its consequences."
Dr Suzanne Wuerthele, U.S. Environmental Protection Agency (EPA) toxicologist...
Nobel Laureate in Medicine, George Wald, Professor of Biology, Harvard University, warned against genetic engineering:
Recombinant DNA technology faces our society with problems unprecedented not only in the history of science, but of life on Earth. It places in human hands the capacity to redesign living organisms, the products of three billion years of evolution. Such intervention must not be confused with previous intrusion upon the natural order of living organisms: animal and plant breeding..... All the earlier procedures worked within single or closely related species....Our morality up to now has been to go ahead without restriction to learn all that we can about nature. Restructuring nature was not part the bargain...this (new) direction may be not only unwise, but dangerous. Potentially, it could breed new animal and plant diseases, new sources of cancer, novel epidemics.
Michael Antoniou, a molecular geneticist involved in human gene therapy, explains that genetic modification "technically and conceptually bears no resemblance to natural breeding." The reproduction process works by both parents contributing thousands of genes to the offspring. They, in turn, get sorted naturally, and plant breeders have successfully worked this way for thousands of years.
Genetic manipulation is different and so far fraught with danger. It works by forcibly inserting a single gene from a species' DNA into another unnaturally.
"A pig can mate with a pig and a tomato can mate with a tomato. But there is no way that a pig can mate with a tomato and vice-v. (Comment Number: APHIS-2007-0044-0762-1)

Response: APHIS acknowledges the comment.

Comment Excerpt Text:

U.S. Department of Agriculture
1400 Independence Ave., S.W.
Washington, DC 20250
Dear United States Department of Agriculture,
I do not believe that these two lines of genetically engineered (Monsanto made) Roundup Ready alfalfa (should b deregulated (or for that matter used at all). The reasons is simply because deregulating their usage will exponentially increase the chances of GE alfalfa infecting organic alfalfa (the grasses pollinate by spores). To vote not to deregulate these brands of GE alfalfa will prevent this, preserving in integrity and independence (as Monsanto will own any crops infected with their alfalfa) ofour organic farms. This will in turn protect and create more American jobs in the much needed area of agriculture. Less reliance on genetic engineering will also promote not only more ethical (environmentally friendly) business practices but also more innovative ones (as farmer's will need to find a way to make profit without the GE crops or pesticides).
Not deregulating these GE crops will keep our nations agriculture healthier overall (as it will prevent an invasive species from entering it), which will in turn increase public health.
To deregulate these alfalfa strands will mean the opposite of all of the above, and giving Monsanto Corporation more of a monopoly over agriculture in the United States and world. It is for this reason and moreover for all of the above benefits that I strongly feel that Docket No. APHIS-2007-0044. (the GE alfalfa) should not be deregulated.
Sincerely,
(Comment Number: APHIS-2007-0044-0864-1)

Response: In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for issue 5.2. In regard to gene flow due to pollen, see the response to comment APHIS-2007-0044-12026-7 for issue 3.0.

Comment Excerpt Text:
Monopolization: As indicated below Monsanto was not in the seed business 13 years ago. Today the Monsanto organization as a whole leads market share volume in many primary crops world wide. “Monopolies are bad, unless you’re the Monoply”
Monsanto Wields Monopoly Power to Jack Up Corn Seed Prices by $100 a Bag
GM Watch, July 24, 2008
http://www.organicconsumers.org/articles/article_13754.cfm
"Monsanto's market power has been quietly accruing over several years and has now begun materially impacting price," said Keith Mudd, OCM's board president. "The lack of competition and innovation in the marketplace has reduced farmers' choices and enabled Monsanto to raise prices unencumbered." (Comment Number: APHIS-2007-0044-0933-15)

Response: Regarding impacts on market concentration and competition, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0.

Comment Excerpt Text:
Monsanto's Greenwash

Given this long and troubling history, it is easy to understand why informed citizens throughout Europe and the U.S. are reluctant to trust Monsanto with the future of our food and our health. But Monsanto is doing everything it can to appear unperturbed by this opposition. Through efforts such as their £1 million advertising campaign in Britain, their sponsorship of a new high-tech Biodiversity exhibit at the American Museum of Natural History in New York, and many others, they are trying to appear greener, more righteous and more forward looking than even their opponents.
In the U.S. they are bolstering their image, and likely influencing policy, with the support of people at the highest levels of the Clinton administration. In May of 1997, Mickey Kantor, an architect of Bill Clinton's 1992 election campaign and United States Trade Representative during Clinton's first term, was elected to a seat on Monsanto's Board of Directors. Marcia Hale, formerly a personal assistant to the president, has served as Monsanto's public affairs officer in Britain. Vice President Al Gore, who is well known in the U.S. for his writings and speeches on the environment, has been a vocal supporter of biotechnology at least since his days in the U.S. Senate. Gore's Chief Domestic Policy Advisor, David W. Beier, was formerly the Senior Director of Government Affairs at Genentech, Inc. (Comment Number: APHIS-2007-0044-0933-20)

Response: APHIS acknowledges the comment.

