

Grasshoppers and Mormon Crickets

Rangeland in the western United States is an important agricultural resource because of the forage production used for livestock feed. Grasshoppers and Mormon crickets (hereafter, referred to collectively as grasshoppers) are natural components of the rangeland ecosystem. However, their populations can reach outbreak levels and cause serious economic losses, especially when accompanied by a drought. Land managers utilize integrated pest management techniques including grazing management, cultural and mechanical methods, prescribed burning, and other techniques to dampen the growth of grasshopper populations and prevent outbreaks.

Despite the best land management efforts, grasshopper infestations often cover vast acreage, and individual landowners may not have the resources to control these infestations and therefore, must rely on Federal support. The U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) is the Federal agency responsible for controlling economic infestations of grasshoppers on western rangelands with a cooperative suppression program.

Grasshopper and Mormon Cricket Biology

Grasshoppers and Mormon crickets are closely related insects that belong to the Order Orthoptera. Grasshoppers are winged and may have long or short horns. Most species are highly mobile due to their strong jumping legs and ability to fly.

Nearly 400 species of grasshoppers inhabit the 17 Western States involved in APHIS' grasshopper program. Anywhere from 15 to 45 species of grasshoppers can be found in a particular rangeland ecosystem, and economic damage usually occurs as a result of several grasshopper species inhabiting an area.

Mormon crickets, classified as *Anabrus simplex*, are flightless, longhorned grasshoppers. Although they do not fly, Mormon crickets are highly mobile and capable of migrating great distances. They move in wide bands by walking or jumping, devouring much of the forage in their path.

Both insects damage grasses and other vegetation by consuming plant stems and leaves. Their feeding causes direct damage to plants' growth and seed production, thus reducing valuable forage and feed for livestock. Other effects of these pests

include: soil erosion and degradation, disruption of nutrient cycles, interference with water filtration, and potentially irreversible changes in the flora and fauna of the rangeland ecosystem. In addition, populations that develop on rangelands can invade adjacent cropland where the value of crop plants is much higher than rangeland grasses.

APHIS' Grasshopper Program

The goal of APHIS' grasshopper program is not to eradicate them but to reduce outbreak populations to less economically damaging levels. In these States, APHIS conducts field surveys of grasshopper populations, provides technical assistance to landowners, and conducts suppression treatments when necessary and when funds are available.

Effective surveys are an essential measure in order to determine the extent of grasshopper infestations and to determine the need for suppression treatments. APHIS conducts these activities in the following Western States: Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming.

APHIS personnel conduct surveys of early season populations of immature grasshoppers and surveys of adult grasshoppers in mid to late season to assess if suppression programs are warranted. APHIS utilizes nymphal survey data for treatment decisions, and the adult survey data for forecasting or predicting where potential grasshopper problems may occur in the spring or early summer of the next growing season.

APHIS also provides States and cooperators with technical assistance on grasshopper control, including guidance on the timing of control treatments, organizing local control programs, and information on the availability of new treatment methods.

Cooperative Suppression of Grasshoppers

Federal agencies own or manage approximately 43 percent of the rangeland in the United States. The U.S. Department of the Interior's Bureau of Land Management (BLM), the Bureau of Indian Affairs (BIA), and USDA's Forest Service (FS) are among the principal managers of the rangeland. Federal rangeland eligible for cooperative grasshopper suppression treatments from APHIS includes: rangeland blocks of more than 10,000 acres that would protect forage as well as prevent re-infestation if treated; incipient populations, or hot spots of grasshoppers, that, if treated, would prevent a wider spread of out-

breaks; and Federal or Trust land borders that, if treated, would prevent the movement of economically threatening populations of grasshoppers to adjacent private agricultural lands.

APHIS, at the request of BLM, may conduct grasshopper suppression treatments on federally managed rangeland when traditional practices fail to keep populations below economic thresholds. After receiving a landmanager's requests for grasshopper assistance and assessing the availability of funds, APHIS decides on the need for suppression treatments on Federal rangelands.

In addition, APHIS contributes to the control of grasshoppers on State and private rangeland as part of a cost-sharing program set by the Plant Protection Act (PPA). State and private rangeland are eligible for suppression programs similar to those of Federal rangelands. On State lands, APHIS provides 50 percent of the funds for treatment and control and the State provides the remaining 50 percent. On private rangelands, APHIS provides 33 percent of the funding, with the State and private landowner paying the remainder. APHIS does not have the authority to conduct suppression programs for grasshoppers on private cropland or on private rangeland borders for crop protection.

Treatment Options

In 2002, APHIS completed the Rangeland Grasshopper and Mormon Cricket Suppression Program Environmental Impact Statement (EIS). The EIS considered three alternatives for managing grasshopper/Mormon cricket populations. The alternatives are as follows: no APHIS control action; insecticide applications at conventional rates and complete area coverage, and reduced agent area treatments. APHIS conducts an environmental assessment in each State. This assessment determines which alternative is chosen.

The insecticides utilized by APHIS in the grasshopper program include carbaryl, diflubenzuron and malathion. All of these effective insecticides are currently registered for use and labeled by the U.S. Environmental Protection Agency for rangeland control of grasshoppers. The pesticide chosen depends on a number of factors including: species of grasshopper/Mormon cricket, age of population, climate, weather, forage condition, economics, and environmental risks.

Each of the pesticides is very effective and safe when used properly under the right conditions. APHIS follows all pesticide label directions, along with conditions outlined in the EIS, the environmental assessment, grasshopper program guidelines, and the original treatment request letter from the land management agency.

APHIS applies insecticides by ground equipment by distributing baits usually made of wheat bran or rolled oats and carbaryl or aerially by distributing ultra-low-volume applications (any application of less than .5 gallons per acre). When using the ultra-low-volume applications, APHIS and its cooperators take every necessary precaution to control spray distribution to avoid drift or off-target movement of the material. No insecticides are applied directly on water, and buffers are established around sensitive sites.

An alternative to full coverage insecticide treatment is the Reduced Area and Agent Treatments (RAATs) approach, which treats less land area and uses insecticides at lower rates. The RAATs strategy relies on the efficacy of an insecticide to suppress grasshoppers within treated swaths, while conserving grasshopper predators and parasites in untreated areas.

Environmental Documents

As required under the National Environmental Policy Act of 1969 (NEPA), APHIS prepares the necessary environmental documents for all of its grasshopper suppression programs conducted in all or part of the 17 Western States. These documents include the EIS of programmatic actions of grasshopper suppression, site-specific environmental assessments, and national or local Section 7 consultations with the U.S. Fish and Wildlife Service or National Marine Fisheries Service on necessary protective measures for non-target impacts on threatened and endangered species.

Additional Information

For additional information on APHIS' grasshopper program, please visit the APHIS Web site at www.aphis.usda.gov or contact your State's plant health director or agriculture regulatory official.

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