



# Alfalfa Forage Insect Control

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In Oklahoma, insect pests are a perennial problem that can cause reduced alfalfa productivity. These pests occur at various times of the growing season and reduce forage production in many ways.

Yellowing (chlorosis) and subsequent death of leaves (necrosis), along with stunting of plant growth, are caused by fluid feeding insects, such as aphids and leafhoppers. The major aphid species include the pea, spotted, and blue alfalfa aphids. Another fluid feeder in alfalfa is the potato leafhopper.

During the spring and summer months, defoliation is a common form of damage in alfalfa. It is caused by the alfalfa weevil and several larvae. Extensive defoliation may cause significant forage yield reductions and can also reduce stand longevity if damage is severe and occurs repeatedly.

A third form of damage by insects is on new stands. During early spring and fall, larval stages of the army cutworm and fall armyworm may cause defoliation to the extent of removing all plant growth above the soil surface, and feeding by large populations may result in stand destruction. In addition, feeding by aphids during this same period can devastate young alfalfa stands, even when populations are low (<10 aphids/stem).

Still another type of damage caused by insect pests is destruction of new growth after cutting. This damage usually occurs after first cutting and is most often caused by variegated cutworms. Alfalfa weevil adults may also create a similar problem. This damage may lead to reduced growth and vigor while contributing to stand thinning. A thorough discussion of pest biology, damage, scouting, and economic threshold levels is provided in OSU Circular E-826, "Alfalfa Production Guide for the Southern Great Plains."

## Aphids

Pea and blue alfalfa aphids generally infest alfalfa fields beginning in March and may continue feeding through April and May. Spotted alfalfa aphids are usually associated with mild, dry weather conditions and may be active throughout the year. Historically, serious infestations have occurred in the fall, winter, and early spring. Pea aphids are the largest of the species that occur in alfalfa. They are light-green in color and possess a dark band at the base of each antennal segment. Blue alfalfa aphids are similar in appearance; however, they are usually smaller and bluish-green in color. In addition, the antennae have no bands, but gradually darken in color toward

the tips. Spotted alfalfa aphids are small and yellowish-green with several rows of small, black dots along the dorsal surface. A magnifying glass or hand lens is essential in identifying these species.

The most damaging species are the blue and spotted alfalfa aphids. Both aphids cause obvious toxic effects (chlorosis and wilt) in plants while feeding. During the spring, plants can be severely stunted and are often killed when large numbers of aphids are present for several weeks.

## Alfalfa Weevils

The alfalfa weevil is the most important pest of alfalfa in Oklahoma. It overwinters as both eggs and adults. During mild winters in Oklahoma, larvae may also begin hatching. However, hatching generally begins in early spring and feeding on the growing tips of alfalfa becomes evident in February or March. Young larvae are yellowish in color, but as they mature, they turn green with black heads and possess a white stripe down the center of the back. For additional information on the development and management of the alfalfa weevil, refer to OSU Fact Sheet F-2091, "Alfalfa Weevil and Its Management in Oklahoma."

## Foliage Feeding Caterpillars

In Oklahoma alfalfa, several species of foliage feeding caterpillars may be found throughout the summer. The species present include webworms, alfalfa caterpillar, green cloverworm, corn earworm, armyworm, and yellow-striped armyworm. These defoliators are rarely a significant problem in established alfalfa, although seedling stands can be heavily damaged by their feeding.

Additional caterpillars that often occur at times of the year when alfalfa is particularly susceptible to defoliation include the fall armyworm, army cutworm, and variegated cutworm. Fall armyworms may destroy newly planted alfalfa in the fall while army cutworms can destroy new stands in early spring. The variegated cutworm may do serious damage immediately following first harvest. Variegated cutworms that have hatched during growth of the first crop mature during first harvest and may destroy or delay regrowth of the second crop.

During mid and late summer, webworms may cause serious defoliation in Oklahoma alfalfa. They spin webbing over leaves and buds of alfalfa terminals and can cause losses in both seed and forage production. Insecticide

applications for defoliators are most effective when larvae are small and/or webbing (webworms only) is minimal.

For a detailed description of the larvae found in Oklahoma alfalfa, consult OSU Extension Fact Sheet F-7159, "Field Key to Larvae in Alfalfa."

