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The Spotted Alfalfa Aphid in Alfalfa Grown For Seed and Forage in Idaho

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NOTICE: According to Idaho's nonfood regulation of May 1990, once a field is designated a "seed" production field no part of the seed crop including chaff, screenings or field grazing may be used for human or animal feed. This applies whether or not pesticides are used on that field.

The spotted alfalfa aphid (*Therioaphis maculata*) has become one of the most serious insect pests of alfalfa in Idaho. In addition to alfalfa, the spotted aphid infests several species of wild clover, medic and burseem. It has been present in the Pacific Northwest since 1957.

This pest always has been difficult to control, but with changes in pesticide availability and the difficulty of registering new pesticides, it has taken on new importance. Growers no longer can depend entirely on chemical controls but must consider all available aphid control measures.

Appearance

The spotted alfalfa aphid is easy to distinguish from other aphids found in alfalfa. It is pale yellow with four to six rows of dark spots along its back (Fig. 1). Under magnification, each dark spot reveals a single short spine. At 1/16 inch long, the spotted alfalfa aphid is smaller than other alfalfa aphids and has relatively short legs and antennae. Adults may be winged or wingless, depending on the season of the year. Unlike the pea aphid, the spotted alfalfa aphid prefers to feed on the lower portions of the plant and on the undersides of leaves.

Life history

In Idaho, the spotted alfalfa aphid generally overwinters inside the alfalfa crown as an adult female. In spring, unmated females give birth to living young (nymphs) that develop into females. They are followed by additional generations of females. In very cold winters, the spotted aphid is thought to lay eggs that hatch directly into female nymphs in spring. These females also give live birth to successive generations of females.

Immature aphids molt four times before becoming adults. Development from birth to adult requires about 5 days at 85°F and 19 days at 60°F. Aphids develop very slowly or not at all below 45°F. Each female produces from 50 to 100 offspring during her lifetime. The aphids may produce 20 or more generations per season in Idaho.

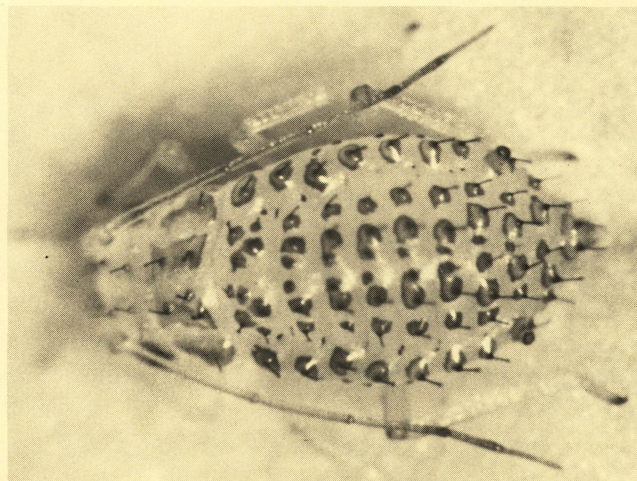


Fig. 1. The spotted alfalfa aphid, an important pest of forage and seed alfalfa, has four to six rows of dark spots on its back.

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Pesticides for alfalfa seed crop only.

Insecticide	Rate (ai/acre)	Remarks
Prebloom		
Capture 2E	.06 to 0.1 lb	Prebloom only. Do not apply to alfalfa during bloom.
Dibrom	1 lb	Do not apply within 4 days of harvest.
dimethoate*	0.25 to 0.42 lb	Prebloom only. Do not apply to alfalfa during bloom.
methyl parathion	0.25 to 0.5 lb	Prebloom only. Do not apply to alfalfa during bloom.
parathion	0.5 lb	Prebloom only. Do not apply to alfalfa during bloom.
permethrin (Ambush 2E, Pounce)	0.05 to 0.2 lb	Apply at least 3 days before bees begin foraging on alfalfa blossoms
Prebloom or postbloom		
endosulfan EC	0.5 lb	Apply in 10 gallons of water per acre by air and 25 gallons by ground sprayer.
Metasystox-R*	0.375 to 0.5 lb	Apply in not less than 1 gallon water per acre.
Spur 22EW	0.15 lb	Apply a maximum rate of 0.15 lb (9.6 fl oz of Spur 22EW) per acre per application. Apply by ground or air with sufficient water to give good spray coverage. A maximum of three applications may be made.

*These products are registered for use on aphids in Idaho, but in Idaho tests on spotted alfalfa aphids, they have been slightly inferior to other products tested.

The spotted alfalfa aphid is a warm-weather aphid. Whereas other alfalfa aphids tend to decline during prolonged hot weather, populations of the spotted aphid often increase or even explode. In most years, winged spotted aphids begin flying in early June and build to peak population levels by mid-July. Sweep net counts in field samples usually are detected by early to mid-June and may persist at high levels into late July. The population crashes 10 to 15 days after the peak and remains at a low level through August. A few winged aphids appear in suction traps into September or October.

Pesticides for alfalfa hay only.