Comment Excerpt Text:
Monsanto.com
Who We Are / Company History
http://www.monsanto.com/who_we_are/history.asp
2008
Monsanto acquires Aly Participacoes Ltda., which operates the sugarcane and breeding technology companies, CanaVialis S.A. and Alellyx S.A., both based in Brazil. With this acquisition, Monsanto enters the sugarcane industry.
Monsanto acquires Semillas Cristiani Burkard (SCB), a privately-held seed company headquartered in Guatemala City, Guatemala. SCB is the leading Central American corn seed company focused on hybrid corn production.
Monsanto acquires De Ruiter Seeds Group, B.V., a Dutch holding company that owns and operates De Ruiter Seeds. De Ruiter Seeds breeds, produces and sells hybrid vegetable seeds for top vegetable products such as tomato, cucumber, aubergine, pepper, melon and rootstock. De Ruiter Seeds is one of the top breeding companies in the world.
2007
Monsanto joins the Chicago Climate Exchange® (CCX), North America's only voluntary, legally-binding greenhouse gas emissions reduction, registry and trading program. As part of this program, Monsanto agrees to reduce its own direct carbon emissions from major U.S. operations or purchase carbon emission offsets. Additionally, the company will work with farmer groups to discuss reducing carbon dioxide in the air by practicing no-till agriculture.
Monsanto and Bayer Crop Science AG announce a series of long-term business and licensing agreements related to key agricultural technologies.
Monsanto acquires Delta and Pine Land Company and divests the Stoneville and NexGen cotton businesses.

Monsanto and BASF announce a long-term joint research and development (R&D) and commercialization collaboration in plant biotechnology. The collaboration will focus on the development of high-yielding crops that are more tolerant to adverse environmental conditions, such as drought.
2006
Monsanto's ASI subsidiary acquires several regional seed companies, including Diener Seeds, Sieben Hybrids, Kruger Seed Company, Trisler Seed Farms, Gold Country Seed, Inc., Heritage Seeds and the seed marketing and sales business of Campbell Seed.
2005
Monsanto acquires Seminis, Inc., a global leader in the vegetable and fruit seed industry. Seminis supplies more than 3,500 seed varieties to commercial fruit and vegetable growers, dealers, distributors and wholesalers in more than 150 countries around the world. The company is headquarters in Oxnard, California
Monsanto acquires the Stoneville cotton business, including it's NexGen brand.
Monsanto's ASI subsidiary acquires NC+ Hybrids, Inc., headquartered in Lincoln, Neb.
Monsanto's ASI subsidiary acquires four companies that are the shareowners of the CORE Group - including Fontanelle Hybrids, based in Fontanelle, Neb.; Stewart Seeds, based in Greensburg, Ind.; Trelay
Seeds, based in Livingston, Wis.; and, Stone Seeds, based in Pleasant Plains, Ill. In a separate transaction, ASI also acquires Specialty Hybrids, a leader serving the Eastern Corn Belt.
2004
Monsanto forms American Seeds Inc. (ASI), a holding company for mostly corn and soybeans. ASI supports regional seed businesses with capital, genetics and technology investments.
Monsanto's ASI subsidiary acquires Channel Bio Corp. and its three seed brands: Crows Hybrid Corn, Midwest Seed Genetics and Wilson Seeds.
1998
The original Monsanto completes its purchase of DeKalb Genetics Corp.
1997
Asgrow agronomics seed business is purchased by the original Monsanto.
The original Monsanto purchases Holden's Foundation Seeds L.L.C. and Corn States Hybrid Service L.L.C., a supplier of high quality foundation seed for the corn seed industry. The original Monsanto maintains Holden's/Corn States policy of broadly licensing seed companies elite corn germplasm and trait technologies. (Comment Number: APHIS-2007-0044-0933-25)

Response: APHIS acknowledges the comment. In regard to Monsanto's influence in agriculture, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0.

Comment Excerpt Text:
ASTA would also like to offer some specific comments on the evolution of traditional breeding and consumer preferences and marketing standards, all of importance to U.S. seed industry.
Evolution of Traditional Breeding
The evolution of plant breeding through the use of molecular genetics has enabled a more efficient and expeditious analysis and enhancement of seed varieties; the ability to improve and maximize plant germplasm potential; and the identification of beneficial traits in order to incorporate them into varieties through biotechnology methods. Plant breeders are able to more

