Featured Pest

Alfalfa was first cultivated in southwestern Asia more than 2,000 years ago and its use spread throughout Europe. Its productivity and nutritive value as livestock feed has earned alfalfa the nickname "queen of forages." Alfalfa was first introduced to the Americas by Spanish and Portuguese conquistadors, and by the late 1800s it was grown to some extent in Montana and other U.S. states. Alfalfa and alfalfa mixes now account for more than half of all forage crop production in the U.S. In 2015, a total of 17.8 million acres of alfalfa was harvested nationally, producing 59 million tons of hay valued at about 20 billion dollars (USDA NASS, 2017).

Insects are very diverse and many have adapted to feeding on a wide variety of plants, including crops, making them an important group of economic pest. It was only a matter of time before the alfalfa weevil followed alfalfa from its native range in Eurasia and North Africa. The alfalfa weevil (Hypera postica) was introduced into North America at least three times, and each introduction is recognized as a distinct strain: eastern, western and Egyptian (Bundy et al. 2005; Hsiao 1996). The western strain was first reported near Salt Lake City in 1904, followed by the Egyptian strain in 1939 near Yuma, Arizona, and the eastern strain in 1952 in Maryland. The alfalfa weevil has now spread throughout the continental U.S. and parts of Mexico and Canada, where it remains the major economic pest of alfalfa.

Identification of weevils is an important first step in management, followed by appropriate scouting. Weevils are small beetles typically less than ¼ inch long with an oblong shape and large snout. Alfalfa weevils are light to dark brown with a dark brown stripe running down the middle of their back. The larvae are tiny when they first hatch and grow to a maximum length of about 0.25-0.4 inches long. Their appearance is yellow to pale green when small, and green with a distinctive thin white line down the center of the back when larger, and a black head.

Adult weevils overwinter in debris in the field and the surrounding area. As temperatures warm in spring, the adults feed on available plant material before becoming sexually mature. As daytime temperatures begin to exceed 50°F, egg laying begins and continues to increase during warmer spring days. Females lay batches of 1-45 eggs within the stem of the alfalfa plant, with an average of 6-10 per cluster. Mating and egg laying continue until summer temperatures become hot and unfavorable for the adults.

After hatching, larvae develop through four stages or instars. The tiny first and second instars feed inside the developing leaf buds and can be more difficult to find, while the larger third and fourth instars that cause most of the damage feed openly on the leaves. The feeding appears as a “shot-hole” pattern as the leaves expand. Older larvae feed openly on the leaves, producing a skeletonized appearance which causes both yield and quality loss. At about the time of first cutting, the fourth instars peak and begin to form cocoons in the leaf litter where they develop to the next generation of adult.
weevils. These new adults typically enter a summer dormancy period to survive the hot temperatures and then become active again in the fall. Feeding by adult weevils does not cause economic damage. Consistent warm weather in the spring can synchronize population development while prolonged cool spring and summer temperatures can spread it throughout the season.

Once a field appears frosted, the damage has been done, meaning scouting the fields needs to begin earlier, when second instars are present and feeding in the folded leaves. Larvae can be sampled using a bucket or a sweep net. Ten sweeps using a standard 38 cm diameter net are taken at three to five sites in each field and the total number of weevil larvae counted. An average of 20 larvae per sweep meets the economic threshold for treatment, or the point when enough yield or quality has been lost to warrant control measures.

An alternative method is termed shake-bucket sampling. Ten stems from three to five different sites are collected and the larvae dislodged by shaking in a bucket. An average of 1.5 – 2 larvae per stem meets the economic threshold and a control option should be chosen. The shake-bucket method captures more first instar larvae compared to sweep netting and is less variable, particularly among inexperienced samplers. Avoid field edges and try to sample from each quadrant to get an average that represents the whole field. If the numbers of larvae begin to go up quickly, sample more frequently and prepare to take action if numbers exceed the threshold.

If scouting determines that the economic threshold has been met, the two main management tactics are early harvest and insecticide application. Harvesting early salvages yield before larger larvae mature and complete the majority of defoliation damage. Some larger larvae can survive the first harvest and the regrowth needs to be monitored for damage. The regrowth may require an insecticide treatment after the baled hay is removed if eight or more larvae per square foot are found under the windrows.

Detailed management guidelines and insecticide treatments are listed on the High Plains IPM Guide, but products containing pyrethroid class active ingredients are commonly used. While effective, these broad-spectrum contact insecticides have well-documented negative effects to beneficial insects and can result in the development of secondary pest populations, particularly aphids. Other management recommendations include mixtures of grass and alfalfa, and grazing with livestock, but these require more research to determine their effectiveness.

At least eight different parasitoid species that parasitize and kill alfalfa weevils were collected from the native range in Eurasia and successfully established in the U.S. Three species of ichneumonid wasp, *Bathyplectes curculionis*, *B. anurus* and *B. stenostigma* are most commonly found parasitizing weevils in the western region. Collectively these beneficial enemies have reduced the frequency of outbreak populations but generally provide only partial control of the alfalfa weevil, and their relative importance can vary with geographic location.

It is important to ensure proper pest identification before control measures are initiated. Make sure to reach the economic threshold, and follow appropriate protocols for weevil control so as to decrease the negative impact on other beneficial insect populations. Scouting every year, and sometimes multiple times per year, is important for adequate control of alfalfa weevil populations in Montana.