## **Blister Beetles**

Blister beetles are slender, soft-bodied, black, gray, or striped beetles from one-half to three-quarters of an inch long. Adults feed on foliage; however, larvae of species found in alfalfa are considered beneficial because they feed on grasshopper eggs. Blister beetles are gregarious, often congregating in large swarms within alfalfa fields. Swarms move frequently and are typically comprised of one or two species of small striped beetles. Blister beetles are important in alfalfa production, not so much for their foliage feeding, but because they produce cantharidin, a secretion that is toxic to horses consuming hay that contains bodies of these insects that were killed in the harvesting process. Cantharidin is secreted from leg and body joints and is toxic even in dried bodies of dead beetles. Suggestions for management of blister beetles in alfalfa can be found in OSU Extension Fact Sheet F-2072, "Blister Beetles and Alfalfa."

## **Miscellaneous Pests**

### **Potato Leafhoppers**

This small, wedge-shaped insect is light green and about one-eighth inch long. Feeding by this insect causes yellowing and necrosis of leaves that begins at leaf tips and is called hopperburn. Losses from this insect may occur during the summer months on new growth after alfalfa is harvested. Damage potential by this pest in Oklahoma is not well-known,

but it is often found in numbers that are known to cause yield reductions in Midwestern states. In the Midwest, numbers as low as 0.5 leafhopper per sweep in seven-inch or shorter alfalfa are considered to exceed the economic threshold. Caution should be used in interpreting these thresholds for Oklahoma, since lower yields of summer cuttings in alfalfa may not justify money spent on control of potato leafhoppers.

### **Grasshoppers**

During mid and late summer, several species of grasshoppers may migrate from field margins, fence rows, or pastures into alfalfa. Border areas and seedling stands are particularly susceptible when field margin vegetation matures and dries. In addition, grasshoppers infesting alfalfa being grown for seed may feed on blossoms and seed pods, resulting in serious yield reductions.

## **Insecticide Usages on Alfalfa**

The rules and regulations governing the chemicals used on alfalfa are quite rigid. This is especially true of alfalfa going into interstate commerce or alfalfa to be fed to lactating dairy animals or animals being finished for slaughter. The chemicals listed in this publication are all approved to be used at the concentration and with the limitations described. Any use of the chemical at different concentrations or a disregard for the limitations should be avoided.

Before using any chemical on alfalfa, check the toxicity, rates of application, and limitations. The producer should also be aware that alfalfa is sometimes contaminated by chemical drift of pesticides being applied to adjacent fields. Remember that all pesticides should be handled with care.

## Alfalfa Forage Insect Control Suggestions

To protect insect pollinators, do not spray during full bloom. If necessary to control insects for maximum seed production, use insecticides least damaging to pollinators.

<i>Insect and Time Most Prevalent</i>	<i>Damage and/or Insect Description</i>	<i>Insecticide and Amount Per Acre</i>		<i>Comments</i>
<b>Alfalfa Seed Chalcid</b>  June to September	Small wasp lays eggs in seed pods. Two to three generations per year.	Proaxis <sup>r</sup>	2.56-3.84 oz	<sup>1</sup> See footnotes on alfalfa seed chalcid.
<b>Alfalfa Weevil</b>  Affects mainly the first cutting. Usually 1 generation per year.	Light green to green larvae with white to yellowish-white stripe down back paralleled by 2 faint white stripes on either side. Black head capsule. Skeletonizes leaves, causing an over-all grayish to whitish cast.	Pounce <sup>r</sup> 3.2 EC (synthetic pyrethroid)	4.0-8.0 oz	Required waiting period before harvest* 0.1 lb active or less - 0 days. Above 0.1 lb active - 14 days. Lower rates (<0.2 lb AI/A) of permethrin have not been highly effective on heavy weevil populations. Lower rates (0.1 lb active) may serve to reduce (not eliminate) feeding under the windrow by moderate weevil populations when used just before (0-3 days) harvest.
Note: There are no alfalfa varieties adapted to Oklahoma conditions that are highly resistant to the alfalfa weevil; however, some varieties show tolerance to this pest.		Warrior <sup>r</sup> (synthetic pyrethroid)	2.56-3.84 oz	Do not apply within 1 day of harvest for forage or within 7 days of harvest for hay.
		Baythroid <sup>r</sup> (synthetic pyrethroid)	1.6-2.8 oz	7 days Note: To enhance resistance management of budworm/bollworm complex in any nearby cotton <b>do not</b> apply pyrethroids to alfalfa from mid-May to late July.
		Furadan <sup>r</sup> 4F	1.0-2.0 pt	1.0 pt - 14 days Above 1.0 pt - 28 days
		Lorsban 4E <sup>r</sup>	2.0 pt	21 days
		Malathion 5E	1.5-2.0 pt	0 days
		Methyl Parathion <sup>r</sup>	1.0 pt	15 days
		Methomyl <sup>r</sup> (Lannate)	3.0 pt	0 days
	Proaxis <sup>r</sup>	2.56-3.84 oz	Do not apply within 1 day of harvest for forage or within 7 days of harvest for hay.	
Application Information: Begin when 1.5-2 larvae per stem are found. This will equate to about 40 or more larvae per square foot. See Current Report CR-7177 for a definitive, more precise method indicating when to spray based on the degree-day concept. Smaller plants, infested early in the season, cannot tolerate 1.5-2.0 large larvae per stem.				
For ground application, use 10-15 gal of total mix per acre. Use 15-20 gal when plants are rank and dense. For best results, by aircraft use 2 gal; 3 gals or more in heavy foliage.				
<b>Army Cutworm</b>  February and March, sometimes to April.	Consumes new growth. Especially damaging to newly planted stands. Economic injury level is 3-4 larvae per sq ft when larvae are 0.5 inch or less in length; 2-3 larvae per sq ft when they are over 0.5 inch in length.	Pounce <sup>r</sup>	2.0-8.0 oz	See comments: end of section. These materials may fail under heavy cutworm pressure. See chemical restrictions under alfalfa weevil section.
		Lorsban <sup>r</sup>	1.0-2.0 pt	
		Baythroid <sup>r</sup>	1.6-2.8 oz	
		Warrior <sup>r</sup>	1.92-3.2 oz	
		Proaxis <sup>r</sup>	1.92-3.20 oz	See restrictions under alfalfa weevil.
		Javelin	0.25-1.5	<i>Bacillus thuringiensis</i> (B.t.) 0 day*