specifically correlate gene(s) with a specific phenotype. In general, the techniques of modern biotechnology allow plant breeders to observe the genetic content of plants and keep track of small genetic changes. Traditional breeding techniques include inter-varietal hybrids, wide interspecies crosses, ploidy modification, tissue culture and induced mutation. These techniques can mean transferring or altering unknown or uncharacterized, and sometimes relatively large, genetic material. Phenotypic, or observable, characteristics are the basis upon which selection is made to do further breeding. The new techniques of biotechnology—and specifically genetic engineering—should be considered within the context of genetic variations that are phenotypically silent. The application of genetic engineering in and of itself or the presence or absence of a particular gene in and of itself should not be relevant to the Agency's assessment under the National Environmental Protection Act (NEPA) of a decision under the Plant Protection Act (PPA). Specific phenotypic effects related to genetic engineering should be assessed on a case-by-case basis. APHIS is in a unique position to be able to draw certain conclusions about the safety of genetic engineering based on the Agency's experience and the broad scientific consensus regarding this technique. It is important for APHIS to make clear that the process of genetic engineering does not raise unique or independent risks. This determination has been made on several occasions by the National Academy of Sciences: Based on a detailed evaluation of the intended and unintended traits produced by the two approaches to crop improvement, the committee finds that the transgenic process presents no new categories of risk compared to conventional methods of crop improvement but that specific traits introduced by both approaches can pose unique risks. [Footnote 3: NRC, Environmental Effects of Transgenic Plants: The Scope and Adequacy of Regulation (National Academy Press, 2002) at 5 (emphasis in the original). See also NRC, Genetically Modified Pest-protected Plants: Science and Regulation (National Academy Press, 2000) at 5-6 and 42-45; National Academy of Sciences, Introduction of Recombinant DNA-Engineered Organisms into the Environment: Key Issues (1987) at 22.] This EIS is the correct mechanism for the Agency to re-address a number of issues raised about genetic engineering—top most, being lack of environmental relevance of moving a gene from one plant to another without any phenotypic change. This EIS is also the correct mechanism to reiterate other conclusions regarding the application of genetic engineering: - Simply because a plant has been genetically engineered (is transgenic) does not in and of itself mean that gene flow from this plant to a nontransgenic plant will be any more likely than between other plants [Footnote 4: See, e.g., discussion in APHIS DEIS for proposed amendments to 40 CFR Part 340, Introduction of Genetically Engineered Organisms-Draft Programmatic Environmental Impact Statement, July 2007. at 73-74.]; - Plants that have been genetically engineered are no more likely than other plants to persist in the environment, simply because they have been genetically engineered [Footnote 5: See, e.g., id. at 76-79.]; - There is no evidence that horizontal gene transfer poses a significant potential risk for the transfer of traits from genetically engineered plants simply because they have been genetically engineered. [Footnote 6: See, e.g., id at 83-86.] (Comment Number: APHIS-2007-0044-10725-2)

Response: APHIS acknowledges the comment. The PPRA assessed phenotypic charaterisitcs of GT alfalfa lines J101 and J163. It concluded that with the exception of resistance to glyphosate, the two lines were no different than conventional alfalfa varietities. The analysis in the EIS is specific to GT alfalfa an assessment of all genetically engineered crops is outside the scope of this EIS.

Comment Excerpt Text:
While the use of modern biotechnology may be an appropriate regulatory trigger under the PPA, for purposes of an analysis conducted under the National Environmental Policy Act (NEPA), it is important for APHIS to make clear that the process of genetic engineering does not raise unique or independent risks. This determination has been made on several occasions by the National Academy of Sciences: Based on a detailed evaluation of the intended and unintended traits produced bythe two approaches to crop improvement, the committee finds that the transgenic process presents no new categories of risk compared to conventional methods of crop improvement but that specific traits introduced by both approaches can pose unique risks. [Footnote 7: NRC, Environmental Effects of Transgenic Plants: The Scope and Adequacy of Regulation (National Academy Press, 2002) at 5 (emphasis in the original). See also NRC, Genetically Modified Pest-protected Plants: Science and Regulation (National Academy Press, 2000) at 5-6 and 42-45; National Academy of Sciences, Introduction of Recombinant DNA-Engineered Organisms into the Environment: Key Issues (1987) at 22.]
This distinction between the PPA regulatory trigger and the potential risk posed by GE plants as compared to plants developed through traditional breeding is particularly important in the context of the NEPA process. While the regulators within APHIS may be familiar with the types of genotypic and phenotypic review appropriate for a particular regulated article, the broader involvement of the public in the NEPA review process requires a more complete discussion of the nature of the risks assessed in the NEPA review, and a full discussion of the context in which the risk assessment for these plants occurs. (Comment Number: APHIS-2007-0044-10866-1)

Response: In regard to agricultural approaches supported by APHIS, see the response to comment APHIS-2007-0044-10725-2 for Issue 13. In regard to the potential for different or unintended plant traits and thus unique risks associated with GE alfalfa, see response to comment APHIS-2007-0044-7620-38 for Issue 13.

Comment Excerpt Text:
ABPC is a coalition representing farmers, food processors and manufacturers, merchandisers and biotechnology providers that support the continued availability and marketability of products derived from agricultural biotechnology. ABPC has been a resource to administration officials over the past ten years. We provide a forum for policymakers to discuss agriculture biotechnology issues and exchange information with the food chain groups. ABPC also strives to reach consensus positions on important biotechnology policy issues.
The first fourteen years of commercially available crops derived from modern biotechnology have delivered substantial economic and environmental benefits. For these reasons, global adoption of these crops has accelerated rapidly in the past several years. Currently, the United States leads the world in the development of these technologies which has been made possible by the science-based regulatory framework adopted by the U.S. government. As a result of APHIS's stringent regulatory review, consumers can be confident in the safety of new crops while innovative companies continue to make investments and create value for farmers and jobs for the American people.
In the case of GT alfalfa, this product has successfully completed the review process at APHIS and the Food and Drug Administration (FDA), and the use of glysophate for effective weed control on alfalfa has been approved by the Environmental Protection Agency (EPA). Per the

DEIS, ABPC acknowledges that GT alfalfa, like other widely used crops with the same trait, can provide important benefits to U.S. producers. Other crops genetically engineered for tolerance to glyphosate have been used safely on millions of acres for over a decade.
In keeping with the Council on Environmental Quality guidelines, the final EIS should incorporate the reviews conducted by FDA and EPA by reference.[Footnote 1: "Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act" 40 C.F.R. Part 1502.2 (Nov. 1978)] (Comment Number: APHIS-2007-0044-11753-1)

Response: APHIS acknowledges the comment. The DEIS and FEIS support the opinion that GE alfalfa can provide benefits to U.S. producers. Regarding the CEQ guidelines and FDA and EPA reviews, see response to comment APHIS-2007-0044-11753-1 for issue 2.0.

