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# Control of alfalfa hay insects in Idaho

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Alfalfa hay is grown on approximately 1 million acres of Idaho farmland. The crop is grown from the northern Panhandle to southeastern Idaho on a diversity of soil types and topographies and in varying climates. Growing conditions and yield losses from insects vary significantly from one region of the state to another. Occasionally, localized outbreaks of alfalfa pests may require insecticide applications.

Restrict insecticide use on alfalfa to situations that absolutely require control. Always consider economic justification before making any application. Pesticides are effective weapons against alfalfa pests but must be used wisely to gain maximum benefit. Misuse of pesticides may result in undesirable side effects such as illegal levels of pesticide residues, bee kills, and loss of beneficial predators and parasites.

The profit margin in alfalfa production is so narrow that determining if and when to spray an alfalfa field is not always easy. The most logical course is to adopt management practices based on an understanding of alfalfa insects and their effects upon the crop. These practices form the basis of an integrated pest management program for controlling pests. Integrated pest management is the intelligent selection and use of pest-control practices that ensure favorable economic, environmental, and social consequences through the use of appropriate biological, chemical, and cultural control methods.

This publication outlines the alfalfa pest complex in Idaho, briefly discusses the biology of the major pests, and provides control recommendations. Color photos and identification information may be found in MS 109, *Keys to Damaging Stages of Insects Commonly Attacking Field Crops in the Pacific Northwest*.

## Species of major importance

### Alfalfa weevil

Adults overwinter in alfalfa-field plant debris, alfalfa crowns, and leaf litter. They also overwinter in adjoining areas such as ditch banks, roadsides, and woodlots.

The adults emerge, start feeding, and mate during the first warm days of spring. Mating will have occurred by the time alfalfa is 2 inches tall. Females begin to lay eggs inside alfalfa stems when the alfalfa is 4 to 6 inches high. Egg laying may continue until early summer.

Newly hatched larvae crawl up the outsides of the stems and enter leaf buds to feed. Later they move down the plants and finish developing on leaves. Mature larvae spin frail, lacelike cocoons near the alfalfa plant crowns or at the base of the plants in plant debris. New adults emerge from midsummer until early fall, feed briefly, and then fly to hibernation sites in fields and surrounding areas. Only one generation occurs each year in Idaho.

Alfalfa weevil larvae damage alfalfa by defoliating it, which reduces yield. They also damage regrowth buds, which stunts growth and sometimes kills stems. When weevils do severe damage as the crop nears the full-bud stage or is within 2 weeks of normal cutting time, the best control method is to harvest the hay early and treat the stubble immediately after harvest with one of the insecticides listed in the table.

**Caution:** *If you cannot remove the hay immediately due to weather or other conditions, larvae feeding under the windrow will cause severe damage.*

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## Insecticides for alfalfa hay insects

Insect	Insecticide	Rate (ai/acre)	Days between treatment and cutting or grazing	Remarks
<b>Alfalfa weevil</b>	methomyl	0.45 to 0.9 lb		
	Lorsban	0.5 lb	14 days	Do not apply more than four times per year or more than once per cutting.
		More than 0.5 lb to 1.0 lb	21 days	
	Imidan	1 lb	7 days	
	permethrin	0.1 to 0.2 lb	14 days	Do not apply more than 0.2 lb per cutting.
	methyl parathion	0.25 to 0.5 lb	15 days	
	methoxychlor	1 to 1.5 lb	7 days	
	carbaryl	1 to 1.5 lb	3 days	Do not apply when foliage is wet or rain is expected within 2 days.
	malathion	0.93 to 1.4 lb	0 days	
	diazinon	1.5 lb	10 days	Hay crop. Pasture for grazing dairy or beef animals or sheep.
			2 days	
	azinphos-methyl	0.375 to 0.75 lb	21 days	Do not apply more than once per cutting.
	Supracide	0.5 to 1 lb	14 days	
Furadan	0.25 lb	7 days	Apply Furadan only in fields planted to pure stands of alfalfa. For waterfowl protection, do not apply in fields close to waterfowl nesting areas and/or in fields where waterfowl are known to repeatedly feed. <i>To prevent bee kills, do not apply Furadan to blooming alfalfa or in fields with blooming weeds.</i>	
	0.5 lb	14 days		
	1 lb	21 days		
<b>Pea aphid</b>	permethrin	0.05 lb to less than 0.1 lb	0 days	Do not apply more than 0.2 lb per cutting.
		0.1 to 0.2 lb	14 days	
	methomyl	0.45 to 0.9 lb	7 days	
	methyl parathion	0.25 to 0.5 lb	15 days	
	dimethoate	0.25 to 0.5 lb	10 days	Make only one application per season.
	malathion	0.93 to 1.4 lb	0 days	
	diazinon	0.26 to 0.5 lb	0 days	Grazing dairy and beef cattle and sheep; green chop. Hay crop.
			7 days	
	Supracide	0.5 to 1 lb	14 days	
	Furadan	0.25 lb	7 days	Apply Furadan only in fields planted to pure stands of alfalfa. For waterfowl protection, do not apply in fields close to waterfowl nesting areas and/or in fields where waterfowl are known to repeatedly feed. <i>To prevent bee kills, do not apply Furadan to blooming alfalfa or in fields with blooming weeds.</i>
		0.5 lb	14 days	
		1 lb	21 days	
	naled	0.75 to 1 lb	4 days	

