



Current Report

Oklahoma Cooperative Extension Fact Sheets are also available on our website at:
osufacts.okstate.edu

Alfalfa Forage Insect Control

Phillip Mulder
Professor of Entomology

Kelly Seuhs
Extension Associate

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 PSS-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 EPP-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 PSS-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.

Insect and Time Most Prevalent	Damage and/or Insect Description	Insecticide (MOA Group) ¹	Amount Per Acre	Comments
Alfalfa Seed Chalcid June to September	Small wasp. Two to three generations per year.	Cobalt ^r (1B +3)	19-38 oz	See restrictions at end of section.
		Proaxis ^r (3)	2.56-3.84 oz	² See footnotes on alfalfa chalcid.
		Warrior ^r (3)	2.56-3.84 oz	
Alfalfa Weevil Affects mainly the first cutting. Usually one generation per year. 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.	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 25WP ^r (3)	5.4-12.8 oz	See restrictions at end of section. Lower rates (<0.2 lb AI/A) of permethrin have not been highly effective on heavy weevil populations. Lower rates (0.1) may serve to reduce (not eliminate) feeding under the windrow by moderate weevil populations when used just before (0-3 days) harvest.
		Warrior ^r (3)	2.56-3.84 oz	
		Baythroid XL ^r (3)	1.6-2.8 oz	Note: To enhance resistance management of budworm/ bollworm complex in any nearby cotton do not apply pyrethroids group (3) to alfalfa from mid-May to late July.
		Cobalt ^r (1B + 3)	19-38 oz	See restrictions at end of section.
		Lorsban 4E ^r (1B) or Lorsban Advanced ^r (1B)	2.0 pt 2.0pt	
		Malathion 5E (1B)	1.5-2.0pt	May cause some degree of burn to crop, depending on temperature.
		Sevin XLR (1A)	1.5 qts	
		Lannate LV ^r (1A)	3.0 pts	
		Proaxis ^r (3) Silencer ^r (3)	2.56-3.84 oz 2.56-3.84/oz	
		MustangMAX ^r (3)	2.24-4.0 oz	
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.				
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				
Army Cutworm 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 25WP ^r (3)	3.2-12.8 oz	See comments: end of section. These materials may fail under heavy cutworm pressure. See chemical restrictions under alfalfa weevil section. <i>Bacillus thuringiensis</i> (B.t.) 0 day*
		Lorsban ^r (1B) or Lorsban Advanced ^r (1B)	1.0-2.0 pt 1.0-2.0 pt	
		Baythroid XL ^r (3)	0.8-1.6 oz	
		Warrior ^r (3)	1.92-3.2 oz	
		Proaxis ^r (3)	1.92-3.2 oz	
		Javelin (11B2)	0.25-1.5 lbs	
		Cobalt ^r (1B + 3)	13-26 oz	
		Silencer ^r (3)	1.92-3.20 oz	
		Sevin XLR (1A)	1.5 qts	
		MustangMAX ^r (3)	2.24-4.0 oz	

