

APHIS

Draft Questions for Baseline and Genetically Engineered Weed Risk Assessment

BRS is developing a weed risk assessment (WRA) approach and we welcome comments and questions from our stakeholders at the upcoming Nov. 16 BRS Stakeholders Meeting.

The current draft of this WRA approach consists of 25 background questions and 25 weed risk questions (16 Biology and 9 Impact), which are listed below.

Background Questions: the purpose of the 25 background questions is to provide administrative, technical and biological context in preparation for answering the 25 weed risk assessment questions.

- 1) Enter the WRA version number.
- 2) Enter the assigned WRA number.
- 3) Indicate whether this is a baseline or genetically engineered (GE) WRA.
- 4) Enter the baseline WRA number.
- 5) Indicate if the document contains confidential business information (CBI).
- 6) If this WRA is for a GE plant, enter the full name of the applicant's institution that developed the GE plant.
- 7) Enter the names of the preparers of this WRA (last name, first name).
- 8) Enter the names of the reviewers of this WRA (last name, first name).
- 9) Enter the primary common name of the species.
- 10) Enter the primary scientific or Latin name of the species or lower taxon according to the [Integrated Taxonomic Information System \(ITIS\)](#), including the taxon author.
- 11) Enter any other common names for the plant, separated with commas and citing sources.
- 12) Enter any scientific name synonyms for the taxon, separated with commas and citing sources.
- 13) Clearly describe the taxonomic level for the WRA and your reasoning for including or excluding taxa from the scope. For example, if there are closely related plants, state whether the scope of the WRA includes the related plants or only the cultivated variety, and why.
- 14) Provide the following information for each known sexually compatible relative (SCR):
 - Scientific name (common name if one exists)
 - Degree of compatibility (natural hybrids known, hybrids formed in field crosses, hybrids formed in laboratory crosses at a high rate, hybrids formed in laboratory crosses at a low rate, etc.)
 - Whether the SCR is present in the U.S.
 - Whether the SCR is considered weedy or invasive, including the context in which it is considered a weed or invasive (e.g., corn field, rangeland, natural area, etc.) and whether it is on a Federal or State Noxious Weed List
 - Whether hybrids are more weedy or invasive than either parent, if known
- 15) If this WRA is for a GE plant, select the two-letter designation for one or more categories of the intended phenotype(s). If this is a baseline WRA, enter N/A.
 - **AP.** Agronomic property (e.g., tolerance to specific environmental stresses, enhanced nitrogen use, male sterility)
 - **BR.** Bacterial resistance
 - **FR.** Fungal resistance
 - **HR.** Herbicide resistance
 - **IR.** Insect resistance
 - **NR.** Nematode resistance
 - **PQ.** Product quality (e.g., delayed ripening of fruit, altered amino acid profile, modified seed storage proteins, enhanced floral characteristics)
 - **VR.** Virus resistance
 - **MG.** Marker gene
 - **OO.** Other modifications that do not clearly fall into one of the other categories (e.g., control lines transformed with empty vectors).
- 16) If this WRA is for a GE plant, enter the GE phenotype intended by the genetic modification (e.g., increased biomass, Phytophthora resistance, increased oleic oil content, etc.).
- 17) If this WRA is for a GE plant, enter a description of the GE phenotype intended by the genetic modification. In addition, describe other phenotypes that may be caused by the genetic modification. Include the mechanism

APHIS

Draft Questions for Baseline and Genetically Engineered Weed Risk Assessment

of action by which the phenotype is conferred, if applicable. Document if any varieties of the taxon being evaluated have had similar phenotypes developed through breeding.

