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Grasshopper Control in Oregon

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Many species of grasshoppers infest crops and rangeland in Oregon. The two most important pests are the migratory grasshoppers, which deposit egg pods in undisturbed lands, and the clear-winged grasshoppers, which deposit pods in very well-defined breeding grounds. Both grasshoppers are early season pests, primarily on rangeland. Later, when wings are developed, grasshoppers move to such crops as alfalfa, cereals, potatoes, and sugar beets.

Serious grasshopper outbreaks are cyclic, dependent on weather. Once the cycle is broken by weather, natural enemies, or insecticides, usually it is several years before tremendous numbers are again found on rangeland. On range, eight or more adult hoppers per square yard constitutes the economic threshold where damage will be excessive.

Life History

Immature grasshoppers (nymphs) begin emerging from egg pods in the spring as temperatures rise. Young nymphs usually are observed at lower elevations in late May in Oregon. Nymphs molt, a process of shedding the outer skin and replacing it with a larger size, five or six times during the 40 to 50 days following emergence. Shed skins often are mistaken for dead grasshoppers.

The last molt results in a fully winged, sexually mature grasshopper. They do not molt again, nor do they get any larger. Activity is then no longer restricted to just feeding and moving slowly by walking or jumping. Mature grasshoppers are capable of flying great distances, during which time mating and egg laying starts. Mass flights may occur when grasshoppers become extremely abundant, when food supplies become scarce, or when grasshoppers are attracted by odors given off by greener plants.

One mating fertilizes several batches of eggs. The number of eggs and egg pods placed in the ground varies with the species. Female migratory grasshoppers can deposit up to 21 pods, each with 15 to 20 eggs, during the course of their lives. The eggs remain in the ground from the time they are deposited during the summer or fall until the next spring. The female usually places egg pods about 1 inch below the soil surface.

The Grasshopper's Enemies

Natural enemies such as flies, beetles, spiders, rodents, and birds attack hoppers at various developmental stages. Biological control normally is not a limiting factor until the hopper population becomes extremely large. By that time several years of range devastation could result.

Weather can limit grasshopper population. Hoppers are sun worshippers, preferring sunny warm weather. Fewer egg pods will be placed in the ground during cool, wet, short summers than during hot, dry, long summers. High temperatures in the summer and fall bring on early maturity and provide for a long egg-laying period. Winter temperatures have little effect on egg survival within pods. However, very dry soil in the spring may prevent eggs from hatching. Spring weather is critical, as illustrated by the following conditions which allow for either maximum increase or heavy mortality in any given year.

Conditions causing mortality

Spring: Warm weather allowing premature hatching, followed by low temperatures that prevent normal development.

Late spring: A short period of hot weather to insure complete egg hatch, followed by long periods of cloudy wet weather that stimulate disease in the hoppers.

Summer: Cool weather for delaying maturity and beginning of egg-laying period.

Fall: Early fall to further shorten the egg-laying period.

Conditions increasing population

Spring: Cool and wet weather, preventing premature hatching and insuring an adequate food supply.

Late spring: Several weeks of warm dry weather allows for complete hatching and good feeding conditions.

Summer: Hot weather, with sufficient rainfall to maintain an ample food supply but with no extremely wet periods to encourage disease in the hoppers.

Fall: Late fall that extends the egg-laying period.

Control

Spraying or dusting should be done before hopper maturation to prevent egg laying, and before range or crops are severely damaged. Grasshoppers that damage row crops usually hatch on rangeland or other undisturbed areas and then migrate to the fields. Timely ap-

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plications along outer margins often will prevent migration into and across fields. For additional information on grasshopper control, obtain USDA Farmer's Bulletin No. 2193, *Grasshopper Control,* from your county Extension agent.

Through the Plant Protection Programs, U.S. Department of Agriculture, the federal government participates in cooperative grasshopper control programs on rangeland. This program does not apply to cropland. Certain criteria must be met to qualify for federal participation and are contained in Oregon State University Fact Sheet No. 209, *Federal Government Participation in Grasshopper Control.* This sheet may be obtained from the OSU Extension Service office in your county.

Registered Chemicals for Oregon Crops

Insecticide[1]	Amount of active ingredient to apply per acre	Crops on which recommended	Minimum number of days from application to harvest, grazing, or feeding
Sevin	1 lb.	Alfalfa, clover	0
		Range and pasture	0
		Sugar beets	10
		Corn	0
Diazinon	0.5 lb.	Alfalfa, clover	0, grazing; 7, hay
		Sugar beets	0
		Range and pasture	0, grazing; 21, hay
Dimethoate[2]	0.25-0.5 lb.	Alfalfa	10
Malathion	1-1.5 lbs.	Alfalfa, clover	0
		Corn	5
		Small grains	7
		Range and pasture	0
		Sugar beets	3
		Potatoes	0
Malathion ULV	0.6 lb. (8 fl. ozs.)	Alfalfa, clover	0
		Range and pasture	0
		Grass and grass hay	0
		Small grains	7
		Corn	5
		Sugar beets	7, if tops are fed
Phosdrin	0.25-0.5 lb.	Alfalfa, clover	1
Dibrom	0.5-0.75 lb.	Alfalfa	4
Toxaphene[3]	1.5 lbs. (in water)	Corn	0
		Small grains	0

[1] Bees are necessary. Do not kill them. Avoid using insecticides during the bloom period when possible. If insecticides are needed during bloom, make applications in the evening after bee activity has ceased.

[2] Do not apply dimethoate during bloom or more than once per season on alfalfa.

[3] Do not graze dairy animals or animals being finished for slaughter in toxaphene-treated fields. Do not feed the animals forage (including silage) from toxaphene-treated fields.