When severe damage occurs during full-bud stage, early cutting will give the best-quality alfalfa hay. Unless you treat the stubble, the alfalfa may fail to regrow for 3 weeks or longer due to larvae feeding on the buds of the crowns.

When severe damage occurs before the alfalfa is near the bud stage, treat the standing hay crop. In this case, be careful to observe the time interval between application and harvest for the pesticide you choose.

Insecticide application is justified under the following two situations:

- 30 percent of the plant terminals begin to show feeding damage
- You collect 20 or more larvae per sweep of an insect net

Twenty larvae per sweep is simply a general index to assist you in determining when to apply an insecticide. Weather conditions, plant vigor, irrigation schedules, cutting date, previous history of weevils in the area, or a combination of these factors help determine if treatment is justified. Treat only when necessary, not as a preventive practice.

## Pea aphid

Pea aphids overwinter as eggs on legumes, including alfalfa. The eggs hatch in spring and produce all females, which give birth to live young. Populations continue to build until they stress the alfalfa plants or the alfalfa begins to bloom. Each female can produce as many as 50 to 100 young. There may be as many as 15 generations per year.

Lady beetles, syrphid fly larvae, lacewing larvae, tiny parasitic wasps, and fungal diseases are the principal natural enemies of pea aphids. They can significantly reduce aphid populations.

Low to moderate populations of pea aphids (50 to 100 per 180-degree sweep) can be tolerated. Apply an insecticide when

- the population approaches 100 per sweep and the plants are less than 1 foot high, or
- the field is about 2 weeks from cutting and under drought stress and plants are wilting, or
- predators and parasites are not abundant in the field.

Predators and parasites are not abundant enough when, after three consecutive days of sampling, you find they have not reduced the number of pea aphids in your samples.

## Species of secondary importance

### Spotted alfalfa aphid

The spotted alfalfa aphid can be a serious pest in alfalfa, which is its only host. It is pale yellow and has four to six rows of dark spots on its back.

Spotted alfalfa aphids overwinter as eggs at the base of alfalfa plants. The eggs hatch in spring, producing all females that give birth to live young when temperatures are between 45° and 95°F. As many as 20 generations can occur per year. The winged forms fly as far as 70 miles with the aid of the wind.

Spotted alfalfa aphids drop to the ground when disturbed. They are usually found on stems and leaves on lower portions of the plant. They secrete large amounts of honeydew, resulting in black, sooty mold that can make the hay unpalatable for livestock. The aphids kill seedlings and may lower the productivity of established fields.

The spotted alfalfa aphid's natural enemies are lady beetles, syrphid fly larvae, lacewing larvae, parasitic wasps, and fungal diseases. They can significantly reduce aphid populations.

In new seedings, more than one aphid per plant justifies insecticide treatment. In established alfalfa, you must consider other factors such as time of year, predators, and pollinators. Generally, apply an insecticide when you find an average of 10 aphids per stem in established stands.

### Clover leaf weevil

This is the largest weevil found in alfalfa fields. In the fall, adults puncture stems and lay eggs in them. The eggs hatch in fall, and both the larvae and adults overwinter. There is one generation annually.