- 18) If this WRA is for a GE plant, summarize relevant details of the introduced genetic material, i.e., the construct.
- 19) Document the following information about the taxon, if applicable: center of origin, when the taxon was domesticated, when it was introduced to the United States, the primary uses of the plant (e.g., human food, animal feed, oil, biofuel feedstock) and the parts of the plant so used (e.g., grain, tubers, leaves), and the major cultivated types (including how much of the cultivated crop is GE).
- 20) Document the following information about the taxon, if applicable: annual or perennial, growth habit (e.g., grass, herb, shrub), whether plants typically reproduce from seed or vegetatively, seed germination requirements and characteristics, flowering and pollination characteristics, disease and pest susceptibilities, habitat types and any other notable biological characteristics.
- 21) Document basic agronomic information, including whether plants of the taxon are commercially grown from seed or vegetatively propagated; whether plants are grown using tillage, reduced till, or no till; whether fertilizers, herbicides, pesticides or irrigation are used to maximize production; and how much of the crop is cultivated using organic practices.
- 22) Is the taxon a known weed or does it act as a problematic volunteer? If yes, document the management practices used to control plants for each land use or habitat type in which it occurs and the difficulty of managing the plant.
- 23) If this WRA is for a baseline plant, document the current geographic distribution of the taxon within the United States and territories. The current geographic distribution includes both where the plant is cultivated and where the plant is established without intentional human assistance (e.g., as a native in its U.S. range or as a naturalized, weedy, or invasive plant). If this WRA is for a GE plant which has a history of cultivation in the U.S., document where the GE plant is cultivated and for how long. Attach a map if available.
- 24) If this WRA is for a baseline plant, document the plant hardiness zones and precipitation zones where the taxon grows without intentional human assistance, both inside and outside the U.S.
- 25) If this WRA is for a baseline plant, determine where the plant has the potential to establish in the U.S. without intentional human assistance. Do not consider cultivation when determining potential distribution. If this WRA is for a GE plant, determine if/how the geographic distribution might change due to the GE trait.

Weed Risk Questions – Biology: These questions address biological characteristics associated with weediness and invasiveness as measured by known weediness, competitive growth ability, reproduction, spread and persistence, and stress tolerance.

B01) Current Weed and Invasive Status: Assess whether the taxon has escaped, naturalized, or demonstrated weediness or invasiveness in the United States, or if cultivated in the United States for less than 50 years, assess whether the taxon has escaped, naturalized, or demonstrated weediness or invasiveness outside the United States in areas that match climates in the United States.

B02) Weedy and Invasive Relatives: Assess whether the plant has relatives that are weedy or invasive in the United States or elsewhere. Plants with relatives that are weedy or invasive may have an increased propensity for weediness or invasiveness. Plants that produce weedy or invasive hybrids pose increased weed risk.

B03) Ability to Establish: Assess whether seedlings and dispersed vegetative propagules could establish in existing vegetation (e.g., crops, pastures, grasslands, wetlands, shrublands, forest, native and naturalized vegetation). This question addresses the ability of individual plants to establish, not the ability of the plant to establish a self-perpetuating population. However, in the absence of other evidence, the establishment of a self-perpetuating population can be an indirect indicator of the ability of individual plants to establish. Consider establishment ability within the type of land uses and habitats in which the plant occurs.

B04) Dense Thickets or Monospecific Stands: Assess whether the plant could grow in dense thickets or monospecific stands without intentional human assistance.

APHIS

Draft Questions for Baseline and Genetically Engineered Weed Risk Assessment

B05) Shade Tolerance: Assess whether the plant can tolerate low light levels with no direct light at some stage of its life cycle. Consideration of the taxon's ecological niche may help address this question. Consideration of the effects of shade on propagule production may also help address this question. However, low propagule production or fecundity is a plant feature associated with increased shade tolerance, so consider relative propagule production, rather than absolute, if you can find data comparing responses to light gradients.

B06) Life Form and Growth Habit: Assess if the plant is a grass, aquatic, or N-fixing woody plant, or has a climbing or rosetting growth habit.

B07) Time to Reproductive Maturity: Assess the plant's time to reproductive maturity without intentional human assistance. Time to reproductive maturity is the time needed from germination or rooting of a new plant to production of seed, vegetative propagules or clones capable of independent growth.

B08) Reproductive Potential: Assess the sexual and vegetative reproductive potential of the plant without intentional human assistance, as measured by propagules per square meter.

