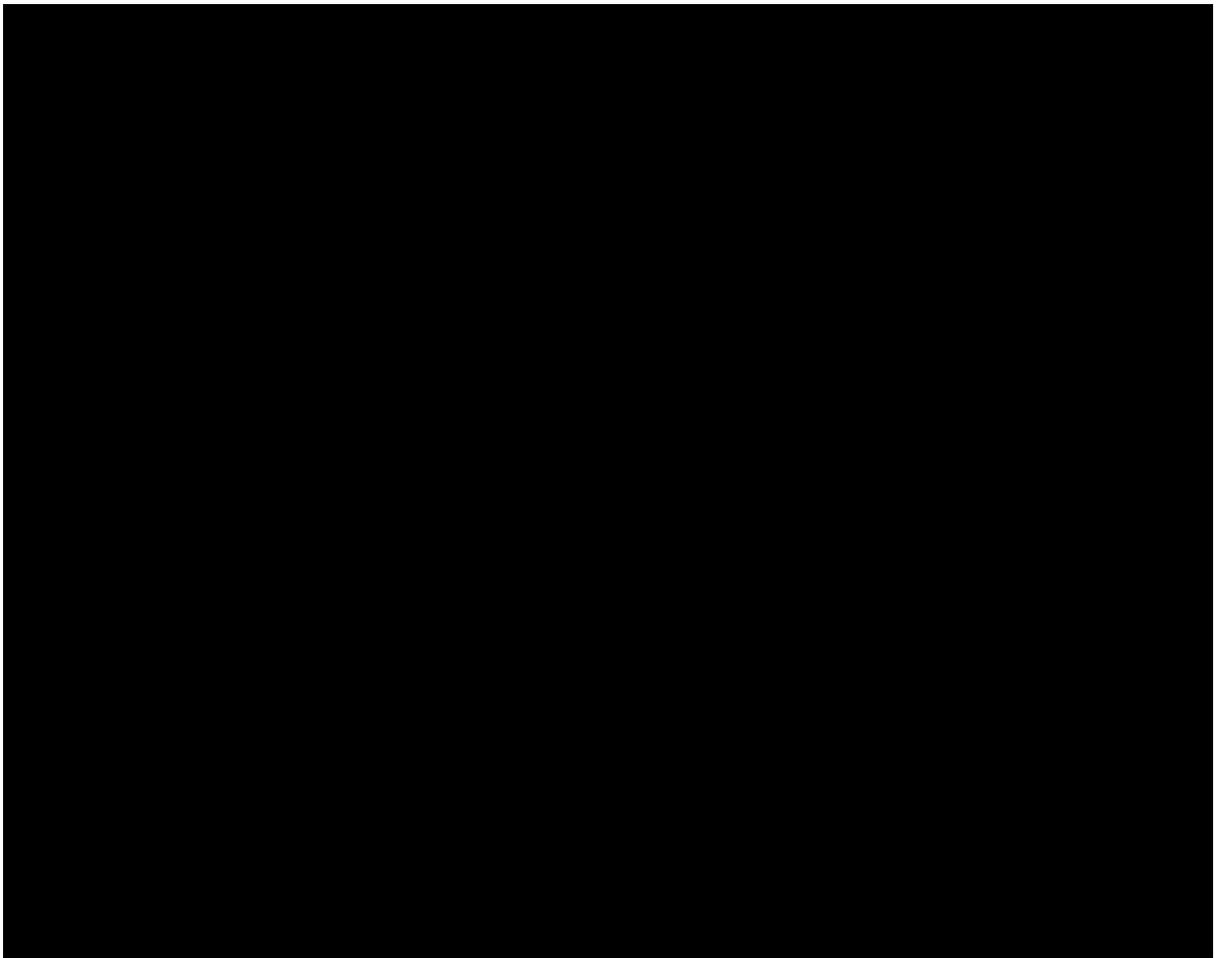


Idaho Insect Control Recommendations for Alfalfa Seed Production

C. R. Baird and H. W. Homan

Alfalfa weevil

Spotted alfalfa aphid



Pea aphid

Lygus bug

Insect Control Precautions and Recommendations

- Do not use pesticide-treated alfalfa, chaff, or seed screening for food or animal feed.
 - Always protect pollinators. Wait until pollinators have left the field before applying insecticides. Choose the insecticides that are least toxic to pollinators. Avoid using Furadan when dandelions are in bloom. Consult CIS 458, *Prevent Pesticide Poisoning of Pollinators*, for bee hazard information (see “Further Readings”).
 - Thorough coverage of foliage is necessary for insect and mite control. Use plenty of water.
 - Time applications to prevent drift to neighboring crops.
 - Buffering increases the effectiveness of certain insecticides. Follow label recommendations to prevent injury to beneficial insects.
 - Methomyl, methyl parathion, Supracide, and Furadan are especially hazardous to applicators. Follow label instructions precisely when storing, handling, and applying these insecticides. Post fields as required to prevent other people from entering them. Destroy containers as labels direct.
 - For more information, contact the extension educator in your county.
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Further Readings

- CIS 458 Prevent Pesticide Poisoning of Pollinators, 50¢
- CIS 878 The Spotted Alfalfa Aphid in Alfalfa Grown for Seed and Forage in Idaho, 50¢
- CIS 987 The Alfalfa Seed Chalcid: An Important Alfalfa Seed Pest, 50¢
- PNW 343 Beneficial Organisms Associated with Pacific Northwest Crops, \$1.00
- MS 109 Keys to Damaging Stages of Insects Commonly Attacking Field Crops in the Pacific Northwest, \$15.00.

To order publications, contact the University of Idaho Cooperative Extension System office in your county or write or call Agricultural Publications, University of Idaho, Moscow, ID 83844-2240 (208-885-7982).

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NOTICE: According to Idaho's nonfood regulation of May 1990, once a field is designated as 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.