<i>Insect and Time Most Prevalent</i>	<i>Damage and/or Insect Description</i>	<i>Insecticide and Amount Per Acre</i>		<i>Comments</i>
<b>Blister Beetles</b> Spring and Summer Earliest on record in Oklahoma - May 14. Latest on record in Oklahoma - October 21.	Destroys foliage, flowers Beetle bodies contain cantharidin, a toxic substance that can be detrimental to livestock.	Warrior <sup>r</sup> Proaxis <sup>r</sup> Sevin XLR	2.56-3.84 oz 2.56-3.84 oz 0.5-1.0 qt	Heavy numbers of blister beetles in hay may cause sickness or death to horses. See OSU Fact Sheet F-2072 for more information. See restrictions under alfalfa weevil. See restrictions under alfalfa weevil. 7 days*
<b>Clover Leaf Weevil</b> Spring	Closely resembles Alfalfa Weevil. Full grown larva 0.5 inch long, green to yellowish green, has pale white stripe down center of back and brown head capsule.	Methyl Parathion <sup>r</sup> Malathion Proaxis <sup>r</sup> Warrior <sup>r</sup>	0.5-1.0 pt 1.5 pt 2.56-3.84 oz 2.56-3.84 oz	See restrictions for other compounds under alfalfa weevil. See restrictions under alfalfa weevil. See restrictions under alfalfa weevil.
<b>Grasshoppers</b> May to frost	Destroys foliage, usually starting at field borders.	Dimethoate 4E Proaxis <sup>r</sup> Furadan <sup>r</sup> Malathion Warrior <sup>r</sup> Lorsban <sup>r</sup> Baythroid	0.5-1.0 pt 2.56-3.84 oz 0.25-0.50 pt 1.5-2.0 pt 2.56-3.84 oz 0.5-1.0 pt 2.0-2.8 oz	10 days* See restrictions under alfalfa weevil. 7 days* (only at this rate). See restrictions under alfalfa weevil. 0.5 pt = 7 days* 1.0 pt = 14 days* 7 days*
<b>Leafhoppers and Lygus Bugs</b> Summer months	Small jumping or flying insects. Cause yellowing of leaves.	Dimethoate Malathion Sevin 80S Methomyl <sup>r</sup> Lorsban <sup>r</sup> Baythroid <sup>r</sup> Pounce <sup>r</sup> Warrior <sup>r</sup> Baythroid <sup>r</sup> Proaxis <sup>r</sup>	0.5-1.0 pt 1.5-2.0 pt 1.25 lb 1.5-3.0 pt 0.5-1.0 pt 0.8-2.8 oz 4.0-8.0 oz 1.92-3.2 oz 0.8-2.8 oz 1.92-3.20 oz	Greatest damage by Lygus Bugs is to seed production. To protect pollinators, apply insecticides before bloom. <b>Malathion and Methomyl are not labeled for leafhoppers.</b>  0.5 = 14 days* 1.0 = 21 days 7 days*  For leafhoppers, consider yield potential and stand age before deciding to treat. Recommendations should be based on plant height and number of leafhoppers per 20 sweeps across each 40-acre block of alfalfa.  Alfalfa Height (Inches)      Leafhoppers in 20 Sweeps 3                                      4 6                                      10 12+                                    20

