

Insect Control For Alfalfa Seed Production

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Many insects are associated with alfalfa grown for seed production. For maximum seed production it is important to adequately control insect and mite pests and at the same time protect the insect pollinators of alfalfa and the parasites and predators of the pests. The major pest insects are discussed in the order they generally appear as the season progresses. The secondary insects listed will require, under certain situations, the applications of control measures to prevent seed losses.

Major Insects Affecting Alfalfa Seed Production

ALFALFA WEEVIL. The adults hibernate in plant debris found in and surrounding alfalfa fields. They emerge in March and are found in the alfalfa until fall. On warm spring days up until the alfalfa is 6 to 8 inches tall adults may fly to other fields. By the time the alfalfa has grown 2 inches tall the weevils have mated and the females begin to lay their eggs inside the tender stems. Upon hatching, the tiny larvae crawl up the outside of the stems and enter the terminal flower and leaf buds. The flower buds are eaten and the leaves are skeletonized as the larvae complete their development. The mature larvae spin a frail, lace-like cocoon before becoming pupae. These may be found among the debris at the ground surface or attached to a stem a foot or more above the ground when the soil is saturated with water. Emergence of new adults occurs in summer into early fall when usually heavy flights to surrounding areas for hibernation occur. For complete details of the alfalfa weevil life cycle

and larvae control see Idaho Current Information Series, No. 73, "Alfalfa Weevil Control 1968."

There is no effective insecticide control for adult alfalfa weevil that will not leave a pesticide residue on the alfalfa. In alfalfa seed fields the alfalfa weevils are kept in check by insecticide treatments applied to control other pests.

ALFALFA SEED CHALCID. In 1967 the alfalfa seed chalcid destroyed over 20 percent of the seed produced in some fields in the Boise Valley area. Other years, damage has usually been less than 5 percent. The tiny black-bodied wasps emerge from hibernation in early summer and infest the alfalfa by laying eggs in the developing seeds. A little over a month is required for the white legless larva to complete its development within the seed and for the next generation of wasps to appear. Larvae hibernate within the seeds which have fallen to the ground in the field, in seed chaff and in non-harvested seed produced by volunteer plants outside of seed fields. There may be a partial third generation in some seasons.

There is no known field-proven insecticide that will control the alfalfa seed chalcid. The practice of incorporating an herbicide into the soil in the spring also buries the hibernating chalcids and prevents them from emerging.

LYGUS BUGS. Alfalfa is an excellent host plant for lygus bugs. In addition to alfalfa they attack and develop on many different plants. They are strong flyers and will move into alfalfa seed fields from hay fields and from other crops and plants reaching maturity. This results in overlapping population of lygus bugs and the development of high populations which can drastically reduce alfalfa seed yields.

The color of lygus bugs varies from yellowish-green to a reddish-brown. At the base of their

wings, in the middle of their backs, there is a characteristic yellowish "V" area. Eggs are laid singly in the tender terminal plant tissues. Young nymphs are a shiny green and move very rapidly. This distinguishes them from the dull green slow moving aphids. Just before the nymphs mature, short wing pads appear on their backs and there are four black spots on each side of the abdomen. About six weeks are required to complete a generation. The adults hibernate in the debris on the ground.

Lygus bugs feed by piercing the tender leaf, stems, buds, petioles and developing seeds with their beaks and by sucking out the plant sap. This causes stunting of the plants, blasting of buds, shedding of bloom, seed curls and shriveling of the seeds. The most serious losses are blossom drop and shriveled seed. However, environmental conditions can also cause blossom drop. The adverse affects of the nymphal and adult lygus feeding starts during the bud stage of the seed producing crop and continues until the plant matures in the fall.

The alfalfa leafcutter bee is readily killed by most insecticides that are toxic to lygus bugs. These pollinators can be protected by treating the lygus bug population in the early bud stage. Dimethoate (Cygon) will control lygus bugs and pea aphids and will hold these pests in check until the plants are in full bloom. When alfalfa weevil larvae are also present, malathion, parathion or azinphosmethyl (Guthion) will be effective.

Throughout the seed producing period lygus bug populations should be kept below an average of four — adults and nymphs — per 180 degree sweep of a 15-inch diameter sweepnet. Two applications of trichlorfon (Dylox) applied 10 days apart will control lygus bugs without being detrimental to alfalfa leafcutter bees. During the period of bloom, when pea aphids are also a problem, trichlorfon (Dylox) plus demeton (Systox) or oxydemetonmethyl (Meta-Systox-R) will be effective. During the hotter, dry periods of mid-summer, naled (Dibrom) applied at night will be more effective than trichlorfon (Dylox).

Before considering the application of any other insecticide to a blooming alfalfa seed field compare the toxicity of the material to alfalfa seed pollinators in Idaho Current Information Series, No. 67, "Toxicity of Insecticides to Insect Pollinators."

PEA APHID. Pea aphids can damage alfalfa grown for seed as well as peas, the principal summer host plant. Generally the control measures applied for the other pests also control the pea aphid.