Harmful insects and mites infesting alfalfa grown for seed usually exceed economic thresholds. They must be managed or controlled to produce maximum seed yields. However, most insecticides used to control lygus bugs, aphids, and other pests easily kill alfalfa pollinators and beneficial predators and parasites.

Once flowering begins, make spray applications for insect pests only in the evening after pollinator activity has stopped for the day. Avoid using broad-spectrum insecticides during bloom.

Information concerning the following pest insects is presented in the order they generally appear during the season.

Species of Major Importance

Alfalfa weevil—Adults overwinter in alfalfa crowns, plant debris, and duff in alfalfa fields and adjoining areas. They emerge in March and begin feeding and mating. They begin to migrate from overwintering sites on warm days in April. Mating will have occurred by the time alfalfa is 2 inches tall. Females begin to lay eggs inside alfalfa stems when the stems are 6 to 8 inches tall. Egg laying may continue until early summer.

Newly hatched larvae crawl up the outsides of stems and enter leaf buds to feed. Later, they move down the plant and finish developing on leaves. Mature larvae spin a frail, lacelike cocoon that can be found near the alfalfa crowns or in the debris at the bases of the plants.

New adults emerge from midsummer until early fall, feed for a short period of time, and then fly to hibernation sites in fields and surrounding areas. Only one generation occurs in Idaho each year.

Apply insecticide when weevil numbers reach 15 to 25 per sweep prebloom and 25 per sweep during bloom. Treat before the alfalfa begins to bloom because most insecticides that control alfalfa weevil are extremely toxic to pollinators.

Alfalfa seed chalcid—In some years, this pest has destroyed more than 20 percent of the alfalfa seed grown in some southern Idaho locations. In other years, losses have been as low as 1 percent. These tiny, black-bodied wasps emerge from late spring until early summer from seeds infested the previous year.