<i>Insect and Time Most Prevalent</i>	<i>Damage and/or Insect Description</i>	<i>Insecticide (MOA Group)¹</i>	<i>Amount Per Acre</i>	<i>Comments</i>
Blister Beetles				
Spring and Summer	Destroys foliage and flowers. Beetle bodies contain cantharidin, a toxic substance that can be detrimental to livestock, regardless of whether beetles are dead or alive	Silencer ⁽³⁾	2.56-3.84/oz	See restrictions at end of section. Heavy numbers of blister beetles in hay may cause sickness or death to horses. See OSU Fact Sheet EPP-2072 for more information.
Earliest on record in Oklahoma - May 14.		Cobalt ^r (1B + 3)	19-38 oz	
Latest on record in Oklahoma - October 21.		Warrior ^r (3)	2.56-3.84 oz	
		Proaxis ^r (3)	2.56-3.84 oz	
		Sevin XLR (1A)	0.5-1.0 qt	
Clover Leaf Weevil				
Spring		Proaxis ^r (3)	2.56-3.84 oz	
		Warrior ^r (3)	2.56-3.84 oz	
		Cobalt ^r (1B + 3)	19-38 oz	
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		Silencer ⁽³⁾	2.5-3.84/oz	
Grasshoppers				
May to frost	Destroys foliage, usually starting at field borders.	Silencer ⁽³⁾	2.56-3.84/oz	
		Cobalt ^r (1B + 3)	7-13 oz	
		Dimethoate4E (1B)	0.5-1.0 pt	
		Proaxis ^r (3)	2.56-3.84 oz	
		Malathion 5E (1B)	1.5-2.0 pt	
		Warrior ^r (3)	2.56-3.84 oz	
		Lorsban ^r (1B) or	0.5-1.0 pt	
		Lorsban Advanced	0.5-1.0 pt	
		Baythroid XL ^r	2.0-2.8 oz	
		MustangMAX ^r (3)	2.8-4.0 oz	
Leafhoppers and Lygus Bugs				
Summer months	Small jumping or flying insects. Cause yellowing of leaves.	Cobalt ^r (1B + 3)	7-13 oz	Leafhopper rate only.
			19-38 oz	Plant bug rate only. See restrictions at end of section.
		Dimethoate 4E (1B)	0.5-1.0 pt	
		Malathion 5E (1B)	1.5-2.0 pt	
		Lannate LV ^r (1A)	1.5-3.0- pts	Greatest damage by Lygus Bugs is to seed production. To protect pollinators, apply insecticides before bloom. Lannate is not labeled for leafhoppers.
Alfalfa Height (Inches)	Leafhoppers in 20 Sweeps	Sevin XLR (1A)	1.0-1.5 qts	
		Methomyl ^r (1A)	1.5-3.0 pt	
3	4	Lorsban ^r (1B) or	0.5-1.0 pt	
6	10	Lorsban		
		Advanced ^r (1B)	0.5-2.0 pts	
		Baythroid XL ^r (3)	0.8-2.8 oz	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.
		Pounce 25WP ^r (3)	6.4-12.8 oz	
		Warrior ^r (3)	1.92-3.2 oz	Up to 3.84 oz for lygus bug.
		Baythroid XLR ^r (3)	0.8-2.8 oz	
		Silencer ⁽³⁾	1.92-3.84/oz	
		Proaxis ^r (3)	1.92-3.84 oz	Leafhoppers only.
		MustangMAX ^r (3)	2.24-4.0 oz	