Comment Excerpt Text:
They are opposed to GM crops that will intensify corporate monopoly, exacerbate inequality and prevent the essential shift to sustainable agriculture that can provide food security and health around the world.
• They call for a ban on patents of life-forms and living processes which threaten food security, sanction biopiracy of indigenous knowledge and genetic resources and violate basic human rights and dignity.
• They want more support on research and development of non-corporate, sustainable agriculture that can benefit family farmers all over the world. (Comment Number: APHIS-2007-0044-1295-3)

Response: In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for issue 5.2. In regard to agricultural approaches supported by APHIS, the mission of APHIS is to protect the health and value of U.S. agricultural, natural, and other resources. While carrying out its diverse protection responsibilities, APHIS makes every effort to address the needs of all stakeholders involved in the U.S. agricultural sector.

Comment Excerpt Text:
I am outraged that the USDA is going to allow Monsanto to release genetically modified Alfalfa, despite the warnings from experts around the world. Monsanto has NO RIGHT to contaminate our entire supply of Alfalfa with their Roundup Ready genetically modified seeds. Crop by crop Monsanto is trying to monopolize the agriculture industry and it is completely unacceptable. As citizens and taxpayers we have a RIGHT to be protected from this potentially dangerous technology that will NOT be able to be stopped once it's unleashed. The conspiracy that is going on between Monsanto and supposedly government organizations MUST be stopped. Please listen to your conscience and stand up for what's right. (Comment Number: APHIS-2007-0044-2226-1)

Response: APHIS acknowledges the comment. APHIS values all types of agriculture: organic, conventional, and genetically engineered. The EIS examines the interaction of GT alfalfa with other types of agriculture.

Comment Excerpt Text:
I would just like to state that I do care wether or not the products I buy contain Genetically Modified components. I would also like to state that there is a large population that would agree with me but are uninformed of the decisions made in the food system. Allowing Monsanto to control our alfalfa supply may lead to them thinking that they too own the cattle who eat the alfalfa. All of which is impossible.
Please please please believe that people do not know much of what is happening to their food, and if they did they might not like what they found out. I personally do not want to eat or support the industry of Genetically Modified food. I would rather starve.
Thank you for you time (Comment Number: APHIS-2007-0044-2262-1)

Response: APHIS acknowledges the comment. The analysis in the EIS recognizes that some consumers prefer conventional or organic food (not GE). The EIS examines the impacts of GT alfalfa on those markets.

In regard to Monsanto's influence in agriculture, see the response to comment APHIS-2007-0044-2225-3 for issue 5.0"

Comment Excerpt Text:
The necessary case-by-case evaluation has not been provided in this EIS, as many of the conclusions are based on the "nothing bad has happened yet" philosophy to scientific analysis. At the very least, humans will be secondary consumers of GT alfalfa via meat, dairy and honey, and the uptake of genetic material from GT crops is not speculation, but scientific fact. (Comment Number: APHIS-2007-0044-2325-6)

Response: In regard to the food and feed safety of GE alfalfa, see the response to comment APHIS-2007-0044-11018-6 for issue 5.2.

Comment Excerpt Text:
Lastly, Monsanto is rightly reviled for their eagerness to use lawsuits (and the threat thereof) against farmers and seed dryers who have inadvertently broken their patents. (Comment Number: APHIS-2007-0044-3228-2)

Response: In regard to potential lawsuits from Monsanto, see the response to comment APHIS-2007-0044-6376-1 for issue 5.1.

Comment Excerpt Text:
As a member of the public and contrary to the apparent belief of the USDA, I do indeed care about buying products that have not been altered by adding genes of other species. Further, although we live on a low income, being retired, my husband and I buy
only organic fruit, vegetables, meat and grains. I think the proliferation of Round-up-resistant crops and patented seed will hurt all the smaller farmers that provide our food. Please, let's pay attention to the desires of people like us as well as to those who point out that the long-term

environmental danger of genetically manipulated plants is more important than big agribusiness getting more money. (Comment Number: APHIS-2007-0044-3292-1)

Response: See the response to comment APHIS-2007-0044-3291-1 for issue 5.6.

Comment Excerpt Text:
I testified in opposition to RR alfalfa at the Lincoln Nebraska USDA APHIS BRS listening session. I was the only person who spoke against RR alfalfa. The evidence of the deceptive stories and false advertising that the pro-GMO biotech companies promote, rang very true in the words spoken by those in attendance, who spoke in favor of RR alfalfa. I offer these comments in response to what was said in favor of RR alfalfa in Lincoln Nebraska.
There were was one gentleman who tried to convince those in attendance that the GMO process is the same plant breeding technique that has been used since wheat and corn were developed a thousand years ago. It is sad that more people do not understand that this is not true. There is a huge difference between the natural process of cross breeding plants and the inserting of genes and traits in vitro in a laboratory with a gene insertion gun. The GMO insertion process takes genes or events from unlike species and shoots them into the DNA of the plant with a shot gun type gene insertion gun. There is also a virus, an antibiotic resistant gene or a genetically engineered agro-bacterium inserted with the foreign gene. The insertion process damages the DNA of the plant upon insertion with NO knowledge or CONTROL over which DNA molecule(s) will be damaged or displaced during the insertion process. The potential side effects of the changes in the protein make up of the grain and forage of the GMO plant are virtually unknown and certainly untested.
There was one gentleman who could not control weeds on his farm without Roundup. I feel sorry for his soil. (Comment Number: APHIS-2007-0044-3395-1)

Response: In regard to the genetic engineering process and unintended plant traits, see the response to comment APHIS-2007-0044-7620-38 for Issue 13.