In the fall fertilized female aphids lay tiny, shiny black eggs on the alfalfa stubble. These hatch in early spring and after four molts the nymphs become wingless females which produce living young without mating. Each may give

birth to 50 to 150 nymphs during her 30-day life. Some of the summer produced aphids develop wings and fly to other fields. In the fall male aphids appear and mate with females that later lay eggs.

Syrphid fly larvae, lady beetles, tiny wasp parasites and lacewing fly larvae are the principal pea aphid parasites and predators. Clipping the first growth and producing seed from the second growth alfalfa generally prevents damaging pea aphid populations from occurring. When pea aphids are numerous enough for their feeding to cause irrigated alfalfa plants to wilt during the hottest period of the day, control treatments should be applied. Properly applied systemic insecticides are less destructive to the beneficial parasitic and predatory insects and pollinators than are the contact insecticides.

TWO-SPOTTED SPIDER MITE. Occasionally when first growth alfalfa plants are under stress for lack of adequate moisture, the two-spotted spider mite will multiply rapidly and the population will require treatment. Usually it is late summer before spider mite populations develop.

The adults spend the winter in the debris at the soil surface. As spring develops, female mites lay eggs on the undersides of leaves. Because of the cold, damp conditions in the spring, spider mite development is slow as compared to hot, dry summer conditions when the eggs hatch in 3 to 5 days and the young mites complete their development in 8 or 9 days. Upon maturing the young female spider mites will begin to lay eggs after one day of feeding. Each female is capable of laying 300 eggs in her 30 to 45 day lifetime.

The presence of spider mites is seldom noticed until their feeding damages the upper leaf surfaces. Feeding injury is characterized by the yellowing and "fired" appearance of the leaf. The lower surface of these "fired" leaves will be covered with a fine webbing which covers the mites and their tiny translucent eggs. At times tear-shaped predatory mites, tiny black lady beetles and minute bug predators will be found under the web feeding on the spider mites. When severe spider mite infestations develop, the leaves turn brown and drop to the ground. There are occasions when the webbing becomes so extensive that the entire terminals of several stems are webbed together. Seed produced from fields heavily infested with spider mites is often shrunken.

To be effective, dusting sulfur or Kelthane must be applied before the leaves are webbed over. Where the contact organophosphorus materials are used for spider mite control two applications are required within an interval of 9 days. The first application will kill the active spider mites that are present and the second application will kill the young mites which have recently hatched and before they become adults and lay eggs. Thorough plant coverage is necessary in spider mite control.

Insects of Secondary Importance

After mid-August large numbers of **alfalfa caterpillar butterflies** may be seen flying over alfalfa fields. The butterflies have yellow wings with black borders. These are second generation adults. The larvae range up to 1½ inches long and are a velvety-green color. There is a fine white stripe on each side of the body through which runs a fine red stripe. Insecticides used for lygus control prevent damaging numbers from developing.

During early spring when the weather is cold and dry, the feeding of **clover leaf weevils** and their larvae may retard the growth of alfalfa. The adult is a dark brown robust weevil about ¼ inch long. The larva is green with a yellowish-white stripe which runs down the middle of the back. It is readily distinguished from the alfalfa weevil larva. It has a brown head and the end of the body is light tan or pinkish in color. Mature larvae are about ½ inch long. They are usually found in a curled position. Moist spring weather favors the development of a fungus disease which greatly reduces the clover leaf weevil larva population. It is never a pest during the growing season.

The feeding of the **clover root curculio** larva destroys the rootlets and nodules and often girdles the tap root of the alfalfa plant. This feeding exposes the root to invasion by disease organisms. The adult curculio somewhat resembles the alfalfa weevil but is shorter, more slender and is coppery-gray to shiny brownish-black in color with a shorter, broader snout. Control practices listed for lygus bugs usually hold this insect in check.

Occasionally weather conditions favor the development of one or more of several different **cutworms**. Their feeding can retard the spring growth of alfalfa. Adult cutworms are dusky brown or grayish moths or "millers" which are commonly seen flying around lights in the summer time. They spend the winter either as eggs, larvae or pupae. Usually their natural enemies keep them in check. When damaging numbers do occur, a DDT, trichlorfon (Dylox), or toxaphene treatment will control them. Before applying the insecticide irrigate the field thoroughly. This will

improve the effectiveness of the treatment by forcing the cutworms to the surface of the soil.

In dry years when the rangeland plants and others growing along canal banks and roadsides become dry and unpalatable, **grasshoppers** will move into alfalfa fields. When they feed only on the leaves, the damage is of little importance, but in late summer they can be very destructive when they clip off the blossoms and seed curls. Insecticides, like parathion, are quite effective but should be used in a manner that will not harm pollinators.

The **spotted alfalfa aphid** which only attacks alfalfa can kill seedling plants and lower the productivity of established fields. This aphid is about 1/16 inch long, lemon-yellow in color, with 6 or more rows of conspicuous grayish spots on the back. It is generally most active after mid-August. The females may give birth to 100 young which mature in 2 to 3 weeks. In the process of feeding this aphid releases an abundance of honeydew upon which a sooty mold grows. A systemic insecticide treatment will be most effective when it is applied to thoroughly irrigated and vigorously growing seedling or established fields.

