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NebGuide

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The Alfalfa Weevil

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Damage from the alfalfa weevil can be severe. The life cycle of this pest and methods of managing it are discussed in this publication.

The alfalfa weevil is the primary insect pest of alfalfa in Nebraska. Management is essential during years when weevil infestations are high.

Because there also are years when weevil damage is economically unimportant, it is necessary for growers to become familiar with management guidelines and recommendations so insecticides are not applied unnecessarily.

Both the eastern and western strains of the alfalfa weevil are present in Nebraska, and much of the state now is infested by weevils that are a mixture of the two strains.

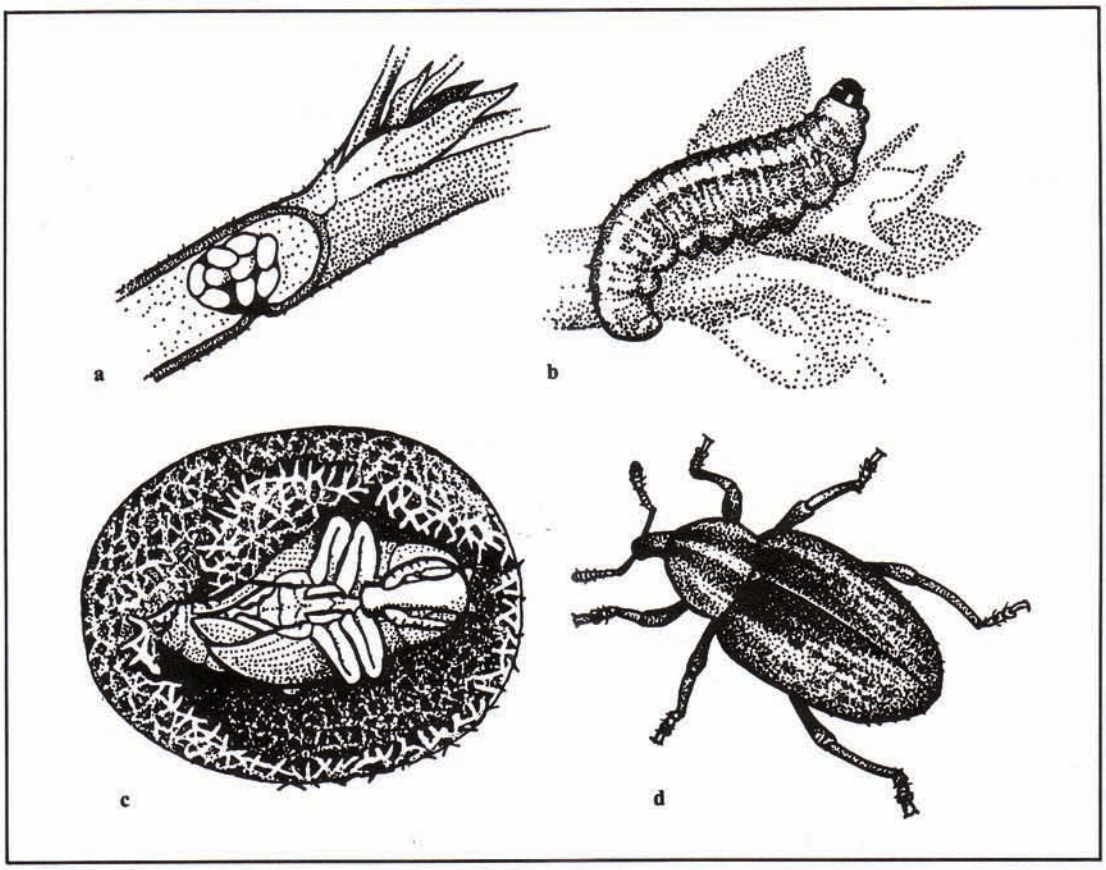

Figure 1. The life cycle of the alfalfa weevil: a) eggs; b) larva; c) pupa within cocoon; d) adult (magnified seven times the normal size)

Damage

The first indications of weevil damage are small holes eaten in leaves at the growing tip during April and May. This damage becomes more apparent as weevil larvae increase in size. Severely damaged fields have a white or gray appearance, due to the drying of skeletonized upper leaves and buds.

Damage is most severe to the first crop or cutting of the season and/or to the regrowth of the second crop. Larvae generally cause damage to the first crop, while adult weevils cause damage to regrowth by feeding on the developing crown buds, retarding growth, and preventing fields from "greening up."

The severity of damage is influenced by alfalfa variety, weather, growing conditions, and perhaps the degree of parasitism of the weevil.

Biology

The life cycle of the alfalfa weevil consists of four stages — the egg, larva, pupa, and adult beetle or weevil *(Figure 1)*. Please refer to *EC 86-1545, Common Forage Legume Insects,* for color photos of alfalfa weevil larvae, adult, and damage.

The insect usually overwinters as an adult in protected areas outside of fields, such as windbreaks, wooded areas, or other protective habitats. Some eggs are laid in the fall, but most are deposited in the spring when weevils re-enter fields.

The female weevil chews a hole into the alfalfa stem and deposits a mass of two to 25 eggs. The average female weevil is capable of laying from 500 to 2,000 eggs during her lifetime.

The eggs vary in color from yellow to brown, becoming darker as they mature, and hatch seven to 14 days after they are laid (fall-laid eggs will not hatch until spring). Young larvae molt or shed their skins three times, increasing in size at each molt. When larvae are mature they are green with a white stripe down the back and are approximately 3/8 inch long.