Adults and larvae eat notches in the margins of leaves. They may cut off entire leaves. Damage is most apparent in spring when the weather is cool and dry. During wet springs, a fungal disease attacks the larvae and reduces their populations. Diseased larvae turn from green to brown.

Control of the clover leaf weevil is seldom necessary; therefore, no economic thresholds have been established.

### Clover root curculio

This beetle has grublike larvae that destroy alfalfa rootlets and nodules and often girdle taproots, exposing the roots to invasion by disease organisms. This can result in severely reduced alfalfa stands, particularly in sandy soils. The adults feed on the stems and foliage but cause little or no yield loss. There is only one generation per year.

No economic thresholds have been developed for this insect, and no insecticides are currently registered for its control in alfalfa. Control practices for the alfalfa weevil usually reduce clover root curculio populations.

### Pea leaf weevil

Pea leaf weevils overwinter as adults in alfalfa fields and emerge in early spring. They feed on the

## Insecticides for alfalfa hay insects (cont'd)

Insect	Insecticide	Rate (ai/acre)	Days between treatment and cutting or grazing	Remarks
Cutworms (cont'd)	Lorsban	0.5 lb More than 0.5 lb to 1.0 lb	14 days 21 days	Do not apply more than four times per year or more than once per cutting.
	Dylox	0.5 to 1 lb	1 day	Do not apply more than three times per cutting.
Alfalfa caterpillar	permethrin	0.05 lb to less than 0.1 lb 0.1 to 0.2 lb	0 days 14 days	Do not apply more than 0.2 lb per cutting.
	methoxychlor	0.75 to 1 lb	7 days	
	carbaryl	1 lb	3 days	Do not apply carbaryl when foliage is wet or rain is expected within 2 days.
	methomyl	0.23 to 0.45 lb	7 days	
	Dylox	0.375 to 0.5 lb	1 day	Do not apply more than three times per cutting.
	<i>Bacillus thuringiensis</i>	See various product labels	0 days	Apply when worms are small.
Grasshoppers	naled	0.75 to 1 lb	4 days	
	methyl parathion	0.25 to 0.5 lb	15 days	
	malathion	0.93 to 1.4 lb	0 days	
	diazinon	0.5 lb	0 days 7 days	Grazing dairy and beef cattle and sheep; green chop. Hay crop.
	azinphos-methyl	0.5 to 0.75 lb	21 days	Do not apply more than once per cutting.
	Furadan	0.125 to 0.25 lb	7 days	Apply Furadan only in fields planted to pure stands of alfalfa. For waterfowl protection, do not apply in fields close to waterfowl nesting areas and/or in fields where waterfowl are known to repeatedly feed. <i>To prevent bee kills, do not apply Furadan to blooming alfalfa or in fields with blooming weeds.</i>
	Lorsban	0.25 lb More than 0.25 lb to 0.5 lb	7 days 14 days	Do not apply more than four times per year or apply more than once per cutting.
	dimethoate	0.25 to 0.5 lb	10 days	Apply only once per season.

**Pesticide residues** — These recommendations for use are based on currently available labels for each pesticide listed. If followed carefully, residues should not exceed the established tolerances. To avoid excessive residues, follow label directions carefully with respect to rate, number of applications, and minimum interval between application and reentry or harvest.

**Groundwater** — To protect groundwater, when there is a choice of pesticides, the applicator should use the product least likely to leach.

**Trade names** — To simplify information, trade names have been used. No endorsement of named products is intended nor is criticism implied of similar products not mentioned.

