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minor acreage crops. Current applied research studies include; alternative management strategies for brown marmorated control in vegetable systems and effects of its invasion on native stink bugs; the effect of strip tillage on beneficial insects in cucurbit systems; monitoring the spread of spotted wing drosophila in Kentucky; and management of sugarcane aphid on sweet sorghum. In addition, he has been studying issues related to expansion of corn acreage under conservation tillage, particularly as related to the management of black cutworm, white grubs, and corn rootworm. Dr. Bessin earned his Ph.D. in Entomology from Louisiana State University.

## **Smarter Alfalfa Weevil Management**

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Alfalfa weevil is the primary insect pest attacking the first cutting of alfalfa reducing both quality and yield. The tiny 1<sup>st</sup> and 2<sup>nd</sup> stage larvae chew on tip leaves producing tiny pin holes which may seem minor, but 3<sup>rd</sup> and 4<sup>th</sup> stages feed extensively shredding leaves resulting in significant damage. A heavy infestation can cause the field to appear grayish. While an individual larva feeds for about 3 weeks, eggs hatch over an extended period, so total damage within a field will accumulate over 5 to 6 weeks.

### *The Weevil*

Alfalfa weevils return to alfalfa fields in Mid-October after a summer hiatus and remain there over the winter. They are active only when air temperatures climb above 48°F. As such, winter weather conditions play an important role in determining the potential for late fall or winter laid eggs. Usually this means that females do not begin to lay eggs in alfalfa stems until spring.

But unseasonably warm winters can allow females to lay eggs much earlier than normal. Consequently, tip-feeding by the larvae is likely to appear earlier following a mild winter. Not only can this catch alfalfa growers off-guard, but plants are smaller and more susceptible to damage by fewer weevils.

Generally, egg hatch may begin in early March, and the larva is a small, light green with a white stripe down the center of its back, and a faint strip on each side. When fully grown, the larva is 3/8 inch in length. It is very similar in appearance to the larva of the clover leaf weevil which can also be common in alfalfa fields. To distinguish between larvae of these two species, carefully examine their heads. Alfalfa weevil larva have black heads, while larvae of the clover leaf weevil have brown heads. Larvae pupate in cocoons near the base of the plant beginning in May with adult emergence in June and July. Upon emergence, adult weevils feed on leaf margins of lower leaves, but weevils soon leave fields and enter a summer dormancy. They tend to settle just outside of field edges, finding protection under surface litter or slightly below the soil surface. It will remain there until about mid-October when they return to alfalfa. There is only one generation per year.

### **The Injury**

Young larvae produce only slight damage but older larvae can cause heavy damage to first cutting alfalfa. Leaves may become skeletonized as feeding progresses. Growing alfalfa plants can tolerate a moderate amount of feeding by weevil larvae without harm; however, a lower number of larvae can cause yield and quality loss on short plants that are growing slowly. Large numbers of weevil larvae on short alfalfa is a recipe for serious problems. First cutting usually suffers the worst feeding injury, although crown injury to regrowth can become significant, particularly under windrows where larvae take shelter after the first cutting. Watch harvested fields carefully for normal green-up. An insecticide application may be justified if adult weevils are feeding on 50% or more of the crowns and re-growth is prevented for 3 to 6 days.

### **The Solution**

Weekly field sampling is the most efficient and reliable method to assess the need to treat for alfalfa weevil. There can be significant differences in weevil levels between fields and among years, as well as variation when they occur due to more variable winter weather conditions we have experienced in recent years. While larval feeding can begin over a wide range of dates depending on the year, for a given year in a given field it is much more predictable by using degree days. Tip-feeding damage from spring-laid eggs can be expected when 190 degree days (base temperature 48 degrees F) have accumulated. Degree days for alfalfa weevil are calculated as the average daily temperature minus 48 degrees F. If the average daily temperature is below 48 degrees F, then no degree day accumulation occurs. Alfalfa weevil degree day information is available on the [University of Kentucky College of Agriculture Ag Weather Center](#). Begin scouting field when degree day accumulations reach 190 degree days. Continue to sample through green up after first cutting.

The use of degree day accumulations, average alfalfa stem length, and number of weevil larvae per 30 stems allows accurate management decisions to be made. Keep in mind that while insecticide applications can be valuable in reducing damage to the alfalfa weevil, unnecessary treatments can have some significant environmental impacts on pollinators and natural enemies of the weevil. To sample a field properly:

- Walk into the field at least 20 paces before beginning to sample.
- Collect 30 complete stems while moving through the field in a "U" or "Z" shaped pattern and place each stem, top first, into the bucket. As you pull a stem off the crown, cup the tip in your hand to avoid dislodging larvae. After collecting 30 stems return to the edge of the field and lay them on a clean, flat surface, such as the hood of a truck.
- Select 4 or 5 stems at a time and beat them vigorously against the inside of the bucket to dislodge alfalfa weevil larvae. Count all larvae, including any that may have fallen onto the surface where the stems were resting and record this number.
- Randomly select and measure 10 of the 30 stems. Measure each stem to the nearest inch. Calculate the average stem height.
- Turn to the Alfalfa Weevil Pest Management Recommendation Table that corresponds to the current degree day range. Use the number of larvae per 30 stems and average alfalfa height in inches to determine the management recommendations for the situation in the field you are sampling.

To determine the need for spray for alfalfa weevil or when to resample fields, you will need to use the tables in [ENTFACT 127](#), Alfalfa Weevil Field Sampling Program. To use these tables you will need to know average stem length, numbers of larvae per 30 stems, and degree days that have accumulated. Generally, resampling is done on a weekly basis, except if less than 225 degree days have occurred and more than 15 larvae were found in 30 stems, but not enough to justify spraying. In this instance, sampling should be repeated in 2 days. In some situations, early harvest may be a weevil management alternative to spraying.

After harvest, watch regrowth for continued alfalfa weevil activity. Treatment may be justified if adult weevils are found feeding on 50% or more of the crowns and regrowth is delayed for 3 to 6 days. Entfact-127 also has treatment thresholds to determine the need to control alfalfa weevil on the first cutting regrowth. Stem length and number of larvae per 30 stems will determine the need to spray and the interval for resampling fields.

Refer to [ENT-17](#) for a complete list of insecticides to control alfalfa weevil. Use Mode of Action Group (MOA) and pre-harvest or pre-grazing intervals to help select the most appropriate insecticide.