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Grasshopper Control in Missouri Forage Crops and Pastures

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Grasshoppers are relatively large insects, capable of doing considerable damage to many crops. In early summer, grasshoppers normally feed on grasses and weeds in non-crop areas, and later in the season, they move into fields. Grasshopper populations in Missouri are sporadic. In general, damage to crops is most severe in dry years.

Description

Grasshoppers are brown, green or gray insects that may be as long as 1-3/4 inches. They have large hind legs for jumping and prominent heads with large eyes. Adult grasshoppers have two pairs of wings. The front pair is characteristically narrow and leathery, whereas the hind wings are thinner and more triangular. Although more than 100 species of grasshoppers occur in Missouri, four species are responsible for most crop damage. The large **differential grasshopper** and the **redlegged grasshopper** appear to be the most common pests, while the **two-striped** and **migratory grasshoppers** also occasionally cause problems.

Life cycle

Grasshoppers usually lay eggs in uncultivated soil in areas such as ditch banks, field margins and roadsides, as well as pastures, alfalfa and clover fields. Two-striped and differential grasshoppers lay their eggs near the roots of bunch grasses or alfalfa crowns covered with debris. These sites are usually along field edges or roadsides. Some species lay their eggs in specific bed areas.

Most kinds of grasshoppers lay eggs during late summer or early fall in pods of 20 to 100 eggs. One female grasshopper may deposit 8 to 25 egg pods. Generally, the eggs pass the winter, but in some instances, eggs may hatch and the emerging nymphs overwinter. Eggs hatch from May to June and, as the food source becomes scarce, the nymphs move to nearby fields. In drought-stressed fields, border vegetation is less abundant or dried out, causing nymphs to move quickly and in higher numbers into crops. Once in the field, grasshoppers may do serious damage to the forage crop or pasture. In Missouri, there is usually one generation per year, except for the migratory grasshopper, which has two.

Young nymphs are quite susceptible to weather and natural enemies. Cool, wet conditions during egg hatch reduce grasshopper numbers.

Damage

Typically, grasshopper damage consists of large, irregular holes extending from the margin to the center of the leaf. The growing tips of alfalfa and other plants may also be injured. Grasshoppers are capable of doing considerable damage in a very short time.

Control

Biological

The biological control agent, *Nosema locustae,* is a naturally occurring microsporidian protozoan that is now being placed on various baits and marketed for grasshopper control under such names as NOLO Bait, Grasshopper Attack, Hopper Stopper and others. Although a promising biological, *Nosema* does not generally produce rapid control of grasshoppers, but rather is a slower, long-term method of grasshopper and cricket control. A major limitation of this control method is that grasshoppers must eat the *Nosema*-treated bait as second or third instar hoppers. This requires both early season scouting and treatment of grasshopper populations in border areas of the field.

Insecticides

The key to effective control of grasshoppers is early detection of the problem. Grasshopper nymphs are easier to kill, partly because of their small size and also because they are usually confined to the hatching area. Do not mow grass along field margins where high populations are found until grasshoppers are controlled. Mowing these feeding sites causes grasshoppers to move into adjacent crops.

In general, control is justified if 3 to 7 or more grasshoppers per square yard are present in alfalfa and clover fields or if 11 to 20 or more grasshoppers per square yard are present in pasture, range or non-crop lands. Keep in mind that the time of day, temperature and vegetation can influence the grasshopper's activity and can affect the number you find.

Table 1 lists insecticides for controlling early season infestations of grasshopper nymphs when confined to non-crop land areas.

Table 1
Grasshopper control in non-cropland areas

Insecticide	Product rate per acre	Restrictions[1]	Comments
Asana XL[2]	2.9 to 5.8 ounces	4,5,6	Spray non-crop land adjacent tilled areas to control migrating hoppers. Treatment is warranted if 15 or more nymphs per square yard are present in non-crop areas.
Penncap-M[2]	2 to 3 pints	3	
Sevin XLR Plus	1 to 3 pints	2	
Sevin 80S	2/3 to 1-7/8 pounds	2	
Sevin 50W	1 to 3 pounds	2	

[1]Restrictions for grass pastures and non-cropland areas

- **Do not apply more than twice per season and allow at least 14 days between applications.**
- **Preharvest or grazing interval is 0 days for aerial application and 14 days for ground application**
- **Preharvest or grazing interval is 15 days after application.**
- **Repeat application as necessary to maintain control, but do not exceed 0.5 pounds active ingredient per**

acre per year.
- **Do not feed treated crop to livestock.**
- **Do not spray ditch banks or areas adjacent to water.**

[2]RU
Any insecticide preceded by RU (Restricted Use) means that all or some uses of this product have been restricted by the EPA.