Females lay their eggs in immature seeds in the curl. Each white, legless larva takes about a month to complete its development within a seed and then emerges as an adult. Second- and third-generation larvae overwinter in seeds on the ground, in seed chaff, and in seed on volunteer plants outside seed fields.

Chemical control is not practical. No insecticides are recommended to control the seed chalcid because the adults lay eggs from July through September whenever seeds are present. The primary control method is fall or spring tillage to bury seed containing overwintering larvae at least $\frac{3}{4}$ inch deep. Adults cannot emerge from buried seed. Destroy infested alfalfa seed chaff and eliminate volunteer alfalfa plants growing near seed fields.

Lygus bugs—Alfalfa is a preferred host plant for several species of lygus bugs, but the bugs also infest many other crops. Lygus bugs are strong flyers and move into alfalfa seed fields from weeds, hay, mint, wheat, and other crops as they are harvested or reach maturity.

Insecticides for Alfalfa Seed Pests

Insect and insecticide	Rate (pounds per acre active ingredient)	When and how to use insecticide
Alfalfa weevil—Prebloom only		
diazinon or	1 to 1 1/2	<p>Apply malathion, diazinon, methyl parathion, Furadan, Supracide, Lorsban, Capture, or Ambush before bloom when weevils reach 15 to 25 per sweep.</p> <p>Apply Ambush at least 3 days and Warrior at least 5 days before bees begin foraging alfalfa blossoms. Apply Supracide, diazinon, methyl parathion, or Lorsban at least 7 days and Furadan at least 14 days before bees begin foraging alfalfa blossoms.</p> <p>Within 18 months of the last Furadan application, do not plant any crop other than alfalfa, corn, peppers, potatoes, strawberries, or sugarbeets.</p> <p>Birds feeding in Furadan-treated areas may be killed. Do not apply Furadan where runoff is likely, on fields where waterfowl are known to feed repeatedly, or close to waterfowl nesting areas. Early Furadan sprays (late April to Mid-May) for alfalfa weevil often are blamed for severe honeybee kills when dandelions are in bloom. Do not use Furadan when these weeds are blooming in the field being treated; choose an insecticide that is less toxic to bees. See CIS 458 in “Further Readings” for information on insecticide toxicity.</p>
Furadan or	1/2 to 1	
Lorsban 4E or	1/2 to 1	
malathion or	1 1/4	
methyl parathion or	1/2	
Supracide or	1/2 to 1	
Capture or	0.06 to 0.1	
Ambush 2E or	0.1 to 0.2	
Warrior	0.02 to 0.03	
Alfalfa weevil—During bloom		
No insecticides are recommended.		<p>Numbers of alfalfa weevil larvae usually decline by late June, but the larvae may still damage the leaves of the blossoming seed crop. Insecticides are not recommended to control weevils during bloom.</p> <p>Most insecticides that control weevils also kill leafcutting bees. It is better to preserve the pollinators and live with minor weevil damage than to kill the pollinators with a weevil spray. Check with your extension educator or fieldman in special cases.</p>
Alfalfa seed chalcid		
No insecticides are registered.		This pest must be controlled by cultural methods. No insecticides are recommended. See CIS 987 in “Further Readings.”
Lygus bugs—Prebloom only		
Carzol or	0.9	<p>Treat when lygus bug populations reach four per sweep.</p> <p>Apply Ambush at least 3 days and Warrior at least 5 days before bees begin foraging alfalfa blossoms. Apply Carzol, diazinon, methyl parathion, Supracide, or Lorsban at least 7 days and Furadan at least 14 days before bees begin foraging in alfalfa fields. Apply dimethoate no later than early bud stage to protect pollinators.</p> <p>Within 18 months of the last Furadan application do not plant any crops other than alfalfa, corn, peppers, potatoes, strawberries, and sugarbeets.</p> <p>Birds feeding in Furadan-treated areas may be killed. Do not apply Furadan where runoff is likely, on fields where waterfowl are known to feed repeatedly, or close to waterfowl nesting areas.</p>
dimethoate or	1/2	
Furadan or	1	
Lorsban 4E or	1	
malathion or	1 1/4	
methyl parathion or	1/2	
Supracide or	1/2 to 1	
Capture or	0.06 to 0.1	
Ambush 2E or	0.1 to 0.2	
Warrior	0.02 to 0.03	
Lygus bugs—During bloom or prebloom		
naled or	1	<p>Treat when bug populations reach four per sweep in an insect net.</p> <p>Apply naled only in the evening after bees have stopped foraging. Use caution when heavy dew is expected.</p> <p>Refer to the Capture and Warrior labels for specific instructions and cautions for their use.</p>
Metasystox-R or	1/2	
Capture or	0.06 to 0.1	
Warrior	0.015 to 0.02	
Pea aphid—During bloom or prebloom		
Metasystox-R or	1/2	<p>Apply pesticide when aphids reach 150 per sweep and beneficial insects are not present.</p> <p>Apply after bees stop foraging in the evening. Do not spray when bees are in the field.</p> <p>Refer to Warrior and Capture labels for specific instructions and cautions for their use.</p>
Warrior	0.015 to 0.02	
Capture	0.06 to 0.1	