B09) Propagule Dispersal: Assess the plant's potential to spread viable propagules without intentional human assistance. Consider natural dispersal mechanisms that can spread propagules (water, wind, birds, mammals, etc.), and unintentional human-mediated dispersal (clothing, agricultural machinery, tires, etc.). Do not consider intentional human-mediated movement of propagules.

B10) Dormancy: Assess whether propagules could remain dormant in the soil or canopy (i.e., forming a seed bank, long-lived bulbs or rhizomes) for greater than 12 months without intentional human assistance.

B11) Regeneration: Assess whether the plant is able to regenerate without intentional human assistance after removal of most of its biomass by mutilation, cultivation, herbivory, or fire. This includes resprouting, coppicing, and suckering. Do not consider seasonal changes (e.g., winter dieback) or growing from seeds or bulbs.

B12) Flood or Drought Tolerance: Assess the plant's ability to survive to reproduction in flood or drought conditions without intentional human assistance.

B13) Tolerance to Poor Soils: Assess the plant's soil requirements and ability to survive to reproduction in poor soils without intentional human assistance such as addition of fertilizers.

B14) Cold Tolerance: Assess the plant's ability to survive to reproduction or over winter in cold temperatures without intentional human assistance. Do not consider dormancy of propagules as cold tolerance.

B15) Biotic Stress Tolerance: Assess the plant's ability to survive to reproduction under the pressures of herbivory or pathogens without intentional human assistance.

B16) Other Biology Weediness Traits: Assess any other characteristics (baseline or GE) that could increase the taxon or GE variety's ability to establish, persist, and spread without intentional human assistance that have not been accounted for in the questions above.

Weed Risk Questions – Impact: These questions assess whether the taxon or GE variety could have an impact on agricultural plants or agriculturally important natural resources, as measured by agricultural impacts, biotic impacts and abiotic impacts.

I01) Agriculture Yield: Assess the plant's ability to reduce yields of other agricultural plants (not including the plant being assessed). Consider potential impacts to agriculture yield only in ecosystems where the plant could establish without intentional human assistance. Do not consider volunteers in the season after a plant is intentionally grown.

APHIS

Draft Questions for Baseline and Genetically Engineered Weed Risk Assessment

102) Agriculture Quality: Assess the plant's ability to reduce the quality of plant products obtained from the land (not including products from the plant being assessed), including pasture and grazing quality. Consider potential impacts to agriculture quality only in ecosystems where the plant could establish without intentional human assistance or in situations when co-mingled seed or other parts of plants being assessed have a property that could cause biological or physical damage to agricultural plants or plant products. Do not consider volunteers in the season after a plant is intentionally grown.

103) Harm to Agriculturally Important Organisms: Assess the plant's ability to produce harmful substances (e.g., a known toxin) or structures (e.g., spines, barbs) that harm agriculturally important organisms.

104) Competition with Plants: Assess the plant's ability to outcompete or displace other (ie: non-crop) plants during or after the establishment phase in a way that could have a negative impact on agriculturally important natural resources. Consider competition with non-crop plants only in ecosystems where the plant being assessed could establish without intentional human assistance.

105) Hydrology: Assess the plant's ability to cause a detrimental change in hydrology only in ecosystems where the plant could establish without intentional human assistance.

106) Soil Quality: Assess the plant's ability to negatively affect soil quality only in ecosystems where the plant could establish without intentional human assistance.

107) Fire Regime: Assess the plant's ability to cause a change in the frequency or intensity of fires only in ecosystems where the plant could establish without intentional human assistance.

108) Physical Obstructions: Assess the plant's ability to restrict the physical movement of people, livestock, wildlife, vehicles, machinery, or water only in ecosystems where the plant could establish without intentional human assistance.

109) Other Impact Weediness Traits: Assess any other characteristics (baseline or GE) that could increase the taxon or GE variety's impact on agricultural plants or agriculturally important natural resources that have not been accounted for in the questions above.