Table 2 lists insecticides available for grasshopper control in alfalfa and clovers, and Table 3 lists insecticides for use on pastures or range grasses. Because of the short residual activity of insecticides registered for use on alfalfa and clovers, don't expect more than temporary control of the present infestation. Reinfestation could occur in 10 to 14 days, at which time a second application may be required.

Table 2
Grasshopper control in alfalfa and clover

Insecticide	Product rate per acre	Restrictions[1]	Comments
Cygon 400	1/2 to 1 pint	1,6,10	Control is warranted if 3 to 7 or more grasshoppers are present per square yard in alfalfa and clover fields.
Furadan 4F[2]	1/4 to 1/2 pint	1,2,4,7	
Guthion 3[2]	1-1/3 to 2 pints	11,12,13,14	
Lorsban 4E	1/2 to 1 pint	3,8	
Penncap-M[2]	2 to 3 pints	9	
Sevin XLR Plus	1 to 3 pints	5	

[1]Restrictions for alfalfa and clover insecticides:

- **Do not apply more than once per cutting.**
- **Do not apply more than twice per season and do not use more than 1 pint per acre in the second application.**
- **Do not apply more than four times per year.**
- **Apply only to fields planted to pure stands of alfalfa.**
- **Preharvest or grazing interval is 7 days.**
- **Preharvest or grazing interval is 10 days.**
- **Preharvest or grazing interval is 7 days for 1/2 pint rate, 14 days for 1 pint rate and 28 days for 2 pint rate.**
- **Preharvest or grazing interval is 7 days for 1/2 pint rate, 14 days for 1 pint rate and 21 days for rates above 1 pint per acre.**
- **Preharvest or grazing interval is 15 days after application.**
- **Do not apply if the crop or weeds in the crop are in bloom.**
- **Apply twice per cutting at the 2/3 pint rate at intervals of 10 to 11 days.**
- **Do not apply more than twice per cutting at the 2/3 pint rate.**
- **Apply only once per cutting at rates above 2/3 pint.**
- **Preharvest intervals are 14 days for 2/3 to 1 pint, 16 days for 1-1/3 pints, 21 days for rates above 1-1/3 pints.**

[2]RU
Any insecticide preceded by RU (Restricted Use) means that all or some uses of this product have been restricted by the EPA.

Table 3
Grasshopper control in pasture and range grasses

Insecticide	Product rate per acre	Restrictions[1]	Comments
Malathion 57 percent	1-1/2 to 2 pints	2, 5	Control is warranted if 15 or moregrasshoppers per square yard are present in grass pastures.
Penncap-M[2]	2 to 3 pints	4	
Sevin XLR Plus	1 to 4 pints	1, 3	
Sevin 80S	2/3 to 1-7/8 pounds	1, 3	
Sevin 50W	1 to 3 pounds	1, 3	

[1]Restrictions for pastures and range grasses:[1]Restrictions for pastures and range grasses: .

- **Do not apply more than twice per season and allow at least 14 days between applications.**
- **May be applied day of harvest.**
- **Preharvest or grazing interval is 0 days for aerial application and 14 days for ground application.**
- **Preharvest or grazing interval is 15 days after application.**
- **Do not apply if the crop or weeds in the crop are in bloom.**

[2]RU
Any insecticide preceded by RU (Restricted Use) means that all or some uses of this product have been restricted by the EPA.

How to spray

For effective control of any insect pest, calibrate the sprayer to apply sufficient gallonage at a speed that will give good coverage. Gallonage varies with the height and density of the foliage. Most situations require at least 12 gallons of spray per acre for effective coverage.

Don't spray when wind velocities exceed 10 to 12 miles per hour and avoid drift into nearby gardens and fields. For best control, especially with malathion, apply only when temperatures are 60 degrees Fahrenheit or above and are expected to remain this warm for one or two days after application.

Precautions

Always handle insecticides with caution, regardless of whether or not they are restricted-use compounds. Read, understand and follow the directions on the label concerning use and safety measures. Wear the protective clothing and devices suggested on the label.

Avoid breathing vapors or dust, and direct contact with skin. If the insecticide concentrate contacts or contaminates the skin, immediately wash the affected area with soap and plenty of water, then change and discard clothing.

Store insecticides in their original container with legible labels securely attached. The storage area should be dry and locked at all times when not actually in use. To prevent contamination of surrounding crops, water or wildlife habitat, promptly and properly dispose of empty containers as directed on the label.

Missouri insect control recommendations are revised annually and are subject to possible change during the growing season. No discrimination is intended and no endorsement is implied.

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Related MU Extension publications

- EC921, Alfalfa Analyst
  http://extension.missouri.edu/publications/DisplayPub.aspx?P=EC921
- PS8, Common Forage Legume Insects
  http://extension.missouri.edu/publications/DisplayPub.aspx?P=PS8

Order publications online at http://extension.missouri.edu/explore/shop/ or call toll-free 800-292-0969.

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