NOTE: Spur and Dylox (trichlorfon) are no longer manufactured. These recommendations are for alfalfa seed only.

Insect and insecticide	Rate (pounds per acre active ingredient)	When and how to use insecticide
Pea aphid—Prebloom only		
diazinon or	1/2	Apply pesticide when aphids reach 150 per sweep and beneficial insects are not present. Apply Ambush at least 3 days and Warrior at least 5 days before bees begin foraging alfalfa blossoms. Apply diazinon, methyl parathion, Lorsban, and Supracide at least 7 days before bees begin foraging in the field. Apply dimethoate no later than early bud stage. See CIS 458 (see “Further Readings”) for insecticide toxicity information.
dimethoate or	1/2	
malathion or	1 1/4	
methyl parathion or	1/2	
Supracide or	1/2 to 1	
Lorsban 4E or	1/4	
Capture or	0.06 to 0.1	
Ambush 2E or	0.05 to 0.2	
Warrior	0.015 to 0.03	
Twospotted spider mite—During bloom		
naled or	1	Apply one of the miticides before leaves are webbed.
Comite or	1.6	Apply two naled treatments at 7-day intervals. Apply naled evenings only but not when heavy dew is expected. While bees are actively visiting the treatment area, do not apply naled or allow it to drift to blooming crops or weeds. Do not tank mix miticides and insecticides; increased hazard to bees may result. Refer to the Capture label for specific instructions and cautions for its use.
Dicofol or	1 1/2	
Kelthane or	1 1/2	
Sulfur		
Helena 90% Sulfur Dust or	20 to 25	
Simplot Super-Sul or	3 to 5	
Capture	0.06 to 0.1	
Spotted alfalfa aphid—During bloom		
endosulfan EC or	1/2	Apply a pesticide when you find 20 to 30 aphids per stem.
Warrior	0.015 to 0.02	Apply endosulfan EC only in late evening when bees are not actively foraging. Do not use endosulfan WP. Do not use endosulfan EC at rates higher than 1/2 pound active ingredient per acre as bee poisoning may result. Refer to the Warrior label for specific instructions and cautions for its use.
Variegated cutworm—Prebloom only		
methomyl or	0.225 to 0.9	Irrigate alfalfa to force cutworms to the soil surface before applying insecticide. Apply when feeding damage is obvious.
Lorsban 4E	1/2 to 1	
Variegated cutworm—During bloom or prebloom		
carbaryl bait	1 to 1 1/2	Broadcast bait to area of infestation. Apply when defoliation is noticeable.
Alfalfa looper—Prebloom		
methomyl or	0.225 to 0.45	Apply when loopers are 1/2 to 3/4 inch long and damage is noticeable.
Lorsban 4E	1/2 to 1	Apply Lorsban and methomyl at least 7 days before bees begin foraging in the field. Do not apply during bloom.
Alfalfa looper—Prebloom or during bloom		
naled	1	Apply when loopers are 1/2 to 3/4 inch long and are noticeably cutting off blooms. Apply naled only in the evening after bees have stopped foraging. Do not apply naled when heavy dew is expected.
Armyworms—Prebloom		
Lorsban 4E or	1/2 to 1	Apply when armyworms are 1/2 to 3/4 inch long and before noticeable defoliation occurs. Apply Lorsban or methomyl at least 7 days before bees begin foraging in the field. Do not apply them during bloom.
methomyl	0.225 to 0.45	
Grasshoppers—during bloom		
naled or	3/4	Apply control when grasshoppers are cutting off blossoms or seed curls.
carbaryl bait	1 1/2	Apply naled to blossoming crop in evenings, only after pollinators have left the field. Do not apply naled during nights when heavy dew is expected. Do not irrigate immediately after applying bait.

