



CROPS

Grasshoppers in field crops

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Quick Facts...

Grasshoppers usually appear first in weedy areas of roadsides, fence rows, irrigation ditches and other noncrop areas.

After these food plants are gone, the insects leave in search of other food, often an irrigated crop or newly emerged winter wheat.

Control grasshoppers in the weedy areas with low rates of insecticides; once they reach the field margins, they may be larger in size and require higher rates of insecticides for control.

Two options are available to farmers once it has been determined that crops are threatened--poison baits, or foliar or soil insecticides.

Grasshoppers are one of the most important groups of insect pests in Colorado. Grasshoppers follow a roughly 22-year cycle in Colorado, with the last major outbreak occurring in the late 1970s and early 1980s. Some problems will occur even in years of low abundance. Although they are most important on rangeland, field crops are attacked, often with economic losses to the farmer. An exception is sorghum, which usually is not fed upon once it has reached about 10 inches in height.

Grasshopper eggs are laid in undisturbed areas, usually in late summer and early fall. Small nymphs or "hoppers" hatch the following spring. Winged adults will appear five to six weeks after hatch. A few Colorado grasshopper species have eggs that hatch in late summer and pass the winter as nymphs. Winged adults of these species usually appear early in the following summer, often causing undue alarm about unusually early grasshopper activity. Some of these species are important on rangeland, but none are considered a threat to field crops. Most field crop damage is caused by the differential, redlegged, two-striped, and migratory grasshoppers, all species that follow the typical grasshopper life cycle.

Control of Grasshoppers

The usual pattern of grasshopper damage in field crops is for early development to occur in weedy areas of roadsides, fence rows, irrigation ditches and other noncrop areas. As these food plants are eaten or dry down, the grasshoppers leave in search of other food, often an irrigated crop or newly-emerged winter wheat. Here they will first feed in the field margins and then, conditions permitting, spread throughout the field.

Grasshoppers will become more difficult and more expensive to control as this pattern develops. Grasshoppers in the weedy areas will be concentrated in a small area. They can therefore be controlled with low rates of insecticides applied to a relatively few acres. Once they reach the field margins, they may be larger in size and require higher insecticide rates for good control, although the acreages will still be small. Once they have spread throughout a field, high insecticide rates applied to larger acreages are required to protect the crop.

Table 1 gives information useful in deciding if a grasshopper population is enough of a threat to a crop to justify spending money on an insecticide treatment. Modify these are general guidelines according to grasshopper stage and species, crop conditions, and crop value. Significant counts for large nymphs, for example, would be almost as low as those for adults, while the largest numbers would be used for small nymphs. Use lower counts for a valuable crop such as pinto beans and higher counts for a lower value crop such as dryland winter wheat. Walk through the field and count the grasshoppers that jump or

move within a square foot area. Multiply that number by 9 to get a count per square yard. Take at least 20 counts per field. Consider treatments when the average count reaches the threatening level.

Two options are available to farmers once it has been decided that crops are threatened: poison baits and foliar or soil insecticides.

Poison Baits

The main advantage to poison baits is that they can be applied to crops or weedy areas in which the plants are too small for good insecticide spray coverage, such as newly-cut alfalfa, or weeds that have dried or have been eaten down. Under other conditions, insecticide sprays are cheaper and more effective.

A new use for baits is the application of *Nosema locustae*, a disease organism that attacks many grasshopper species. Recent information indicates that this disease can reduce grasshopper populations over a period of several years, but *Nosema* baits will not protect a crop during the same growing season in which it is applied. *Nosema* baits are most effective when applied early in the season against small nymphs, but are too slow acting to be reliable for the protection of high value crops.

Poison grasshopper baits may be purchased commercially or formulated by the farmer. Both have carbaryl (several formulations of Sevin) as their active ingredient. There are a number of recipes for grasshopper baits. The following will yield enough bait to treat approximately 1 to 1.5 acres: 2 pounds Sevin 80S or 1.5 quarts Sevimol, 1.75 gallons of water, and 0.5 gallon molasses (0.25 gallon with Sevimol).

Mix these together and spray onto 25 pounds of bran, wheat middlings, or equal parts of wheat middlings and sawdust, while the dry mixture is being tumbled in a concrete mixer or similar device. The resulting mixture or one of the commercial baits may be applied with an endgate spreader. Use the heavier rate (treat just one acre with the above recipe) if the grasshoppers are large. The application may have to be repeated if there is heavy feeding on the bait.

Foliar and Soil Insecticides

Foliar insecticides are the treatment of choice in most situations. The *Colorado Pesticide Guide--Field Crops* lists the insecticides currently approved for control of grasshoppers on Colorado field crops and noncrop areas that serve as infestation sources. These registrations are subject to change, so check the current label. Be sure to follow all label instructions and precautions.

Apply systemic soil insecticides to winter wheat at planting time, if adequate soil moisture is available to mobilize the chemical so it can be taken up by the plant. Since most grasshopper feeding will be in the field margins, treat the outer two to three drill rounds to protect the entire field. Currently, Phorate 20G, Thimet 20G and Disyston 15G are registered for this use. Such treatments will also help control fall infestations of Russian wheat aphid. Place these insecticides in a grass seeder attachment, not mixed with the seed, and apply according to label instructions.

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Table 1: Economic significance of grasshopper nymph and adult counts.

Economic significance	Nymphs/square yard		Adults/square yard	
	Margin	Field	Margin	Field
None	< 25	< 15	< 10	< 3
Light	25 - 35	15 - 25	10 - 20	3 - 7
Threatening	50 - 75	30 - 45	21 - 40	8 - 14
Severe	100 - 150	60 - 90	41 - 80	15 - 28
Very severe	> 200	> 120	> 80	> 29