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# service in ACTION

## Alfalfa weevil: characteristics and control

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### Quick Facts

- The alfalfa weevil is one of the most important insect pests to attack alfalfa in Colorado.
- The use of resistant varieties and timing of cutting can help reduce weevil problems.
- Beneficial insects and diseases combine with good crop management practices to eliminate the need for any chemical controls.
- Insecticide treatments are expensive, hazardous to pollinating insects and can trigger pea aphid outbreaks.
- Alfalfa weevil insecticide treatments are an important source of honey bee losses in Colorado.

### Life History

The alfalfa weevil spends the winter as an adult in the crowns of the alfalfa plant or under leaves or other debris. Adult weevils are small, 1/4-inch, brownish-grey snout beetles, with a darker brown band down the back.

Another weevil that can be confused with the alfalfa weevil is the clover root curculio or Sitona weevil. These are slightly smaller than the alfalfa weevil and lack the brown band down the back. Sitona larvae feed on roots and occasionally cause serious stand losses in older fields. There are no effective controls for Sitona.

Alfalfa weevil adults emerge in the spring after average temperatures reach 60 degrees F. They start chewing holes in young alfalfa leaves as soon as crop growth begins, but do not lay eggs for several weeks. In

A number of insect pests attack alfalfa in Colorado. One of the most important is the alfalfa weevil (*Hypera postica*), which has been a problem in most alfalfa-producing areas of the state since the early 1900s. Losses from this insect vary from year to year, but in some seasons they can be large enough to justify the application of an insecticide.

The key to economical management of the alfalfa weevil is combining crop management practices, biological control and the use of insecticides only when weevil numbers are high enough to insure that yield benefits will outweigh treatment costs.

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Figure 1: Adult weevil.

early April the female weevils begin to chew holes in alfalfa stems with their beaks. They deposit 1 to 40 eggs in each cavity. The eggs are small and bright yellow, although they darken as they near maturity.

Egg hatch occurs in 1 to 2 weeks. The newly-hatched, yellowish-green larvae (immature weevil or "worm") will feed within the stem for a few days before moving to the opening leaf buds at the tips of the stems. Later, they feed on the leaves, producing a characteristic ragged or skeletonized appearance. Severe damage gives the field a grayish or whitish cast, as if it had been frosted. At maturity the larvae are dark green, 3/8-inch in length, with a black head and a white stripe down the back.



Figure 2: Ragged leaf damage.

Larvae usually can be found in the field for 1 to 2 months, mostly during May and June. Mature larvae move down the plant or drop to the ground and spin a fragile, lacelike cocoon attached to debris or the plant. A new adult will emerge after 10 to 12 days. Adults can be found in the field until early fall when they move to their overwintering sites.



Figure 3: Mature larvae.

### Crop Management Practices

Any crop management practice that helps produce a dense, uniform stand will make the crop better able to tolerate insect feeding. The use of resistant varieties and timing of cutting can help reduce weevil problems. Weevil-tolerant alfalfa varieties such as Perry and Arc will still produce good yields even after a moderate amount of weevil damage.

Immediate cutting can be an alternative to insecticide application if an economic infestation develops during the bud or early bloom stage. If the cutting cannot be made within the week, then the insecticide treatment should probably be made. Cutting before the optimum growth stage can reduce dry matter yields, although hay quality may be increased.

Many larvae are destroyed by the cutting process, and others are left exposed to their natural enemies, high temperatures, direct sunlight and lack of food. Survival in stubble can be reduced by removing windrows and bales quickly, as these provide some protection for the larvae. Green-chopping alfalfa is also an effective way to reduce alfalfa weevil populations.

### Biological Control

Several natural enemies of the alfalfa weevil have been imported and established in Colorado by the Colorado Department of Agriculture, and new species continually are being imported and released. The small *Bathyplectes* wasps appear to be well established in several parts of the state and have been reported to parasitize and kill as many as 30 to 35 percent of the larvae in certain fields. *Tetrastichus incertus* wasps have also been established in many parts of Colorado.

Other beneficial insects such as lady beetles, lacewings and damsel bugs attack some alfalfa weevil larvae and other insect pests of alfalfa. In addition, a fungus disease has been reported, although not in Colorado, to kill large numbers of weevil under certain conditions.

In many cases, these beneficial insects and diseases combine with good crop management practices to eliminate the need for any chemical controls.

**Chemical Control**

Insecticide treatments are expensive, hazardous to pollinating insects and can trigger pea aphid outbreaks, particularly when aphid-susceptible alfalfa varieties are grown (see Service in Action 5.531, *Aphids in alfalfa*). For these reasons, insecticide treatments should be used only when it is absolutely necessary.

The need for a treatment can be determined by assessing the severity of an infestation by calculating the percentage of damaged terminals, by counting the number of larvae per stem, or by counting the number of larvae captured with a standard 15-inch diameter sweep net. If 30 to 50 percent of the terminals are damaged or if larval counts average 1.5 to 2 per stem or if larvae average 20 per 180 degree sweep, then an insecticide treatment should be made or the crop should be cut immediately.

Stem counts can be made by gently cutting several groups of 20 stems per field and shaking the larvae into a bucket or pan for counting. Larvae per sweep should be determined by averaging the counts from several sets of 25 sweeps.

If high populations are not treated before first cutting, enough larvae and new adults may survive so as to keep the second cutting from "greening up." Stubble protection is rarely needed, but if there are more than 8 larvae and new adults per square foot in the stubble or more than 50 percent of the new growth has been damaged, then a treatment should be considered. The failure of a field to "green up" after 7 to 10 days with adequate moisture is another sign that a stubble treatment is needed.

If most of the damage is being caused by adults, check the insecticide label to make sure that the product is registered for adult control and that a high enough rate is being applied.

The insecticides recommended for control of alfalfa weevil larvae can be found in the alfalfa section of the *Colorado Pesticide Guide--Field Crops*, along with rates per acre and preharvest intervals. If other alfalfa pests are

present in economic numbers, select an insecticide that also is labelled for control of that pest or include a second material for that purpose. The effectiveness of the insecticide can be reduced by cool weather, poor coverage, insufficient gallonage, or heavy rainfall just after the application.

**Protection of Pollinators**

Alfalfa weevil insecticide treatments are an important source of honey bee losses in Colorado. Several steps can be taken to minimize these losses.

- \* Do not apply insecticides unless the alfalfa weevil has reached economic numbers.
- \* If weevil numbers are high and the crop is starting to bloom, harvest rather than spray.
- \* If an insecticide treatment is absolutely necessary, make the application during the early morning or late evening hours when bees are least likely to be foraging in the field.
- \* Avoid treating fields in bloom and fields with many flowering weeds.
- \* If blooming alfalfa must be treated, notify local beekeepers so their bees can be moved or confined during the application.
- \* Follow all pesticide label precautions concerning bee safety.
- \* Use insecticides that are as safe as possible for honey bees (see Table 1).

**Table 1: Relative hazard of alfalfa weevil insecticides to honey bees.**

<b>Extremely hazardous</b>	
Ambush Furadan 4F Malathion ULV	PennCap M Pounce Sevin (all carbaryl formulations but Sevin XLR+)
<b>Very hazardous</b>	
Lannate Parathion	Phosdrin
<b>Moderately hazardous</b>	
Lorsban 4E	Malathion
<b>Relatively safe</b>	
Methoxychlor	Sevin XLR+