After feeding is complete, most mature larvae move to leaves near the base of the plant or to debris on the soil surface where they form loosely woven cocoons of silk and bits of plants. The larvae then transform to the pupal stage, from which the adults emerge in about 10-14 days.

Adults are approximately 3/16 inch long and have a long snout, characteristic of the beetle group known as weevils. The body is light brown after emergence, with a darker brown stripe on the back extending from the front of the head to about half the length of the body. These markings vary somewhat with the age of the insects and may become less obvious as body scales are rubbed off and the color darkens.

Adult weevils remain in the field for a few weeks until they move out to spend the summer in nearby protective areas. These adults sometimes move back into the alfalfa field for a short time in the fall although no significant damage occurs at that time.

Management of Weevils with Integrated Pest Management

Integrated Pest Management (IPM) is a common sense approach to crop protection. This concept relies on combinations of insect suppression and crop production techniques to optimize yield and quality. Pesticides and other management practices usually are recommended only when justified by the presence of economic insect infestation levels.

The following four tactics are involved with integrated management of the alfalfa weevil.

1) Plant Resistance — Several alfalfa varieties are resistant to the weevil. A variety is considered resistant when the level of resistance appears adequate to prevent or significantly reduce yield loss, except perhaps under the most severe conditions.

The type of alfalfa weevil resistance available in alfalfa varieties today is referred to as tolerance. Alfalfa varieties with tolerance resistance and those that are susceptible may be infested with a similar number of weevils, but resistant varieties produce satisfactory yields despite weevil feeding. First cutting forage yields of resistant varieties (such as Perry, Arc, Gladiator and Team) were 22 to 33 percent higher than those of the most susceptible varieties in Nebraska tests.

Wrangler, a new alfalfa variety with weevil resistant parentage, also is available, but as yet has not been field tested under severe weevil infestation. Refer to *NebGuide G77-357, Selecting Alfalfa Varieties for Nebraska,* for detailed information on alfalfa variety performance.

2) Cultural Control — Many insect pests of alfalfa, including the alfalfa weevil, can be at least partially managed by timely cutting of the hay. Occasionally the use of insecticides can be avoided altogether with this method.

Many larvae, particularly smaller ones, will be killed if exposed for long periods to direct sunlight and subsequent high temperatures at the soil surface. In addition, the plant material remaining after cutting will not be sufficient to sustain weevil larvae until regrowth begins, so many will starve.

Alfalfa can be cut at various growth stages in the presence or absence of weevils. The short- and long-term effects of various cutting practices on yield, quality and persistence are well known.

Repeated cutting earlier than the recommended 1/10 bloom often results in reduced dry matter yields and an increased potential for earlier stand decline. However, the forage harvested is of somewhat higher quality when

cutting occurs early.

Late fall harvesting or grazing reduces the number of fall-laid weevil eggs that successfully overwinter.

Refer to the current issue of the publication *EC 1511, Insect Management Guide for Alfalfa, Soybeans, Small Grains, Range and Pasture,* for specific guidelines regarding the need for implementation of management procedures. If the field has reached the bud or early bloom stage, immediate cutting is the most practical and efficient way to deal with a weevil problem.

The pupae and adults are much hardier than larvae, and many survive after cutting until regrowth begins. Removing hay windrows or bales as soon as possible provides less protection for susceptible weevil stages and should reduce their ability to survive.

While highly favorable to regrowth, cool and moist conditions following cutting also favor weevil survival.

Another sound cultural practice is to maintain a uniform, dense and vigorous stand of alfalfa through proper cutting intervals and fertilizer applications. Sturdy plants with well-developed root systems are able to withstand more weevil feeding, even under stress conditions.

Crop rotation helps reduce many insect and disease problems by interrupting life cycles and reproduction.

3) Biological Control — A small parasitic wasp, *Bathyplectes curculionis* (Thomson), has been imported from Europe to help control the alfalfa weevil. Occasionally, under favorable conditions, this wasp may kill as many as 80 to 90 percent of the weevil larvae. It was released in other areas of the United States, and has spread with the weevils into Nebraska.

Other species of wasps, including a closely related *Bathyplectes (B. anurus)* and a parasite of the adult weevil *(Microctonus aethiopoides),* have been introduced into Nebraska. Hopefully, these natural enemies eventually will help hold weevil infestations below damaging levels.

4) Chemical Control — Any one of several insecticides can be used for control of alfalfa weevil larvae or adults when treatment is justified.

Refer to the current issue of the publication *EC 1511, Insect Management Guide for Alfalfa, Soybeans, Small Grains, Range and Pasture,* for a description of the stem-count method for use in determining if and when management of the weevil should be considered. *EC 1511* also provides a listing of insecticides registered for alfalfa weevil control.

For ground application of insecticides use at least 15 to 20 gallons of total spray volume per acre and at least two gallons per acre for aerial applications. ***Always read pesticide product labels thoroughly and follow all instructions, restrictions and precautions.***

Do not expect perfect control. A small number of surviving weevils will not seriously harm the crop and actually may be beneficial because their survival allows for the survival of natural enemies.

Chemical control may be adversely influenced by cool weather, non-uniform or inadequate coverage, heavy rainfall shortly after application, and poor choice of insecticides. To evaluate the effectiveness of chemical controls, carefully examine new growth several days after treatment. If the new growth is not damaged, the control probably was effective.

All chemicals are toxic to bees and should not be used if alfalfa is in bloom or if the stand contains flowering weeds. Instead, consider taking a cutting. If the field must be treated with an insecticide, apply it in the evening, when most of the bees will have returned to hives.

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C-1, Field Crops

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