Comment Excerpt Text:
This paper examines the potential impacts of the wide-scale introduction of biotechnology-derived crops on the coexistence of different breeding and cultivation crop systems. In the context of modern biotechnology, the term “coexistence” has been defined to refer to the ability of farmers to make a practical choice between conventional, organic, and biotechnology-derived crop production and the resulting ability to offer that choice to consumers (CEC 2006, USDA 2008). More generally, the coexistence of different crop production systems has been carefully developed through the cooperative efforts of farmers, seed producers and other members of the agricultural community over the past century or more.

The biotechnology-derived crops specifically discussed in this paper are those that contain the glyphosate-tolerance trait, i.e., the plants are able to tolerate the use of the herbicide glyphosate “over the top” of the crop even after the plants have emerged from the ground. The scientific and agricultural principles involved in this analysis (e.g., biology, plant breeding, seed production, good agricultural practices), however, are universal and apply to the coexistence of any

biotechnology-derived crop (e.g., insect resistant, drought resistant) with one or more other crop production systems.

The safety of crops developed through biotechnology has been well-documented elsewhere and is not discussed here. Unless otherwise noted, all references to biotechnology-derived crops here are to crops that have been fully assessed for health and environmental safety by the appropriate federal regulatory agencies and fully cleared for commercial use in the United States (U.S.).

Plant Variety Biology

Plant evolution and all plant breeding are based on the interplay and unique combinations of genes among plants. This biological certainty has existed since the dawn of time. It was the ability to harness this activity that allowed humans to cultivate crops and develop agriculture millennia ago. Any discussion of pollen flow from biotechnology-derived plants must take place within the context of pollination and gene flow that has always occurred among plants.

Thus, genetic (transgenic) engineering is widely considered to be the next logical step in a natural progression in biotechnological techniques that have been developed over millennia and, in particular, over the past century. These techniques are often referred to as classical or traditional, even though they include such modern processes as tissue culture, embryo rescue, and chemical- and irradiation-induced gene mutation.

For example, a 1989 report by the National Research Council (NRC), of the National Academy of Science sets out to explore the basic biological principles that underlie both classical and molecular means of altering the genetic makeup of organisms and explains how its "interpretation of these principles leads to the conclusion that the products of classical and molecular methods are fundamentally similar" (NRC 1989). The report further concludes that while classical modifications for enhancing genetic variability in plants, such as spontaneous or mutagen-induced variation, hybridization and gene transfer, are relatively imprecise and undirected and less powerful than molecular techniques for modifying genes, "no conceptual distinction exists between genetic modification of plants and microorganisms by classical methods or by molecular techniques that modify DNA and transfer genes" (NRC 1989). Moreover, as the report's accompanying figure illustrates, "no distinction exists between so-called classical and molecular breeding methods at the steps of evaluation in laboratory, field, or large-scale environmental introduction" (NRC 1989).

The Food and Agriculture Organization (FAO) and the World Health Organization (WHO) concluded, in a 1991 Joint Consultation report, that "genetic modification of organisms by means of current technologies represents the latest point reached in a continuum of development rather than a unique branch of science. Many aspects of an assessment strategy are therefore common to all products irrespective of whether the method used to effect genetic modification is traditional breeding and selection, chemical or physical mutagenesis, or recombinant DNA technology" (WHO 1991). The report concludes that "[b]iotechnology has a long history of use in food production and processing. It represents a continuum embracing both traditional breeding techniques and the latest techniques based on molecular biology. The newer biotechnological techniques, in particular, open up very great possibilities of rapidly improving the quantity and

quality of food available. The use of these techniques does not result in food which is inherently less safe than that produced by conventional ones" (WHO 1991).

Issued in 2000, an Institute of Food Technologists (IFT) Expert Report presents a detailed discussion of how foods that are derived using recombinant DNA technology are merely "the latest step in a 10,000-year sequence of human intervention in the genetic improvement of food" (IFT 2000). Nobel Prize-winner Norman Borlaug has written that "genetic engineering of plants at the molecular level is just another step in humankind's deepening scientific journey into living genomes. Genetic engineering is not a replacement of conventional breeding but rather a complementary research tool to identify desirable genes from remotely related taxonomic groups and transfer these genes more quickly and precisely into high-yield, high-quality crop varieties" (Borlaug 2000).

In a review of the place of direct gene transfer in the context of several thousand years of genetic modification of food crops, Channapatna Prakash [Footnote 1: Professor of Plant Molecular Genetics at Tuskegee University, Alabama, and past member of the USDA Advisory Committee on Agricultural Biotechnology.] concludes that "[u]sing gene transfer techniques to develop GM crops thus can be seen as a logical extension of the continuum of devices we have used to amend our crop plants for millennia. When compared to the gross genetic alterations using wide-species hybridization or the use of mutagenic irradiation, direct introduction of one or a few genes into crops results in subtle and less disruptive changes that are relatively specific and predictable" (Prakash 2001).

