Frequently Asked Questions About Grasshoppers and Mormon Crickets in Western States

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What impact do grasshoppers and Mormon crickets have on rangeland, agriculture, and the environment?

Grasshoppers and Mormon crickets are natural components of the rangeland ecosystem; however, when their populations reach outbreak levels, they cause serious economic losses to U.S. agricultural resources—particularly in warm, dry conditions. APHIS cooperates with Federal, State, Tribal, and local agencies, organizations, and institutions to conduct survey and suppression activities in Western States to reduce grasshopper and Mormon cricket damage and protect valuable agricultural resources and rangeland. The monetary value of rangeland for livestock forage, recreation, carbon sequestration, and other ecosystem services is estimated to be between $10.7 billion to $21.2 billion (according to a 2012 Economic Analysis prepared by the University of Wyoming through a cooperative agreement with APHIS).

Uncontrolled infestations could cause significant economic losses for U.S. livestock producers by reducing forage available on rangeland, forcing producers to buy supplemental feed or sell their livestock at reduced prices. Besides feeding on grasslands, large grasshopper and Mormon cricket populations can also devastate cultivated crops such as alfalfa, barley, corn, and wheat.

Grasshopper outbreaks can cause significant losses to beekeepers, and their colonies can suffer losses as well when grasshoppers destroy bee rangeland food sources. Beekeepers are then forced to move their hives or buy alternative food sources to sustain them. They can also experience greatly reduced honey production during these times. Grasshopper outbreaks likely impact wild pollinators similarly by destroying or reducing flowering plants.

Rangeland provides recreation areas and opportunities for the public that can also be negatively impacted by grasshopper population outbreaks and the widespread damage they cause. Damage from grasshoppers and Mormon crickets also reduces habitat and food sources for wildlife, which can threaten animal and plant biodiversity as well as the rangeland's ability to sequester carbon.

Benefits derived from suppressing outbreak populations are diverse and include:

- Protection of adjoining cropland;
- Forage preservation for wildlife;
- Habitat sustainment for threatened and endangered species;
- Protection of fragile soils;
- Safeguards to reforestation efforts and social and recreational value; and
- Highway traffic safety, which large masses of Mormon crickets on the roadways can compromise.

Are these invasive or domestic grasshoppers and Mormon crickets?

Low levels of grasshopper and Mormon cricket populations are natural components of the rangeland ecosystem; however, when their populations reach outbreak levels, they cause serious economic and environmental losses. Nearly 400 grasshopper species inhabit the Western United States, but only a small number of them (12

species, in particular) are considered pests, with varying numbers and combinations of species found in a given rangeland ecosystem. The Mormon cricket (*Anabrus simplex*) is the only katydid species known to hatch outbreak populations in the United States.

Is there a difference between grasshoppers and Mormon crickets in terms of the rangeland damage or treatment?

Grasshoppers and Mormon crickets belong to the insect order Orthoptera. Rangeland grasshoppers are ground-dwelling insects with powerful hind legs that enable them to escape from threats by leaping vigorously. Most species also have wings that allow them to fly relatively long distances. They are sometimes referred to as “short-horned” grasshoppers. Mormon crickets are flightless, shield-backed katydids. Although they cannot fly, Mormon crickets move in large groups made up of millions or billions of individual insects, and can migrate great distances.

Grasshoppers and Mormon crickets damage grasses and other vegetation by consuming plant stems and leaves, damaging plant growth and seed production. This reduces valuable livestock forage, and can lead to other environmental effects, including soil erosion and degradation, disruption of rangeland nutrient cycles, interference with rangeland water filtration, and potentially irreversible changes in the rangeland ecosystem. In addition, some populations that develop on rangelands can invade adjacent cropland where the value of traditional crop plants is often much higher than that of rangeland grasses.

How does APHIS assist landowners and managers experiencing grasshopper and Mormon Cricket outbreaks and who is eligible for treatment?

APHIS helps Federal, State, and private landowners in 17 Western States manage grasshopper and Mormon cricket damage on rangeland by providing information about population levels, conducting suppression treatments where possible, and

providing technical assistance.

APHIS and cooperators share the costs of providing suppression treatments on rangelands, in compliance with Section 7717 of the Plant Protection Act. APHIS treats grasshoppers only upon request, and after determining that treatment is warranted. When a Federal land management agency, Native American tribe, State agriculture department, county or local government, private group, or individual with jurisdiction over the land makes a written request for grasshopper treatment, APHIS visits the site and assesses various factors to determine whether action is necessary.

These factors include grasshopper densities per yard, the pest species and its biological stage, treatment timing and options, and other ecological considerations, among others. County, State, and Federal officials, Tribes, and/or rancher groups may also initiate cooperative local programs and request APHIS assistance when surveys show the potential for large grasshopper populations.