Adult lygus bugs vary in color from pale yellowish green to dark reddish brown. They have a yellowish, triangular area between the wing bases.

The adult female lays eggs singly in tender plant tissues. First instar nymphs are tiny, transparent, and difficult to see. The second and third instar nymphs are shiny green and move very rapidly compared with the dull green, slow-moving pea aphid that they resemble. The nearly mature fourth and fifth instar nymphs have short wing pads.

Lygus bugs complete a generation in about 4 to 6 weeks. All stages of lygus bugs can occur in seed fields throughout the growing season. Adults overwinter in alfalfa crowns, plant debris, and cracks in the soil.

Damage occurs when lygus bugs pierce tender leaves, stems, buds, petioles, and developing seeds with their beaks and inject toxic saliva as they feed. This causes stunting of plants, blasting of buds, shedding of bloom and seed curls, and shriveling of seeds. The most serious losses are from blossom drop and shriveled seed.

Nymphal and adult feeding damage appears during the bud stage and continues until the seeds begin to harden in the pod. Little damage occurs late in the season even though large lygus populations may exist.

Check seed fields at least once a week for lygus bugs and their predators. Base spray decisions on numbers of insects counted in sweep net samples, not on calendar date. During bloom and seed maturation, apply insecticides to bring lygus bug populations to less than four bugs per sweep (180 degrees or a half-circle sweep). Populations of 10 to 15 bugs per sweep can be tolerated in late season as seeds are hardening. Late-season lygus sprays (cleanup sprays) do little to prevent damage to the final seed crop and usually are not worth their cost.

Damsel bugs and bigeyed bugs are important predators of lygus bugs. Count these beneficial insects when taking sweep samples for pest counts. Combined damsel bug and bigeyed bug numbers must be in about a 2 to 1 ratio to lygus numbers for control to occur. In other words, there must be twice as many predators (damsel and bigeyed bugs) as prey (lygus bugs). Spiders such as crab spiders, wolf spiders, and jumping spiders are also important lygus predators and should be considered in control decisions.

Pea aphids—The pea aphid can be a pest in seed alfalfa during early and midseason. Wilted and stunted plants are symptoms of damaging numbers of aphids.

Pea aphids overwinter as eggs on legumes, including alfalfa. Eggs that hatch in spring produce females that give birth to living young. Populations increase until plants are stressed or alfalfa begins to bloom. Each female can produce 50 to 100 young, and there may be 15 generations per season.

Lady beetles, syrphid fly larvae, lacewing larvae, damsel bugs, tiny wasp parasites, and a fungal disease are the principal natural enemies of pea aphids and can significantly reduce their populations. For more details on beneficial predators and parasites, refer to PNW 343, *Beneficial Organisms Associated with Pacific Northwest Crops*.

To help protect beneficial organisms, apply insecticides only when necessary and at the minimum labeled rate. Low to moderate populations of aphids (50 to 100 per sweep) can be tolerated. Apply an insecticide when populations reach 150 per sweep and beneficial insect numbers are low.