In a European Review article on transgenic crop breeding (plant molecular breeding), Francisco García-Olmedo [Footnote 2: Professor of Biochemistry and Molecular Biology, Universdad Politécnica de Madrid.] states that it "represents a new technology that adds to, rather than substitutes for, traditional breeding practice, and shares with it the same long-standing objectives: higher yield, better products, better-adapted plants" (2002).

The most recent edition of "Breeding Field Crops," a textbook long recognized as the standard work in its field, expresses a similar view. "Biotechnology in its most simplistic sense is the genetic modification of living organisms. Hence, all crop varieties grown today have had their DNA manipulated in some form or another – the essence of biotechnology….Traditional plant breeding procedures are based on manipulation of genes and chromosomes through sexual reproduction in whole plants…. Today, biotechnology has developed the genomic tools for supplementing traditional plant breeding procedures by extending genetic manipulations beyond the level of sexual reproduction…. In many respects, plant genetic engineering (transformation) is comparable to the backcross method of breeding in which desirable genes are transferred to a recipient genotype by a succession of crosses" (Sleper and Poehlman 2006).

Finally, a paper reflecting similar views, entitled "Agricultural Biotechnology" was published online in 2003 by the Food Safety Research and Information Office of the National Agricultural Library. The paper notes that "biotechnology is often seen as a natural progression from the early techniques of traditional plant breeding using artificial man-made crosses to modify a plant," and refers to the precision associated with the techniques of genetic engineering (USDA 2005a).

In evaluating the techniques to be used in assessing potential health, safety and environmental risks associated with biotechnology-derived organisms, the National Academy of Sciences (NAS) has repeatedly held that the properties of the organism should be the focus of risk assessments, not the process by which the organism was produced and, further, that there is nothing inherent in the use of modern gene transfer techniques that distinguishes the potential risks of biotechnology-derived organisms from the risks associated with unmodified organisms and those modified by other methods (NAS 1987, NRC 2000). The U.S. Food and Drug Administration (FDA) has commented in various policy and guidance documents on the similarity in issues raised across various breeding methods (e.g., narrow-crosses, wide-crosses, mutagenesis, and recombinant DNA techniques), and stated that all of these techniques "require extensive back crossing with the parent line to eliminate mutations unlinked to that responsible for the desired phenotype and undesirable traits in extraneous genetic material introduced along with that encoding the desired trait" (FDA 1992).

The techniques of modern biotechnology allow us for the first time to directly observe and record the genetic contents of plants around us and to manipulate them with greater specificity and certainty than ever before. Because we can trace those changes for the first time, however, does not mean that this is the first time that genetic changes in plants have occurred. Such changes, some of them significant, occur naturally and constantly. In modern agriculture, plant scientists are actively attempting to promote and direct these changes in order to improve plant health, sustainability and nutrition.

These minor genetic changes do not create safety concerns in modern commercial breeding programs. Phenotypic variations resulting from conventional breeding are typically far broader than those possible through genetic engineering, but pose no known risks in the vast majority of cases. For example, sexually crossing wild varieties of tomatoes into cultivated varieties has resulted in the transfer of chromosomal segments of variable sizes, encoding dozens to hundreds of unknown genes (Bradford et al. 2005, Ho et al. 1992, Young et al. 1989). However, despite these variations in the specific molecular environments in which the transferred genes were present, the commercial varieties all exhibited the desired phenotype, they all looked, grew, and tasted as expected (Bradford et al. 2005, Ho et al. 1992, Young et al. 1989).

This was not an isolated incident. Recent genome mapping and sequencing results support the argument that slight genomic alterations have no meaningful effect on the way humans interact with plants through the plant's phenotypic properties. Total DNA content, the number of genes, and gene order can vary considerably even among varieties of the same species (Arumuganathan and Earle 1991, Bradford et al. 2005, Fu and Dooner 2002, Song and Messing 2003). Studies have shown that different varieties of

corn, chili pepper and soybean can differ in their DNA contents by as much as 42%, 25% and 12%, respectively (Bradford et al. 2005, Graham et al. 1994; Mukherjee and Sharma 1990, Rayburn et al. 1989). For soybeans, this means that different varieties can differ by over 100 million base pairs of DNA (Bradford et al. 2005, Ilic et al. 2003). By comparison, transgenes add only a few thousand base pairs to genomes, reflecting the greater precision associated with modern biotechnology. Among corn plants, even individual plants within a defined population have different numbers of genes (Bradford et al. 2005, Fu and Dooner 2002, Song and Messing

2003). An even more extreme example of genetic diversity in a single crop is the production of vegetable oil from five different Brassica species: B. napus, B. rapa, B. juncea, B. carinatta and B. hirta (Kimer and McGregor 1995). Transposable elements move into and out of genes where they can alter gene expression or serve as sites of chromosome breakage or rearrangement. Parts of DNA continuously insert themselves between genes and are likely to have resulted in improvements in plant adaptation through both evolution and breeding (Bradford et al. 2005, SanMiguel 1996, Ceccarelli et al. 1997, Shirasu et al. 2000).