Insecticide	Rate (ai/acre)	Remarks
diazinon	0.375 to 0.5 lb	Do not apply within 7 days of cutting hay. <i>Do not apply to alfalfa during bloom.</i>
Dibrom	1 lb	Do not apply within 4 days of harvest.
dimethoate*	0.25 to 0.42 lb	Do not eat or feed within 10 days of application. <i>Do not apply to alfalfa during bloom.</i>
Di-Syston 15G	1 lb	Apply one broadcast application per crop season. Do not apply within 28 days of grazing or cutting for forage.
malathion*	0.93 to 1.52 lb	0 days to harvest. Do not apply when bees are in the field.
methomyl	0.45 to 0.90 lb	Do not feed or graze within 7 days. <i>Do not apply to alfalfa during bloom.</i>
methyl parathion	0.25 to 0.5 lb	Do not treat sooner than 15 days before harvesting, cutting or grazing. <i>Do not apply to alfalfa during bloom.</i>
permethrin	0.05 to 0.2 lb	0 days to harvest for up to 0.1 lb per acre; for more than 0.1 lb per acre, do not apply within 14 days of grazing, harvesting or cutting.
Phosdrin*	0.5 lb	Do not treat within 1 day of harvesting.
Supracide	0.5 to 1 lb	Do not apply within 14 days of cutting, grazing or feeding to livestock. <i>Do not apply to alfalfa during bloom.</i>

Note: These recommendations are *not* for use on seed fields.

*Not effective on spotted alfalfa aphids in Idaho tests.

Damage

Both adults and nymphs suck fluids from alfalfa leaves and stems. The first sign of their feeding in young alfalfa is a whitening of leaf veins. Continued feeding causes the leaf to curl, turn yellow, die and drop. While feeding, the aphids inject a toxin into the plant that can kill seedlings and severely stunt older plants. On mature plants, damage first occurs near the ground and progresses upward until the entire plant is defoliated

except for a few leaves at the ends of the terminal branches. Regrowth on damaged alfalfa is prevented or retarded after cutting. Weakened alfalfa is more easily invaded by weeds and less able to withstand other stresses.

The spotted alfalfa aphid also secretes a sticky honeydew that interferes with cutting, drying and baling of hay and with combining of the seed crop. The honeydew supports the growth of a black, sooty mold that lowers the forage quality of hay.

Management guidelines

Prevention — Use aphid-resistant alfalfa varieties in future plantings, especially in areas where aphids are a problem every year. No one variety is appropriate for all of Idaho; growers should consult their fieldman and county Extension agricultural agent for recommendations on aphid-resistant varieties for their area.

The following cultural practices may aid in spotted aphid control:

1. Plant seed fields using a 30- to 36-inch row spacing and space alfalfa crowns similarly within the row. Such fields are more easily managed for insect control. Pest populations usually are less dense in open plantings, and spray applications can better penetrate the foliage. Pollinators in less-dense plantings also can trip more bloom, resulting in higher yields.
2. Plant in spring because spotted aphids are much less prevalent than they are in fall.
3. Use proper irrigation management according to the needs of individual fields to help prevent stress on the alfalfa plants.

Pest monitoring — Much has been said about Integrated Pest Management (IPM) of alfalfa pests in recent years, yet most growers have not utilized the available IPM tools. It is critically important to know if aphid populations are increasing. Seed fields should be sampled two or three times weekly, especially during the peak of the season and in areas with a history of spotted aphid problems.

Although a sweep net is useful in sampling pea aphid populations, it has limited value in spotted aphid sampling. The spotted alfalfa aphid occurs lower on the plant than the pea aphid, where it is not easily picked up in a net.

Stem counts are more useful in determining spotted aphid levels. In four or five locations in each field, five

or more stems should be carefully cut near the ground and examined for aphids. Spotted aphids tend to fall from the plant at the slightest disturbance so aphid counts should be made in the field.

Treatment thresholds (average of several locations in the field):

Mature alfalfa	20 to 30 aphids per stem
New seeding alfalfa (broadcast)	1 aphid per 2 stems
New seeding alfalfa (rows)	1 aphid per 5 stems

If stem counts exceed the thresholds, growers should consider chemical control while taking into account the numbers of beneficial insects in the field. Do *not* spray if lady beetles are present in a ratio of one adult lady beetle per five to 10 spotted aphids or three lady beetle larvae per 40 spotted aphids. The presence of parasitic *Aphidius* wasps, parasitized aphid mummies and aphid predators such as lacewing larvae, damsel bugs and syrphid fly larvae also should be considered. See Pacific Northwest Cooperative Extension Bulletin PNW 343, *Beneficial Organisms Associated with Pacific Northwest Crops*, for help in identifying useful insects in alfalfa and other crops.

Chemical control — Spotted aphids always have been more difficult to control than other aphids in alfalfa. In recent years, seed growers have had more difficulty than usual. One factor has been the prolonged, hot summers during which the spotted aphids were present at high levels for several weeks. The aphids also may have some resistance to frequently used insecticides. Other failure factors associated with insecticide use include extremely high and recurring populations of aphids, growers using minimal water (5 gallons or less) in their spray tanks, growers failing to buffer the water-insecticide mix and others.

The following recommendations are not new, but they serve as reminders to do everything possible to enhance chemical control efforts:

1. Use recently purchased insecticide.
2. Use cool spray water, preferably 50° to 70°F.
3. Buffer the spray mix according to your water's pH.
4. Do not allow spray mix to stand in the sun.
5. Do not store spray mix overnight.
6. Use sufficient water, at least 25 gallons per acre for ground application and 10 gallons per acre for air application.
7. Use drop nozzles and higher spray pressure to help the spray penetrate the alfalfa canopy.

8. Use the most current insecticide recommendation provided in University of Idaho CIS 231, *Idaho Insect Control Recommendations for Alfalfa Seed Production*, available from your county Extension office.
9. Use insecticides carefully. Do not apply when pollinator populations will be killed. See University of Idaho CIS 458, *Prevent Pesticide Poisoning of Pollinators*.

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.

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