<i>Insect and Time Most Prevalent</i>	<i>Damage and/or Insect Description</i>	<i>Insecticide (MOA Group)¹</i>	<i>Amount Per Acre</i>	<i>Comments</i>	
Defoliating Caterpillars					
(Alfalfa Caterpillar, Green Cloverworm, Corn Earworm, Armyworm, Webworms)	See OSU EPP- 7159 for detailed description of each species	Lannate LV ^r (1A)	0.75-3.0 pt	See restrictions at end of section. 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.	
		Sevin XLR (1A)	1.0-1.5 qts		
		Lorsban ^r (1B) or Lorsban Advanced ^r (1B)	1.0-2.0 pt 2.0pt		
Summer		Warrior ^r (3)	1.92-3.2 oz		
		Mustang MAX ^r (3)	2.24-4.0 oz		
		Steward SC (22)	9.2-11.3 oz		
		Silencer ^r (3)	2.56-3.84/oz		
		Cobalt ^r (1B + 3)	13-38 oz		
		Baythroid XLR ^r (3)	0.8-1.8 oz		
		Proaxis ^r (3) Pounce 25WP ^r (3) Javelin (<i>Bacillus thuringensis</i>) (11B2) Agree (B.t.) (11B2)	2.56-3.84 oz 3.2-12.8 oz 0.25-1.5 lb 0.5-2.0 lb		
				Highest rate for beet armyworm. Rate varies depending on species. See restrictions at end of section	
				Use of synthetic pyrethroids is not suggested in cotton-growing areas. See note under alfalfa weevil section.	
				Rate range may depend on pest species (check label).	
Pea Aphid 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.	Silencer ^r (3) Cobalt ^r (1B + 3) Dimethoate 4E (1B)	2.56-3.84/oz 13-26 oz 0.50-1.0 pt	Several resistant varieties are available.	
		Lorsban ^r (1B) or Lorsban Advanced ^r (1B)	1.0-2.0 pt 2.0 pt		
		Malathion 5E (1B)	1.5-2.0 pt		
		Proaxis ^r (3)	2.56-3.84 pt		
		Lannate LV ^r (1A)	1.5-3.0 pt		
		Pounce 25WP ^r (3)	3.2-12.8 oz		
		Mustang MAX ^r (3)	2.24-4.0 oz		
		Baythroid XL ^r (3)	1.6-2.8 oz		
		Warrior ^r (3)	2.56-3.84 oz		
Blue Alfalfa Aphid 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, and about 40 aphids/stem when alfalfa is 20 inches	Silencer ^r (3) Cobalt ^r (1B + 3) Dimethoate (1B)	2.56-3.84/oz 13-26 oz 0.50-1.0 pt	Currently, no well-adapted varieties for Oklahoma exhibit high resistance to the blue alfalfa aphid. See chemical restrictions at end of this section.	
		Lorsban ^r (1B) or Lorsban Advanced ^r (1B)	1.0-2.0 pt 2.0 pt		
		Malathion 5E (1B)	1.5-2.0 pt		
		Proaxis ^r (3)	2.56-3.84 oz		
		Pounce 25WP ^r (3)	3.2-12.8 oz		
		Warrior (3)	2.56-3.84 oz		
		Baythroid XL ^r (3)	2.8 oz		
		MustangMAX ^r (3)	2.24-4.0 oz		
		Lannate LV ^r (1A)	1.5-3.0 pt		
Spotted Alfalfa Aphid 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 (above).	Silencer ^r (3) Cobalt ^r (1B + 3) Dimethoate 4E(1B)	2.56-3.84 oz 13-26 oz 0.5-1.0 pt	Suppression only. See restrictions at end of section. Several well-adapted resistant varieties are available. In the fall, even light populations (1 to 3 aphids per stem) can devastate seedling alfalfa stands. See chemical restrictions at end of this section.	
		Lorsban ^r (1B) or Lorsban Advanced ^r (1B)	1.0-2.0 pt 2.0 pt		
		Malathion 5E (1B)	1.5-2.0 pt		
		Proaxis ^r (3)	2.56-3.84 oz		
		Pounce 25WP ^r (3)	3.2-12.8 oz		
		Mustang MAX ^r (3)	2.24-4.0 oz		
		Warrior ^r (3)	2.56-3.84 oz		
		Lannate LV ^r (1A)	1.5-3.0 pt		

<i>Insect and Time Most Prevalent</i>	<i>Damage and/or Insect Description</i>	<i>Insecticide (MOA Group)¹</i>	<i>Amount Per Acre</i>	<i>Comments</i>
Variegated Cutworm 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.	Silencer ^r (3)	1.0-3.2/oz	See restrictions at end of section. If larvae are large control is usually poor. See chemical, restrictions at end of this section.
		Cobalt ^r (1B + 3)	13-26 oz	
		Javelin (11B2)	0.25-1.5 lb	
		Lorsban ^r (1B) or Lorsban	1.0-2.0 pt	
		Advanced ^r (1B)	2.0 pt	
		Lannate LV ^r (1A)	1.5-3.0 pt	
		Pounce ^r (3)	3.2-12.8 oz	
		Baythroid XLR ^r (3)	0.8-1.6 oz	
		Warrior ^r (3)	1.92-3.2 oz	
		Proaxis ^r (3)	1.92-3.2 oz	
Mustang MAX ^r (3)	2.24-4.0 oz			