Although traditional cross-breeding is not without some degree of risk, that potential risk is quite small, carefully managed and widely accepted. Some conventional breeding techniques include intervarietal hybrids, wide interspecies crosses, inbreeding, ploidy modification and tissue culture (Bradford et al. 2005). Conventional breeding also includes mutation breeding in which random genetic changes are induced throughout the plant's genome. These breeding methods, routinely used in conventional agriculture, can and do produce collateral (i.e., pleiotropic) effects.

In all these cases, the selection of plants to take forward to further breeding and commercialization is based almost entirely on phenotypic characteristics (observable traits, i.e., how the plant looks, thrives and produces) (Bradford et al. 2005). Analysis of the unique genetic makeup of plants was impossible until quite recently and remains expensive and time-consuming. It is also largely unnecessary for the vast majority of plant breeding. While some potential risks to human health or the environment may be associated with any cross-breeding, traditional agronomic practices have developed reliable and well-accepted methods for addressing and minimizing these risks.

For example, over 2,200 crop varieties have been commercialized that have had an irradiation-induced mutation step in their pedigrees (Bradford et al. 2005, Haslberger 2003, Kuiper et al. 2001). Only in extremely rare cases were increases in a potentially harmful constituent found in varieties developed through either irradiation or chemical mutagenesis (Bradford et al. 2005, Van Harten 1998). Even in the few cases where such constituents were found at unexpectedly high levels in these conventionally bred cultivars, they were substances already known to be present in those species (e.g. solanine in potato or psoralens in celery) rather than entirely novel compounds (Bradford et al. 2005). Accordingly, they would be detected using the same standard phenotypic screens applied to biotechnology-derived crops. For over a century of conventional plant breeding, developers safely monitored and controlled variations in trait expression within a plant population during the course of these phenotypic screens, the multi-generational process of selection for desired traits. (Comment Number: APHIS-2007-0044-7620-38)

Response: As discussed in appendix U of the DEIS, analysis of forage samples demonstrates that GT alfalfa is compositionally and nutritionally equivalent to other alfalfa varieties currently on the market except for the expression of the transgene protein. There are no unintended traits observed, as described in appendices U and W of the DEIS. For example, emergence, vigor, yield, regrowth after cutting, response to stressors, reproductive characteristics, stand longevity, dormancy, germination, and symbiotic relationship with root nodule microorganisms were all within normal expected ranges. A summary of yield information is presented in table 4-4 in

section IV.D.1 and table K-8 in appendix K of the DEIS. The public tests and other relevant references on yield referred to in the comment are discussed in appendix U of the FEIS.

Comment Excerpt Text:
For over twenty years, Monsanto has been an agricultural company focused on using biotechnology to help farmers produce more while conserving more, while FGI is dedicated to developing, producing, and marketing high-quality, value-added alfalfa genetics and technologies. Doing so is not a unique or novel process; instead, the development of genetically engineered ("GE") crops such as RRA carries on a long tradition in the United States of using technology to improve the quality of agricultural products. As the World Health Organization has observed, "[b]iotechnology has a long history of use in food production and processing. It represents a continuum embracing both traditional breeding techniques and the latest techniques based on molecular biology. The newer biotechnological techniques, in particular, open up very great possibilities of rapidly improving the quantity and quality of food available. The use of these techniques does not result in food which is inherently less safe than that produced by conventional ones." [Footnote 4: World Health Organization, Strategies for assessing the safety of foods produced by biotechnology, Report of the Joint FAO/WHO Consultation (1991); see also Comment Appendix 2 at 1-5 (discussing history of biotechnology in agriculture, and noting that the National Academy of Sciences "has repeatedly held that the properties of [GE organisms] should be the focus of risk assessments, not the process by which the organism was produced"); International Food Information Council Foundation, Questions and Answers About Food Biotechnology (Dec. 1, 2008) ("Based on strong scientific evidence and consensus among a broad representation of scientific and governmental bodies, there is no known food safety concern related to consuming food produced through biotechnology. A number of food and health organizations such as the American Dietetic Association, American Medical Association, and Institute of Food Technologists recognize and support the use of food biotechnology."), available at http://www.foodinsight.org/Resources/Detail.aspx?topic=Questions_and_Answers_About_Food_Biotechnology.] (Comment Number: APHIS-2007-0044-7620-4)

Response: APHIS acknowledges the comment. Refer to the response to comment APHIS-2007-0044-0278-1 for issue 6.0, which describes APHIS' regulatory approach and how the potential risks GT alfalfa and other biologically engineered products have been addressed.

Comment Excerpt Text:
Many of Monsanto's seeds have been genetically modified to "self-destruct", meaning the seeds and the forthcoming crops are sterile (known as "terminator" technology). This ensures that farmers must buy new seed from Monsanto every year. Even worse, once the terminator seeds are released, the trait of seed sterility could be passed to other non-genetically engineered crops, making most or all of the seeds in the region sterile. If allowed to continue, every farmer in the WORLD could come to rely on Monsanto for his or her seed supply! (Comment Number: APHIS-2007-0044-8492-2)

Response: GT alfalfa J101 and J163 do not utilize "terminator" technology. This technology, called Genetic Use Restriction Technology, is not commercially available due to opposition from the public as well as a moratorium under the UN Convention on Biological Diversity. As discussed in chapter I of the FEIS and appendix Q of the DEIS, the GE alfalfa events J101 and J163 include incorporation of the CP4 EPSPS transgene.