Twospotted spider mite—Adults overwinter in debris on the soil surface. Females lay eggs on the undersides of leaves beginning in late spring. Mites hatch in 3 to 5 days, and young mites complete development in 7 to 10 days. Each female can lay up to 300 eggs in her 45- to 50-day lifetime.

Damaging populations of this mite usually develop in mid- to late summer. Development is rapid during hot, dry weather but slows when temperatures cool.

Spider mites are seldom noticed until their feeding damages the upper leaf surface. Feeding injury is characterized by leaves with a yellowed and “fired” appearance. When infestations are high, mites make webs that may entangle entire terminals of several stems. Leaves may turn brown and drop to the ground.

Natural enemies of twospotted spider mites include tear-shaped predatory mites, tiny black lady beetles, and the minute pirate bug. They feed on spider mites on the lower surfaces of mite-damaged leaves. In many fields they maintain control of spider mites. However, some pyrethroid insecticides are particularly harmful to the beneficials thus allowing spider mite numbers to explode to high levels in a very short time.

For effective chemical control, apply a miticide before leaves are webbed. Use enough spray to cover both upper and lower leaf surfaces.

Use chemicals only when needed, and *do not tank mix miticides with insecticides. Tank mixing these pesticides often harms pollinators and beneficial organisms more than using the products alone.*

Spotted alfalfa aphid—The spotted alfalfa aphid has been the most serious aphid pest in alfalfa since the early 1980s. Alfalfa is its principal host. The aphid is pale yellow and has four to six rows of dark spots on its back.

The spotted alfalfa aphid generally overwinters as an adult female inside the alfalfa crown, but in very cold winters it is thought to lay eggs that survive until spring. The eggs hatch in spring and produce females that give live birth when temperatures are between 45° and 95°F. Winged forms first appear in early June and reach peak population by late July. As many as 20 generations can occur each year.

The spotted aphid jumps when disturbed. It is usually found on stems and leaves on the lower portions of the plant.

This aphid secretes large amounts of sticky honeydew that supports the growth of black sooty mold. The honeydew and mold lower the forage value of alfalfa hay and produce sticky alfalfa and seed during harvest. The spotted aphid also kills seedlings and may lower the productivity of established fields.

The spotted aphid's natural enemies are lady beetles, syrphid flies, lacewings, damsel bugs, parasitic wasps, and a fungal disease. These enemies significantly reduce populations.

In new seedings, one aphid per five plants in row seedings and one aphid per two plants in broadcast seedings justify insecticide treatment. In established alfalfa, other factors such as time of year, predators, and pollinators must be considered. Generally, apply spray when you find 20 to 30 aphids per stem. For more details, refer to CIS 878, *The Spotted Alfalfa Aphid in Alfalfa Grown for Seed and Forage in Idaho* (see "Further Readings").

Species of Secondary Importance

Alfalfa caterpillar—These butterflies have yellow wings with a black border. Large numbers of them may fly over alfalfa fields from mid- to late summer.

Larvae (caterpillars) measure up to 1 1/2 inches long. They are velvety green and have a narrow, white stripe on each side of the body with a fine, red stripe running through it.

Insecticides used to control lygus bugs usually control the alfalfa caterpillar also. Specific sprays for this pest are seldom needed.

Clover root curculio—This pest has a grublike larva that destroys alfalfa rootlets and nodules. It girdles tap roots, exposing the roots to invasion by disease organisms.

The adult curculio resembles the alfalfa weevil but is shorter, more slender, and has a shorter, broader snout. Adults are copper gray to shiny brownish black.

Control practices for the alfalfa weevil usually reduce root curculio populations. This pest has no known predators or parasites, and no insecticides are registered for its control.

