Alfalfa Weevil Control Options in New Mexico

Guide A-338

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INTRODUCTION

Alfalfa weevil, *Hypera postica* (Gyllenhal) (Coleoptera: Curculionidae), is one of the most significant insect pests in alfalfa in New Mexico. Each year, producers report significant economic losses due to this pest, particularly on first cuts. Most of the damage occurs early in the growing season when weevil populations are high and natural predator and parasitoid populations tend to be low. Typically, the first and second cuttings of alfalfa are the most heavily damaged. Yield reductions as high as 1,000 to 1,500 lb/ac have been recorded in research trials in Artesia and the Mesilla Valley in the 1980s, when such losses were considered common. Biological control has lessened those losses somewhat, particularly in the Mesilla Valley and particularly since 2000, but in some areas and in some years, growers still experience significant losses.

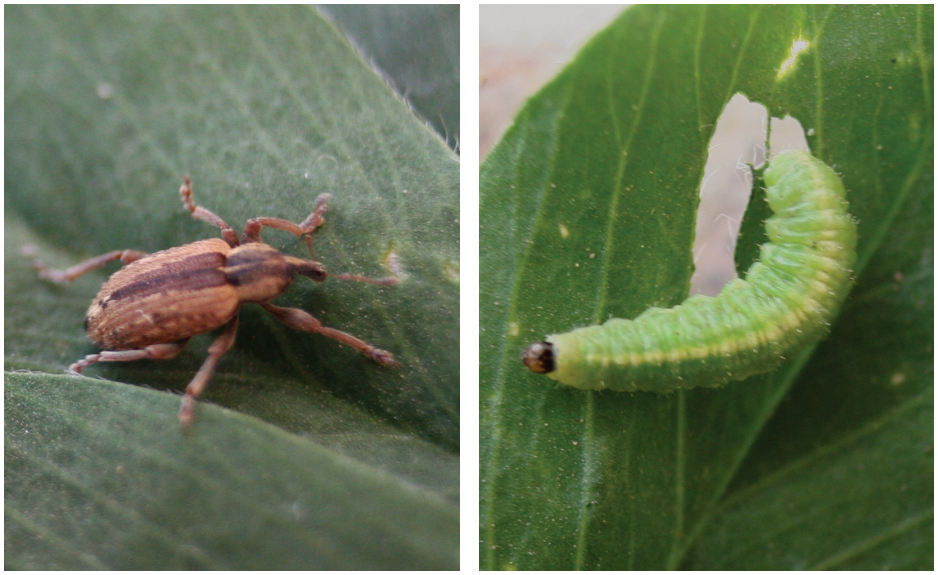

Figure 1. **Alfalfa weevil adult (left) and larva (right) with feeding damage (photos by Patricia Monk).**

Adult weevils feed on foliage and lay eggs in the stem, particularly from fall to early spring. Although alfalfa weevil adults feed on alfalfa, larvae are by far the primary concern (Figure 1). In the spring, eggs hatch and larvae begin feeding. Young larvae feed on leaf buds at the tip of the plant, while older larvae feed primarily on open leaflets. Ultimately, larvae will skeletonize foliage, which will be readily apparent on close inspection of plants. Larvae feed for about 3 to 4 weeks on the terminal and upper leaves, but feeding damage is usually extended over a much longer period since eggs don't all hatch at the same time. Peak larval densities generally occur shortly before the first cutting in most areas. The extent of damage depends on the size of the plant, the size of the larvae, and the number of larvae per stem. Mature weevil larvae are 5 to 6 mm long and light green, with a distinctive white band along the middle of the back.

Once a field becomes infested with alfalfa weevil, some damage usually occurs every year. However, there are a number of management options that will reduce damage in addition to insecticidal control. These include biological control (particularly by parasitic wasps) and cultural controls including grazing, clean cutting, and early cutting.

BIOLOGICAL CONTROL – THE BASELINE FOR CONTROL

Biological control of alfalfa weevil by parasitic wasps is essential for good control. In the 1980s, the USDA released a number of beneficial wasps to help control alfalfa weevil in New Mexico. In surveys conducted over

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Figure 2. Oomyzus incertus was released in Doña Ana, Chaves, and Eddy Counties in the 1980s. Recent research indicated that it often provides 40% control early in the season in Doña Ana County, but is not well established in any other areas. Releases are in progress throughout New Mexico to replicate its success in the Mesilla Valley.

Figure 3. Bathyplectes curculionis and the closely related parasitoid *B. anurus* are both commonly found in alfalfa fields in New Mexico. Southern New Mexico fields often get 40 to 50% control and higher from these species early in the season, and up to 90% control by the second or third cutting.

Figure 4. Pupae of *Bathyplectes curculionis*. In the field, the pupae will be covered by a web-like film.

the last 10 years, NMSU entomologists determined that one of those wasps, *Oomyzus incertus* (Figure 2), had become established and was providing good control of alfalfa weevil when combined with control by *Bathyplectes* spp., some of which had hitchhiked into the U.S. when alfalfa weevil became established.

Many fields in the Mesilla Valley have brief infestations that are quickly controlled by both types of parasitic wasps. In the rest of New Mexico, only *Bathyplectes* spp. are well established (Figure 3). The pupae of *Bathyplectes* spp. are 2 mm long, oblong, and dark brown with a white stripe around the center; in the field they are surrounded with a web-like film (Figure 4). This wasp eventually can produce 80 to 90% control, but often not until after the first cutting. There may be significant damage in years with high initial populations of weevils. In New Mexico, like the rest of the U.S., two types of parasitic wasps are needed to achieve good control before the first cutting.

