

# Bureau of Land Management

## Grasshopper Fact Sheet

### 1. What is the concern about grasshoppers for this summer?

Grasshopper experts are predicting infestations that haven't been seen in two or three decades, based on the 2010 Grasshopper Hazard Map created by the USDA, Animal Plant Health and Inspection Service, Plant Protection and Quarantine (APHIS). Grasshopper numbers increased 10-fold from 2008 to 2009 and that trend is expected again this year. Many survey points in the fall of 2009 resulted in counts of 15+ grasshoppers per square yard.

### 2. Are 15+ grasshoppers per square yard a lot?

Grasshopper densities vary each year depending on many environmental factors, such as temperature, moisture, and forage availability. In a normal year, densities of 8 grasshoppers per square yard are common. In years when outbreaks occur, densities may easily reach over 60+ grasshoppers per square yard. Managers typically consider an economic threshold density when deciding whether to treat a grasshopper outbreak. An economic threshold is the density at which the cost of the damage will be greater than the cost of treatment. Past research indicates grasshopper suppression treatments are warranted when densities exceed 15 grasshoppers per square yard.

### 3. What kind of damage can result from large grasshopper infestations?

Grasshoppers are voracious feeders, eating approximately one-half of their body weight in green forage per day. At densities of 30 per square yard, grasshoppers will consume all the green forage available and at higher densities shrubs, woody material, and even paint on buildings may be consumed.



In high densities, grasshoppers can severely reduce the forage value of rangeland. Their feeding causes direct damage to plants' growth and seed production, thus reducing valuable forage and feed for wildlife and .. Other effects include: soil erosion and degradation, disruption of nutrient cycles, introduction of invasive plants, 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.

### 4. What treatment options are commonly used?

#### Biological

A biological control protozoan, *Nosema locustae*, has been primarily used by homeowners for small infestations. *Nosema* is slow acting and may not reduce grasshopper populations to non-economic numbers the year of application. Additionally, experimental treatments over large acreages have yielded variable success in reducing grasshopper numbers.

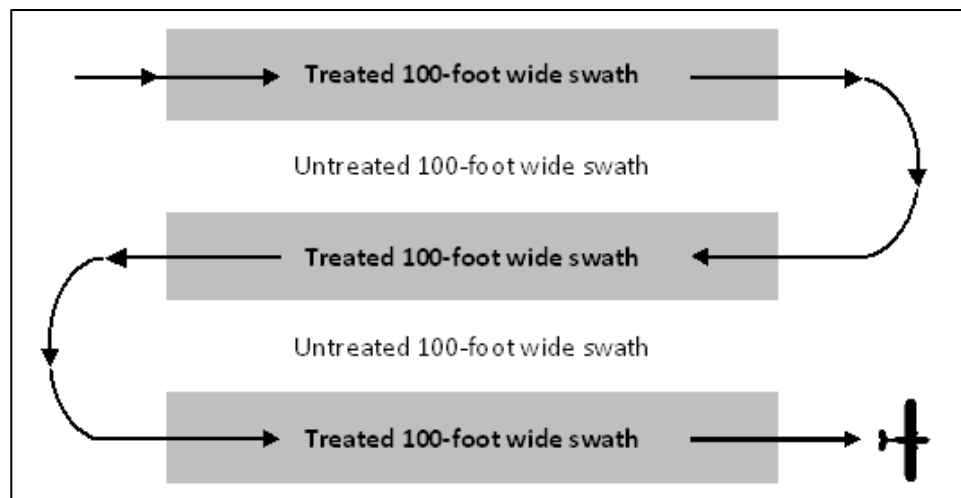
### Chemical

Over the last several years, diflubenzuron, has emerged as the preferred chemical choice for grasshopper control. Diflubenzuron is not a pesticide that effects the nervous system like many other pesticides, but rather, it is a chitin inhibitor. Chitin is the material that provides structure for the insect's exoskeleton (the outer shell). Diflubenzuron inhibits hardening of the exoskeleton after a molt, causing the insect to die. An important benefit to diflubenzuron application is that it is not toxic to adult insects (pollinating bees and predators), birds, and mammals; however, it is toxic to immature aquatic insects. Diflubenzuron has a low persistence in soil, typically breaking down to low residual amounts in 30 days.

Other pesticides that have been traditionally used to control grasshoppers involve the use of carbaryl and malathion. Mortality from these pesticides is caused by injury to the grasshopper's nervous system. These chemicals are applied at very low volumes when used as sprays. Carbaryl can also be used as a bait, applied from the ground. A disadvantage of using these pesticides, as liquids, is that they are less target specific and can injure beneficial insects. Because of their toxicity, carbaryl and malathion are not commonly used over large acreages for grasshopper control, but rather, for smaller infestations where immediate control is preferred. Moreover, none of these chemicals are approved for use near streams, lakes, or other water bodies.

### 5. What kind of treatment methodology is used to reduce environmental impacts?

Historically, grasshopper treatments involved covering the entire infested area with a pesticide. This blanket approach has been replaced with a technique that not only uses lower rates of pesticide, but also a reduction in the area treated. The Reduced Area and Acreage Treatment (RAAT) is a method in which the rate of insecticide is reduced from traditional labeled rates, and untreated swaths are alternated with treated swaths. Utilizing RAAT methodology, grasshoppers are exposed to a pesticide in treated swaths and predators and parasites in untreated swaths. This approach can reduce the cost of control and the amount of pesticide used by more than 50 percent.



## **Fifty percent aerial application rate under RAAT methodology**

### **6. What precautions are used to protect the environment and human health?**

The U. S. Environmental Protection Agency (EPA) evaluates pesticides to ensure that they will not have unreasonable adverse effects on humans, the environment and non-target species, but because they are designed to kill or otherwise adversely affect living organisms, pesticides may pose some risk to humans, animals, or the environment. Carbaryl, diflubenzuron, and malathion are EPA registered pesticides that have specific labeled uses and precautions to minimize impacts to the environment and human health. These precautions may include, but are not limited to, restrictions from applying near to water bodies; protection of honeybees; and consideration of wind speed and drift. In addition to label requirements, the BLM may require other precautions, based on site specific situations.

### **7. What about sage-grouse? Don't they rely on grasshoppers as a food source?**

Yes, sage-grouse do utilize grasshoppers as a food source, as do many other birds, reptiles and mammals. Considering the predicted grasshopper numbers and using the RAATs method for treatment, the numbers of grasshoppers remaining after treatment will still be more than in a normal year.

### **8. How many acres are affected?**

A map of the potential grasshopper areas follows.

### **9. Will you be spraying from an airplane or using hand methods?**

Diflubenzuron treatments would be primarily conducted aerially. Carbaryl treatments would primarily be ground treatments by spreading out bait.

### **10. When will you begin treatment? How long will it last?**

This will depend on which method is used. Diflubenzuron treatments would begin in late May and continue through June. Spot treatments of carbaryl and malathion could begin in May and continue throughout the summer.

### **More Information**

If you would like more information on grasshopper control, please contact Ken Henke, BLM Weed and Pest Coordinator, at 307-775-6041.