Cutworms—Cutworm feeding seriously retards the spring growth of alfalfa. Adult cutworms are the dusky brown or grayish moths or "millers" commonly seen flying around lights in summer. They overwinter as eggs, larvae, or pupae.

Predators, parasites, and diseases help keep cutworms in control. When treatment is needed, bait formulations that pose a low hazard to pollinators and beneficial organisms are usually the most effective. If you choose a chemical spray, first irrigate the field thoroughly. This will force cutworms to the surface where the chemical is more effective.

Alfalfa looper—This is an occasional pest of alfalfa seed fields. It occurs from May through June.

Loopers are green to black. They feed primarily on alfalfa foliage but may feed on blooms. A few loopers are of little concern because disease organisms and parasitic wasps usually control them. If loopers are destroying blooms, insecticide treatments are warranted. Spray when larvae are small. Mature larvae (1 1/4 to 1 1/2 inches long) are difficult to kill.

Grasshoppers—Grasshoppers damage seed alfalfa by clipping off blooms and seed curls. Sprays applied for grasshoppers injure pollinators so apply grasshopper control only if necessary to prevent crop loss.

To help stop grasshoppers from moving into seed fields from adjacent fields, spray borders of adjacent fields with an appropriate insecticide. Carbaryl bait (Sevin) is an effective grasshopper treatment and is safe for use near pollinators.

Armyworms—Armyworms are an infrequent pest of alfalfa seed. Bertha, western yellow stripe, and beet armyworms are the most common species.

Armyworms usually occur on weeds such as lambsquarters and prickly lettuce and seldom require control in a seed field. Sprays applied for armyworm control injure pollinators and should be avoided, if possible.

Blister beetles—Blister beetles are often seen feeding on alfalfa bloom. However, their presence seldom justifies insecticide treatment, which would endanger essential pollinators and beneficial insects.

Effects of Insecticides on Beneficial Insects and Mites

Beneficial predators and parasites are an important component in controlling pest insects. The effects of insecticides on useful insects range from minor to severe, depending on timing of application and choice of product. In many cases growers have no alternative but to control pests by any method available, but in most instances choices are available that minimize hazard to beneficial organisms.

Early spraying in the prebloom stage usually has the least negative effect on beneficial populations but the more toxic materials such as Furadan and Cygon delay the buildup of damsel bug and bigeyed bug populations for 3 to 4 weeks. Other carbamate and organophosphate materials such as Lannate, Lorsban, Metasystox-R, and methyl parathion may delay beneficials for 2 to 4 weeks.

Among the synthetic pyrethroids, Ambush causes higher mortality of damsel bugs, bigeyed bugs, and spiders and will delay population increases for 2 to 3 weeks. Capture and Warrior used prebloom cause minimal delay in the buildup of beneficials, perhaps 1 to 2 weeks.

On-bloom sprays should utilize materials that minimize loss of beneficials. MSR causes moderate to severe mortality, but populations usually return to normal levels within 2 to 3 weeks. Capture and Warrior similarly knock down most beneficial insect populations, but they usually return to normal levels within 1 to 3 weeks if high rates of insecticides are avoided.

Miticides used alone are usually nontoxic to beneficial insects or mites present in the field. Miticides used in tank-mix combination with insecticides increase the hazard many times and are not recommended. Tank mixes of miticides and insecticides have devastated pollinators and beneficial parasites and predators on several occasions in Idaho.

Insect identification is a key skill that seed growers must acquire. Many growers can identify the pest insects, but most do not recognize the beneficials. We recommend that growers acquire the publications listed in "Further Readings" and learn to identify all the main pests and beneficial insects found in alfalfa. Farmers can send in questionable insects for positive identification to the extension educator in their county or to extension entomologists at University of Idaho research and extension centers:

Bob Stoltz, Twin Falls Research and Extension Center, (208) 736-3618

Larry Sandvol, Aberdeen Research and Extension Center, (208) 397-4181

Craig Baird, Parma Research and Extension Center, (208) 722-6701

Pesticide residues—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.