Comment Excerpt Text:
MYTH #1: Genetic engineering is merely an extension of traditional breeding.
REALITY: Genetic engineering is a new technology that has been developed to overcome the limitations of traditional breeding. Traditional breeders have never been capable of crossing fish genes with strawberries. But genetically engineered "fishberries" are already in the field. With genetic engineering, these types of new organisms can be created and released into the environment1. Food and Drug Administration scientists stated that genetic engineering is different from traditional breeding, and so are the risks2. Despite this warning, the FDA continues to assert that GE foods and crops are not different and don't require special regulations.
MYTH #2: Genetic engineering can make foods better, more nutritious, longer-lasting and better-tasting.
REALITY: The reason for the 70 million acres of GE crops grown in this country today has nothing to do with nutrition, flavor or any other consumer benefit. There is little benefit aside from the financial gains reaped by the firms producing GE crops. Nearly all of the GE corn, soy, potatoes and cotton grown in the United States has been genetically altered so that it can withstand more pesticides or produce its own. (Comment Number: APHIS-2007-0044-8810-2)

Response: In regard to the genetic engineering process and unintended plant traits, see the response to comment APHIS-2007-0044-7620-38 for Issue 13.

Comment Excerpt Text:
MYTH #6: GE foods are necessary to feed the developing worlds growing population.
REALITY: In 1998, African scientists at a United Nations conference strongly objected to Monsanto's promotional GE campaign that used photos of starving African children under the headline "Let the Harvest Begin." The scientists, who represented many of the nations affected by poverty and hunger, said gene technologies would undermine the nations' capacities to feed themselves by destroying established diversity, local knowledge and sustainable agricultural systems7. Genetic engineering could actually lead to an increase in hunger and starvation. Biotech companies like Monsanto force growers to sign a ãtechnology use agreementä when growing their patented GE crops which stipulates, among other things, they the farmer can not save the seeds produced from their GE harvest. Half the world's farmers rely on saved seed to produce food that 1.4 billion people rely on for daily nutrition. (Comment Number: APHIS-2007-0044-8810-6)

Response: APHIS acknowledges the comment. The comment regarding the necessity of GE crop production for African nations, however, is outside the scope of the EIS and APHIS' regulatory authority.

Comment Excerpt Text:
A major UN/World Bank-sponsored report compiled by 400 scientists and endorsed by 58 countries concluded that GM crops have little to offer global agriculture and the challenges of poverty, hunger, and climate change, because better alternatives are available.
Other farm technologies are more successful
Integrated Pest Management and other innovative low-input or organic methods of controlling pests and boosting yields have proven highly effective, particularly in the developing world.
GM foods have not been shown to be safe to eat
Genetic modification is a crude and imprecise way of incorporating foreign genetic material into crops, with unpredictable consequences. The resulting GM foods have undergone little rigorous and no long-term safety testing, but animal feeding tests have shown worrying health effects.
Stealth GMOs in animal feed -- without consumers consent (Comment Number: APHIS-2007-0044-9298-3)

Response: APHIS acknowledges the comment and recognizes that there are many agricultural techniques that can be used singularly or in combination in manage pests and improve yields. However, a broader discussion of these techniques used abroad is outside the scope of this EIS. In regard to the food and feed safety of the GT alfalfa transgene, see the response to comment APHIS-2007-0044-11018-6 for issue 5.2. In regard to presence of GE products without consumer consent, APHIS analyzed the impact of GT alfalfa deregulation on downstream markets, including meat and dairy, in appendix T of the DEIS. The analysis concluded that adoption of GT alfalfa could benefit dairy and meat farmers to the extent that it affected overall prices of high quality alfalfa hay. APHIS found no evidence that overall organic dairy and meat farmers would be harmed by the unintended presence of genetically engineered material in non-GT and organic feed, although specific GT-sensitive segments could be.

Comment Excerpt Text:
While Monsanto and FGIs GT Alfalfa is currently the only existing GE alfalfa, it is possible that in the future, additional lines of GE alfalfa will be created with traits that can be “stacked.” Stacking of GE crops may create significant environmental impacts that have not before been analyzed anywhere, such as “super-glyphosate tolerance.” For instance, in other GT crops, GE crop producers intend on stacking up to three mechanisms of glyphosate-tolerance in a single plant. This will allow more frequent applications of higher doses of glyphosate, perhaps over the entire growing season of the crop. Such super-tolerance will enable vastly increased use of glyphosate (over already exorbitant and growing levels) in an attempt to keep up with the rapidly growing level of glyphosate-resistance found in various weed species. The end result is a vicious circle of rising glyphosate use to control resistant weeds, followed by increased weed resistance, which in turns drives still more chemical use. New GT crop varieties have also begun to stack glyphosate-resistance with resistance to older, more toxic pesticides like 2,4-D, demonstrating that the proliferation of glyphosate-resistant weeds is driving the creation of new stacked crops, which will in turn drive the return to using of more toxic herbicides. While Monsanto and FGI have yet to propose such stacking in alfalfa, it is a potential future impact that APHIS must address. (Comment Number: APHIS-2007-0044-9936-20)

Response: Any future genetically engineered varieties that incorporate multiple transgene traits would undergo separate environmental review by APHIS at the time the developing company petitions for deregulation. The environmental impacts under NEPA would be evaluated at that time.