## Insecticides for alfalfa hay insects (cont'd)

Insect	Insecticide	Rate (ai/acre)	Days between treatment and cutting or grazing	Remarks	
<b>Spotted alfalfa aphid</b>	permethrin	0.05 lb to less than 0.1 lb	0 days	Do not apply more than 0.2 lb per cutting.	
		0.1 to 0.2 lb	14 days		
	methyl parathion	0.25 to 0.5 lb	15 days		
	malathion	0.93 to 1.4 lb	0 days		
	diazinon	0.26 to 0.5 lb	0 days		Grazing dairy and beef cattle and sheep; green chop. Hay crop.
			7 days		
	methomyl	0.45 to 0.9 lb	7 days		
	dimethoate	0.25 to 0.5 lb	10 days		Make only one application per season.
Supracide	0.5 to 1 lb	14 days			
<b>Clover leaf weevil</b>	methyl parathion	0.5 lb	15 days		
	methoxychlor	1 to 1.5 lb	7 days		
<b>Clover root curculio</b>	No products are currently registered for clover root curculio.				
<b>Pea leaf weevil</b>	No products are currently registered for pea leaf weevil.				
<b>Blister beetles</b>	carbaryl	0.5 to 1 lb	3 days	Do not apply carbaryl when foliage is wet or rain is expected within 2 days.	
<b>Armyworms</b>	naled	0.75 to 1 lb	4 days	Do not apply more than 0.2 lb per cutting.	
		permethrin	0.05 lb to less than 0.1 lb		0 days
	0.1 to 0.2 lb		14 days		
	methyl parathion	0.5 lb	15 days		
	methoxychlor	1.5 to 2 lb	7 days		
	carbaryl	1 to 1.5 lb	3 days		Do not apply carbaryl when foliage is wet or rain is expected within 2 days.
	malathion	1.25 to 1.4 lb	0 days		
	Lorsban	0.5 lb	14 days		Do not apply more than four times per year or more than once per cutting.
		More than 0.5 lb to 1.0 lb	21 days		
methomyl	0.23 to 0.9 lb	7 days			
<i>Bacillus thuringiensis</i>	See various product labels	0 days	Apply when worms are small.		
<b>Cutworms</b>	methomyl	0.23 to 0.9 lb	7 days		
	permethrin	0.05 lb to less than 0.1 lb	0 days	Do not apply more than 0.2 lb per cutting.	
		0.1 to 0.2 lb	14 days		
	methyl parathion	0.25 to 0.5 lb	15 days		
carbaryl	1 to 1.5 lb	3 days	Do not apply carbaryl when foliage is wet or rain is expected within 2 days.		

edges of leaves, leaving notch-shaped holes. Adult feeding can kill seedlings and seriously defoliate older alfalfa stands.

This insect is a serious problem in northern Idaho only. Carefully monitor newly planted fields for this weevil. No insecticides are currently registered for this pest on alfalfa hay.

## **Blister beetles**

Blister beetles occasionally form large aggregations in alfalfa and may defoliate plants, but the loss is usually negligible. The more serious problem is that they can contaminate hay. The dead beetles are highly toxic when eaten and can kill horses. Fortunately, cattle are much less sensitive to blister beetles.

Do not crimp or condition second- or third-cutting hay intended for horses unless you have thoroughly inspected the field and found no blister beetles. Crimping and conditioning crush and kill more blister beetles than cutting alone. Cutting the hay with a self-propelled swather that drops the hay in a loose windrow will allow more blister beetles to leave the field before baling. If you suspect baled hay of containing blister beetles, do not feed it to horses.

## **Armyworms and cutworms**

Mature armyworm caterpillars are 1½ to 2 inches long. They are velvety black with two prominent stripes and several fine, bright-yellow stripes on the sides. They differ from most cutworms in feeding during the day and resting at night. No economic thresholds have been developed for armyworms.

Cutworm caterpillars are similar in size and shape to armyworms but are usually dull gray, brown, or black and may be striped or spotted. They often curl up when disturbed. Cutworms usually feed at night. They cut off young plants or eat the foliage of older plants.

If alfalfa fields do not green up in spring, cutworms may be present (particularly redbacked or army cutworms). Examine the soil around the base of the plants for the presence of cutworms.

Economic thresholds have not been developed for cutworms, but if you apply insecticides, they will be most effective in late evening when the caterpillars begin their nighttime activities. Insecticide treatments are also more effective when applied just after an irrigation or rain.

## **Alfalfa caterpillar**

The adult butterflies, which are yellow with black borders around the wings, do not damage alfalfa. The velvety-green caterpillars feed on foliage during late summer. Alfalfa caterpillars are usually not important pests in Idaho. Consider an insecticide treatment only when you collect six or more larvae per sweep of a sweep net.

## **Grasshoppers**

Both immature and adult grasshoppers damage alfalfa by eating foliage and blooms. Usually they move into a field during late summer when the surrounding native vegetation has dried. If you find grasshoppers along field borders, you can apply an insecticide before the grasshoppers enter the field. Sprays applied for grasshopper control will kill pollinators. Use Sevin bait, which is an effective grasshopper treatment, when protection of pollinators is a concern.

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