APHIS does not have the authority to conduct grasshopper suppression treatments on private crop lands. However, APHIS conducts rangeland suppression treatments in areas where federally managed rangeland is immediately adjacent to private crop lands. This protects rangeland forage, and prevents grasshoppers and Mormon crickets from moving into adjacent crops. In these circumstances, APHIS only treats the adjacent rangeland, and the crop owner is responsible for treating their croplands, if desired.

Who pays for the treatment?

When treatment is necessary, APHIS shares the costs of providing suppression treatments on rangelands in compliance with Section 7717 of the Plant Protection Act. On Federal and Tribal Trust rangelands, APHIS pays 100 percent of treatment costs. On State lands, APHIS provides 50 percent of the treatment costs, and the State provides the remaining funds. On private lands, APHIS provides 33 percent of the treatment costs, with the State and/or private landowner responsible for paying the remainder. Cost shares are only available if APHIS conducts the suppression treatments.

What do APHIS' grasshopper and Mormon cricket treatments consist of?

APHIS uses the Reduced Agent and Area Treatments (RAATs) method when conducting treatments. This method applies treatments to alternating swaths of land, decreasing the amount of insecticide used by reducing the amount of area treated (usually by at least 50 percent). Since the early 2000s, APHIS has used RAATs on approximately 99% of the acres we have treated. The RAAT strategy relies on an insecticide's ability to suppress grasshoppers and/or Mormon crickets within treated swaths—and the natural movement of grasshoppers into the treated swath as they forage—while reducing the impact to grasshopper predators and parasites in the alternating untreated swaths.

APHIS is using diflubenzuron to conduct a majority of the treatments. It is a chitin inhibitor which prevents the growth of the immature grasshoppers and/or Mormon crickets after it is ingested. The application methods and drift mitigation measures are designed to allow treatments to reach the plants as quickly as possible, so chemicals don't linger in the air and are less prone to drift. APHIS applies diflubenzuron at rates well below the maximum allowable rate specified on the label and only one time a year within a treatment area.

When does APHIS begin grasshopper and Mormon cricket suppression treatment?

Timeframes vary from state-to-state. However, APHIS generally starts suppression treatments in the late spring, and will continue into the summer. In most Western states, the prime time to treat grasshoppers and/or Mormon crickets is in June and July before their populations reach adulthood, and when they begin to lay eggs that would hatch the following year. APHIS primarily uses diflubenzuron, an insect growth regulator treatment, to target young grasshoppers.

How can people get involved if they need some kind of assistance?

They can also reach out to their USDA State Plant Health Directors for guidance on certified applicators. USDA provides outreach and planning meetings starting in the fall, through the winter, to prepare for and be positioned to respond if needed the following year.

What environmental safeguards does APHIS employ when treating?

APHIS is committed to being a good steward of the environment and following the National Environmental Policy Act (NEPA).

Environmental Impact Statement and Environmental Assessments

APHIS prepares environmental assessments (EA) as required under NEPA to evaluate the impacts of the various alternatives proposed by APHIS to suppress grasshopper and Mormon cricket populations. An EA is prepared in each State, or for geographically similar portions of a State where the program may operate. The EA is made available to the public for review during a 30-day comment period. The EAs are tiered to the environmental impact statement that was completed in 2019.

U.S. Fish and Wildlife Service Consultation

In addition, APHIS conducts local consultations with the U.S. Fish and Wildlife Service to ensure compliance with Section 7 of the Endangered Species Act. During the consultation, both agencies agree on mitigation measures to protect threatened and endangered species and their designated critical habitat.

Monitoring

The program’s integrated pest management strategy includes grasshopper population monitoring, and we only treat outbreaks that will be harmful to rangeland. We minimize the potential for drift and volatilization by not using ultra-low volume sprays when the following conditions exist in the treatment area:

- Wind sustained velocity exceeds 10 miles per hour (unless State law requires lower windspeed)
- Rain is falling or is imminent

- Dew is present over large areas within the treatment block
- There are temperature inversions near the ground surface that could affect the spray deposition

The grasshopper program does not apply insecticides directly to water bodies such as reservoirs, lakes, ponds, pools left by seasonal streams, springs, wetlands, and perennial streams and rivers. The program also follows all other label restrictions designed to protect aquatic habitats. Furthermore, we provide the following distance buffers from water bodies:

- 500-foot buffer with aerial liquid insecticide
- 200-foot buffer with ground liquid insecticide
- 200-foot buffer with aerial bait
- 50-foot buffer with ground bait

PPQ uses environmental residue monitoring to assess application success and determine if our mitigation measures protect sensitive habitats, including aquatic habitats.

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