<i>Insect and Time Most Prevalent</i>	<i>Damage and/or Insect Description</i>	<i>Insecticide and Amount Per Acre</i>		<i>Comments</i>
<b>Defoliating Caterpillars (Alfalfa Caterpillar, Green Cloverworm, Corn Earworm, Armyworm, Webworms)</b>  Summer	See OSU Fact Sheet 7159 for detailed description of each species.	Malathion	2.0 pt	Read insecticide label carefully. Specific rates may apply for each or only a few species. Even heavy (5-6/sweep) defoliator infestations may be adequately controlled by simply cutting alfalfa early. Decisions to treat should be based on number of larvae and noticeable damage. For webworms specifically, control is generally poor if worms and/or webs are large. Treat early in outbreaks.
		Methomyl <sup>r</sup>	0.75-1.5 pt	
		Sevin 80S	1.25-1.625 lb	
		Lorsban	1.0-2.0 pt	
		Warrior <sup>r</sup>	1.92-3.2 oz	
		Mustang MAX	2.24-4.0 oz	
		Steward SC	9.2-11.3 oz	
		Baythroid <sup>r</sup>	1.6-2.8 oz	
	Proaxis <sup>r</sup>	2.56-3.84 oz		
	Pounce <sup>r</sup>	2.0-8.0 oz		
	Javelin ( <i>Bacillus thuringiensis</i> )	0.25-1.5 lb	0 days.*	
	Agree (B.t.)	0.5-2.0 lb	0 days.*	
<b>Pea Aphid</b>  Usually early March, April, and May	Large green aphid with dark bands at base of each antennal segment. Causes chlorosis and wilting of leaves. Economic injury level is about 50 aphids/stem for 10 inch alfalfa, about 100 aphids/stem when alfalfa is 20 inches tall. Usually present over entire plant.	Dimethoate	0.50-1.0 pt	Several resistant varieties are available. See Current Report CR-2106 for information on variety insect resistance level and adaptability in Oklahoma.
		Furadan <sup>r</sup>	0.50-2.0 pt	
		Lorsban <sup>r</sup>	1.0-2.0 pt	
		Malathion	1.5 pt	
		Methyl Parathion <sup>r</sup>	0.50-1.0 pt	
		Proaxis <sup>r</sup>	2.56-3.84 oz	
		Methomyl <sup>r</sup>	1.5-3.0 pt	
Pounce <sup>r</sup>	2.0-8.0 oz			
Mustang MAX	2.24-4.0 oz			
Baythroid <sup>r</sup>	1.6-2.8 oz			
<b>Blue Alfalfa Aphid</b>  Usually early March, April and May, but may persist later.	Large green aphid. Similar in appearance to pea aphid, but lacks dark antennal bands at base of each segment. Often found in high numbers on terminals. Heavy infestations may cause severe stunting. Economic injury level is about 20 aphids/stem for 10 inch alfalfa, about 40 when alfalfa is 20 inches tall.	Dimethoate	0.50-1.0 pt	Currently, no well-adapted varieties for Oklahoma exhibit high resistance to the blue alfalfa aphid. See Current Report CR-2106. See chemical restrictions at end of this section.
		Furadan <sup>r</sup>	0.50-1.0 pt	
		Lorsban <sup>r</sup>	1.0-2.0 pt	
		Malathion	1.5 pt	
		Methyl Parathion <sup>r</sup>	0.50-1.0 pt	
		Proaxis <sup>r</sup>	2.56-3.84 oz	
		Pounce <sup>r</sup>	2.0-8.0 oz	
		Warrior	2.56-3.84 oz	
Baythroid <sup>r</sup>	1.6-2.8 oz			
Mustang MAX	2.24-4.0 oz			
<b>Spotted Alfalfa Aphid</b>  Most common in summer and fall but may occur throughout year	Small tan-colored aphid with black spots in rows over surface of body. May deposit large amounts of honeydew. Plants wilt, yellow and die. Economic injury levels are similar to the blue alfalfa aphid.	Dimethoate	0.50-1.0 pt	Several well-adapted resistant varieties are available. See Current Report CR-2106. In the fall, even light populations (1-3 aphids/stem) can devastate seedling alfalfa stands. See chemical restrictions at end of this section.
		Lorsban <sup>r</sup>	1.0-2.0 pt	
		Malathion	1.5 pt	
		Methyl Parathion <sup>r</sup>	0.50-1.0 pt	
		Proaxis <sup>r</sup>	2.56-3.84 oz	
		Pounce <sup>r</sup>	2.0-8.0 oz	
		Mustang MAX	2.24-4.0 oz	
Warrior <sup>r</sup>	2.56-3.84 oz			