Populations of these parasitic wasps have been established in research and commercial fields in the Pecos Valley and in Los Lunas. Wasps from these fields have been spreading out and have been detected in commercial fields up to 20 miles from the original release site. Additional releases have been made in commercial fields in a number of other counties in New Mexico.

CULTURAL CONTROLS

Alfalfa weevil control should begin as close as possible to the first cutting, when most plants are in the bud stage, to deprive weevil larvae of food and shelter. This also exposes larvae to high temperatures and low relative humidity, which can cause death by desiccation. When infested alfalfa is cut, larvae may shelter under windrows, so scout for damage during regrowth in the strips where hay was windrowed.

Early Cutting: In New Mexico, cutting early is an effective means of preventing further damage. This is often a good alternative to insecticide applications, particularly in desert environments. Rather than spraying, early cutting is recommended if hay is 7 to 10 days away from scheduled cutting or if plants are blooming. Some chemicals have preharvest intervals longer than 10 days, restricting their use in these situations. If it is not feasible to cut all fields early, insecticides can be applied to the most heavily infested fields while the less heavily infested fields are cut. This strategy will also preserve some beneficial insects on the farm. The beneficials can disperse from the untreated fields to the treated fields and help control mid-season infestations of alfalfa caterpillar or beet armyworm.

Grazing: Grazing will help control alfalfa weevil. Grazing has been shown to reduce weevil populations and damage at the NMSU Agricultural Science Center field plots in Alcalde. Typically, grazing reduces the number of alfalfa weevil eggs by 50 to 70%. Caution is required, however, since grazing can damage stands of non-grazing varieties of alfalfa. To reduce potential damage, consider the following: 1. Minimize the time livestock are held in the field. 2. Remove livestock when fields are wet. 3. Do not drylot livestock on alfalfa fields.

SCOUTING

Regular, frequent field scouting is essential to prevent alfalfa weevil larvae from causing economic damage. Scouting will determine if infestations can be controlled by cutting early, or if insecticides are justified for immediate control. Stem sampling is more accurate than sweep net sampling. Collect a minimum of 30 stems in a bucket while walking in a U inside the field, then examine stems for small larvae and for damage. Control by cutting early or an insecticide application has historically been recommended when there are 1 or 2 larvae per stem, or 30 to 60 larvae in a 30-stem sample. However, these guidelines were developed when hay prices were low. Yields can be reduced by about 170 lb/ac for each larva per stem before the first cutting, and by 140 lb/ac for each larva per stem on subsequent cuttings. In general, plants less than 8 inches tall will require treatment if there are 30 larvae per 30-stem sample or an average of 1 larva per stem. Taller plants, lower-yielding stands, high populations of beneficials, or expensive insecticides could justify the less aggressive threshold of up to 60 larvae per 30 stems.

Early cutting is preferred if hay is close to harvest or to reduce insecticide costs, deter immediate damage, and suppress weevil populations. Close cutting removes food and shelter for weevil larvae, and the heat and low humidity of our New Mexico deserts will produce high mortality of weevil larvae. Older plants can compensate better for alfalfa weevil damage, so there is less urgency in treating or cutting older plants.

Threshold levels should be lowered with high commodity prices because potential losses are greater. As hay prices increase, more aggressive treatments are justified, assuming control costs are unchanged. The value of the crop should also be considered. Treatment will be harder to justify in fields that are less productive, are weedy, or are mixed with other forages due to lower plant densities.

Table 1. Insecticides Labeled for Control of Alfalfa Weevil in New Mexico

Alfalfa Weevil Insecticides	Active Ingredient	Rate per Acre	Harvest or Graze (days)	Mode of Action Group[2]	Restricted Entry
Baythroid XL[1]	cyfluthrin	1.6–2.8 fl oz	7	3	12 h
Cobalt[1]	chlorpyrifos + gamma-cyhalothrin	19–38 fl oz	14 (19–26 oz), 21 (>26 oz)	1B, 3	24 h
Cobalt Advanced[1]	chlorpyrifos + lambda-cyhalothrin	16–38 fl oz	14 (13–26 oz), 21 (>26 oz)	1B, 3	24 h
Imidan 70 W (WSB)	phosmet	1–1 1/3 lb	7	1B	5 d
Lorsban Advanced	chlorpyrifos	1–2 pt	14 (1 pt), 21 (>1 pt)	1B	24 h
Mustang Maxx[1]	zeta-cypermethrin	2.2–4 fl oz	3	3	12 h
Pounce 25 WP[1]	permethrin	0.4–0.8 lb	14 (>6.4 oz)	3	12 h
Proaxis[1]	gamma-cyhalothrin	2.56–3.84 fl oz	1 (forage), 7 (harvest)	3	24 h
Sevin 80 S	carbaryl	1 7/8 lb	7	1A	12 h
Warrior 1 CS[1]	lambda-cyhalothrin	2.5–3.8 fl oz	1 (forage), 7 (hay)	3	24 h

[1]Restricted-use pesticide.

[2]Insecticide Resistance Action Committee mode of action classifications: 1A carbamates: AChE inhibitors; 1B organophosphates: AChE inhibitors; 3 pyrethroids: sodium channel modulators.

INSECTICIDES

Insecticides may be a good option if other options have not sufficiently controlled alfalfa weevil. Several commercially available products are labeled for control of alfalfa weevil. Cost of control will vary depending on the product and use rate. Consider rotating use among insecticides with different modes of action to reduce the likelihood of insects developing insecticide resistance. Insecticide guidelines are listed in Table 1.

For more information on management and insecticide treatment options for alfalfa weevil, contact your local Cooperative Extension agent.

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