Insect Control Recommendations

These recommendations are only for alfalfa seed production. Some of the suggested treatments will leave residues on the alfalfa and seed cleanings. To prevent insecticide residues in marketed milk and meat, do not feed DDT, Kelthane or toxaphene treated hay or seed cleanings to milking dairy animals or to animals being fattened for slaughter.

REMEMBER: 1. Always protect the pollinators. Wait until the pollinators have left the field before applying insecticides. Use only those materials that are the least toxic to pollinators. Keep the pollinator nests thoroughly covered during and until the insecticide has completely settled.

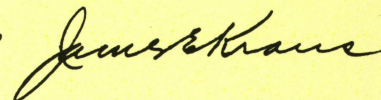
2. Thoroughly treat the field. Use adequate amounts of carrier so that immediate retreatment is not required. Apply the treatments at a time when there will be the least possible drift onto neighboring crops.

INSECT CONTROL RECOMMENDATIONS

Insect	Insecticide	Dosage Per Acre, Actual Material	When and Where to Use	Safety Restrictions
Alfalfa weevil adult larvae	None		None of the effective insecticides have Federal clearance. Their use will leave residues on the hay. Do not feed treated foliage to milking dairy animals or meat animals being fattened for slaughter.	
	Malathion	1-1¼ lb.	Apply in early bud stage before larvae have skeletonized 50% of plant terminals.	*Hazardous. Handle and apply only when wearing protective clothing and carefully follow label precautions.
	Parathion*	4 oz.		
Azinphosmethyl* (Guthion)	6, 8, or 12 oz.			
Alfalfa seed chalcid	None		Destroy all volunteer, ditch bank and roadside plants. Cultivate alfalfa fields in spring to bury plant debris and seeds at least an inch deep. Irrigate alfalfa just as the chalcid wasps emerge.	
Lygus bugs	Dimethoate (Cygon)	1½ lb.	In early bud stage only.	
	Trichlorfon	1-1½ lb.	Blooming alfalfa. When an average of 4 bugs per sweep are present, apply in evening or early morning. Most effective when 2 treatments are applied at a 10-day interval.	
	Naled (Dibrom)	1 lb.	Blooming alfalfa. Effective during hot, dry periods of mid-summer.	Apply only in evening after alfalfa leafcutter bees have left the field.
	DDT plus toxaphene	1 lb. plus 4 lb.	Blooming alfalfa. Can be safely used when pollinators are alkali bees. Very toxic to alfalfa leafcutter bees and should not be used when these bees are present. Do not feed treated foliage to milking dairy animals or to animals being fattened for slaughter.	
Pea aphid	Dimethoate (Cygon)	½ lb.	In early bud stage if needed.	
	Demeton* (Systox)	4 oz.	During bloom period.	*Hazardous. Handle and apply only when wearing protective clothing and carefully follow label precautions.
	Oxydemetonmethyl* (Meta-Systox-R)	½ lb.	In early bud stage. Apply only in evening during bloom period.	
	Naled (Dibrom)	1 lb.	During bloom period.	
Sulfur	25 lb.	As a preventative before damage occurs.		
Two-spotted spider mite	Dicofol* (Kelthane)	1½ lb.	On foliage as needed and when mites re-occur.	*Do not feed treated foliage or seed cleanings to milking dairy animals or to animals being fattened for slaughter.
	Naled** (Dibrom)	1 lb.	Two treatments at a 9-day interval. **Apply in evening or at night.	
	Demeton* (Systox)	4 oz.	Apply only to well-irrigated and vigorously growing plants when aphids average 20 to 40 aphids per plant or an average of 1 per seedling.	
Spotted alfalfa aphid	Oxydemetonmethyl* (Meta-Systox-R)	4 oz.		*Hazardous. Handle and apply only when wearing protective clothing and closely follow label directions.
	Parathion*,**	8 oz.	**Do not apply to plants in bloom. Two applications will be needed.	
	Demeton* (Systox)	4 oz.		
Cutworms	DDT	2 lb.	Apply only when field is well-irrigated to force the cutworms to the soil surface.	Do not feed DDT or toxaphene treated foliage or seed cleanings to milking dairy animals or to animals being fattened for slaughter.
	Toxaphene	3 lb.		
	Trichlorfon* (Dylox)	1½ lb.		
Grasshoppers	Dieldrin	4 oz.	As needed.	Banding around outside of seed fields. Do not allow animals to pasture treated area. Apply so drift will not deposit on blooming plants.
	Malathion	1 lb.		

These recommendations are based on the best information currently available for each chemical listed. If followed carefully, residues should not exceed the tolerance established for any particular chemical. To avoid excessive residues, follow label recommendations carefully with respect to dosage levels, number of applications, and minimum interval between applications and harvest. **The grower is responsible** for residues on his crops as well as for problems caused by drift from his property to other properties or crops. Brand names have been used for convenience only. No preference is intended.

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