^r Restricted-Use-Pesticides

¹ MOA = Mode of Action Group for rotational purposes

For additional information, see the following:

OSU Extension PSS-2072 - Blister Beetles in Alfalfa

OSU Extension PSS-2097 - Alfalfa Weevil and Its Management in Oklahoma

OSU Extension EPP-7159 - Field Key to Larvae in Alfalfa

OSU Extension EPP-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

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:

²**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.

All B.t. products — 0 days to harvest, 12 hour re-entry interval.

Baythroid^r — 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. 7 days to harvest.

Cobalt^r – Do not cut or graze treated alfalfa within 7 days of application of 13 ounces, within 14 days of application of 26 ounces, or within 21 days after application of rates above 26 ounces. Do not make more than 4 applications per season. Do not make a second application of any product containing chlorpyrifos within 10 days of first application.

Dimethoate — 10 days to harvest.

Lannate LV^r — Do not apply within 7 days of cutting or allowing livestock to graze.

Lorsban^r — (all formulations in this section) Do not make more than four applications per year. Tank mixes of 1 pt Lorsban plus .75 pt of Furadan have provided good control of both aphids and alfalfa weevils, while shortening the harvest interval to 14 days. Additional waiting periods; .5 pt rate, 7 days; 1 pt rate, 14 days; above 1 pt rate, 21 days. Do not make more than four applications per year or apply more than once per crop cutting.

Malathion 5E — 0 days to harvest for up to 1.5 lbs, 5 days for more than 1.5 lbs.

Mustang MAX^r — 3 days to for cutting or grazing, 7 days for harvesting seed.

Pounce^r (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. Required waiting period before harvest: 0.1 lb active or less - 0 days, above 0.1 lb active - 14 days.

Proaxis^r — 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^r) then read the label carefully for use rate limitations. One day for harvest of forage and 7 days to harvest for hay.

Sevin — 7 days to harvest.

Silencer^r — Do not apply more than 0.24 pts per acre per cutting or more than 0.96 qts. per acre per season. Do not apply with 1 day of harvest for forage or within 7 days of harvest for hay.

Warrior^r — 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. One day for harvest of forage and 7 days to harvest for hay.

r Restricted use pesticides.

The Oklahoma Cooperative Extension Service

Bringing the University to You!

The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.

Extension carries out programs in the broad categories of agriculture, natural resources and environment; family and consumer sciences; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

Some characteristics of the Cooperative Extension system are:

- The federal, state, and local governments cooperatively share in its financial support and program direction.
- It is administered by the land-grant university as designated by the state legislature through an Extension director.
- Extension programs are nonpolitical, objective, and research-based information.
- It provides practical, problem-oriented education for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.
- It utilizes research from university, government, and other sources to help people make their own decisions.
- More than a million volunteers help multiply the impact of the Extension professional staff.
- It dispenses no funds to the public.
- It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
- Local programs are developed and carried out in full recognition of national problems and goals.
- The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
- Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.

Credit is extended to Richard Berberet, retired Legume Research Entomologist for providing original content of this current report.

Oklahoma State University, in compliance with Title VI and VII of the Civil Rights Act of 1964, Executive Order 11246 as amended, Title IX of the Education Amendments of 1972, Americans with Disabilities Act of 1990, and other federal laws and regulations, does not discriminate on the basis of race, color, national origin, gender, age, religion, disability, or status as a veteran in any of its policies, practices, or procedures. This includes but is not limited to admissions, employment, financial aid, and educational services.

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Director of Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Vice President, Dean, and Director of the Division of Agricultural Sciences and Natural Resources and has been prepared and distributed at a cost of 42 cents per copy. 0413 Revised. GH