<i>Insect and Time Most Prevalent</i>	<i>Damage and/or Insect Description</i>	<i>Insecticide and Amount Per Acre</i>		<i>Comments</i>
Late April or May	Most common occurrence is on regrowth after first cut. In some years may destroy regrowth for period of 2-3 weeks. Larvae may attain nearly two inches in length. Tan to mottled black in color with distinctive light yellow, diamond shaped markings along the center of the back.	Javelin	0.25-1.5 lb	If larvae are large, control is usually poor. See chemical restrictions at end of this section.
		Lorsban	1.0-2.0 pt	
		Methomyl <sup>r</sup>	0.75-3.0 pt	
		Methyl Parathion <sup>r</sup>	0.50-1.0 pt	
		Pounce <sup>r</sup>	2.0-8.0 oz	
		Baythroid <sup>r</sup>	1.6-2.8 oz	
		Warrior <sup>r</sup>	1.92-3.2 oz	
		Proaxis <sup>r</sup>	1.92-3.2 oz	

<sup>r</sup> Restricted-Use-Pesticides

For additional information, see the following:

OSU Extension Fact Sheet F-2072 - Blister Beetles in Alfalfa

OSU Extension Fact Sheet F-2097 - Alfalfa Weevil and Its Management in Oklahoma

OSU Extension Fact Sheet F-7159 - Field Key to Larvae in Alfalfa

OSU Extension Fact Sheet F-7184 - Alfalfa Aphids in Oklahoma

OSU Extension Current Report CR-7177 - Scouting for the Alfalfa Weevil in Oklahoma

OSU Extension Current Report CR-7179 - Integrated Control of the Alfalfa Weevil

\*Required waiting periods before harvest.

When insecticides are applied to alfalfa that will be grazed or mowed for hay, certain precautions for use of materials must be taken. The following waiting periods from application to grazing or cutting have been established: Agree, 0 days; Malathion, 0 days for up to 1.5 lb, 5 days for more than 1.5 lb; Methyl Parathion, 15 days; Sevin, 7 days; Dimethoate, 10 days; Methomyl, 0 days for hay and 7 days for grazing or feeding to livestock; Baythroid 7 days; B.t. products, 0 days (12 hour reentry interval); Warrior, 1 day for forage and 7 days for hay; Mustang MAX, 3 days; Proaxis, 1 day for forage and 7 days for hay.

**Pounce<sup>r</sup> (Permethrin)** — Do not apply more than 0.2 lb active per cutting. Do not apply permethrin products in cotton producing areas from mid-May to late July.

**Baythroid<sup>r</sup>** — One application per cutting only, and up to three applications per season. Avoid application of this product in cotton producing areas from mid-May to late July. Do not apply by ground within 25 feet, or by air within 150 feet of any body of water. Increase the buffer zone to 450 feet when ultra-low volume (ULV) application is made.

**Furadan<sup>r</sup>** — Additional waiting periods, 0.25 lb rate, 7 days; 0.5 lb, rate, 14 days; above 0.5 lb rate, 28 days. Do not apply Furadan more than twice per season, or more than once per cutting. Do not use more than 0.5 lb in the second cutting.

**Lorsban<sup>r</sup>** — Do not make more than four applications per year. Tank mixes of 0.5 lb Lorsban plus 0.375 lb of Furadan have provided good control of both aphids and alfalfa weevils, while shortening the harvest interval to 14 days. Additional waiting periods; 0.25 lb rate, 7 days; 0.50 lb rate, 14 days; above 0.50 lb rate, 21 days. Do not make more than four applications per year or apply more than once per crop cutting.

**Proaxis<sup>r</sup>** — Do not apply more than 0.24 pints per acre per cutting. Do not apply more than 0.96 pints per acre per season. Avoid application when bees are actively foraging. This chemical is Gamma-cyhalothrin; if it is used in the same season as lambda-cyhalothrin (Warrior<sup>r</sup>) then read the label carefully for use rate limitations.

**Warrior<sup>r</sup>** — Avoid application around bee shelters or when bees may be actively foraging. Do not apply more than 0.03 lb a.i. per acre per cutting or more than 0.12 lb a.i. per acre per season.

<sup>1</sup> **Alfalfa Seed Chalcid** — Control with insecticides is usually unsatisfactory due to persistence of attack and restrictions against using chemicals with long residual effects. To avoid the necessity of spraying for this insect and thereby harming beneficials; alfalfa seed should be produced as early in the season as possible.

## The Oklahoma Cooperative Extension Service

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