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NebGuide

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Management of the Army Cutworm and Pale Western Cutworm

This NebGuide describes the life cycle of the army cutworm and pale western cutworm, and provides recommendations for management.

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The army cutworm, *Euxoa auxiliaris*, and the pale western cutworm, *Agrotis orthogonia*, are sporadic pests that are distributed throughout the Great Plains. The army cutworm can be found throughout Nebraska, but is more common in the western half of the state. Because of the drier environment, the pale western cutworm is found only in the western third of Nebraska. Both cutworms can feed on a vast array of crops and weeds. Their major economic impact is limited to winter wheat and alfalfa, because these are the vulnerable crops growing in the early spring when larval feeding activity occurs. However, they can also cause substantial damage to early spring row crops (sugarbeets and corn), especially in areas where winter cereal cover crops are used.

Life, History and Appearance

Army Cutworm: The adult army cutworm moth has a wing span of about 1 1/2 inches and is typical of the "miller moths" that are commonly observed. The moth has five color forms, ranging from a lighter form with fairly distinct wing markings to a darker melanic form with less distinct wing markings. The form in *Figure 1* is most common. Female army cutworm moths lay their eggs directly onto soil. They seem to be attracted to bare areas such as overgrazed pastures, alfalfa stubble, stressed grassy areas, and newly planted or tilled cropland. Females lay from 1,000 to 3,000 eggs from late August until late October. The result of this extended ovipositional period is a great variation in larval size within fields.

Figure 1. Common adult color form of the army cutworm. (Photo courtesy of Colorado State University Entomology Slide Collection.)

The eggs hatch shortly after they have been exposed to moisture (i.e. rainfall). Larvae continue to feed as long as temperatures are favorable, and partially grown larvae overwinter in the soil. Larval feeding activity

resumes in late winter or early spring when soil temperatures increase. Army cutworms become active at relatively cool temperatures, possibly even below 40°F, because solar heating warms soil temperatures well above the air temperature. Feeding continues through the spring. Fully grown larvae burrow into the soil, create an earthen chamber, and pupate. Adults emerge from the soil in May and early June to complete the life cycle.

Generally, larvae of the army cutworm have a pale grayish body color that is splotched with variable white or light markings *(Figure 2)*. The upper surface is lighter with a pale stripe along the center of the back. There is a lighter band along the side of the larvae below the spiracles. Larvae can attain lengths of 1 1/2 to 2 inches when fully grown.

Figure 2. Larvae of the army cutworm (bottom) and the pale western cutworm (top).

The most prominent trait of the army cutworm moth is its migration pattern. Adults emerge in May and early June and feed on a variety of nectar-bearing flowering plants. These moths gradually migrate westward toward the mountains and continue to feed on available nectar sources as they ascend in elevation. As they move westward, they rest during the day in dense vegetation or seek shelter in garages, attics and living areas of houses, and can become a significant nuisance pest at this time. During outbreak years, tremendous numbers of these moths can congregate around buildings and residential areas. Moths may remain in these areas for several days, feeding on local nectar sources. However, when temperatures begin to warm consistently and flowering of major plants in the area has ceased, the moths will move westward to higher elevations offering cooler temperatures and new sources of food. The moths spend the summer in the Rocky Mountains, and in late August and September they return to the plains to mate and deposit eggs.

Pale western cutworm: The adult pale western cutworm moth is gray to brownish white with a body length of just under 3/4 inch and wingspan of 1 3/8 inch *(Figure 3)*. The moths are typical noctuid moths that fly at night and are attracted to lights. The distinctive characteristic of these moths is the white under-surface of the wings. Moths begin to emerge in late August and quickly increase in numbers, peaking by mid-September. Moth activity decreases by early October. The moth flight coincides with tillage and planting of winter wheat. Moths are attracted to areas with loose soil to deposit their eggs. Each female lays 250-300 eggs in the upper 1/2 inch of soil. Some eggs may hatch during a warm spell in the fall or winter, but most hatch early in the spring when temperatures at the soil surface reach 70°F. This may occur from February through March.

Young larvae are small and very difficult to find. Larvae pass through 6-8 stages before they cease feeding and pupate. Until they are about 1/2 inch long, they are grayish-white. As they get bigger they become a grayish-green color. The pale western cutworm is pale with no distinct markings on its body *(Figure 2)*. When fully grown, the pale western cutworm is about 1 1/4 inch long. The only other cutworm likely to be present in fields at this time is the army cutworm, which generally is larger because it begins development in the fall. Also, pale western cutworm larvae are lighter than the army cutworm, which has distinct striping on the body *(Figure 2)*.

Pale western cutworms feed through the spring and mature in May and early June. They then burrow into the soil and form earthen cells where they pass most of the summer, pupating in early August shortly before they emerge as adults.

Damage

Army Cutworm: The army cutworm is a climbing cutworm that "grazes" on the leaves of its host plants. When green vegetation is in short supply, as in the early spring, the army cutworm may completely devour the above-ground portion of the plant. Under extremely high populations larvae may migrate, all moving in

the same direction in large numbers, often devouring any green vegetation in their path. This behavior has resulted in the name "army" cutworm.

The army cutworm has an extremely wide host range. It feeds on nearly all field crops, including alfalfa, barley, corn, oats, potato, sugarbeets, wheat, many vegetables and a number of grasses. Crops most often economically damaged are winter wheat and alfalfa because they are frequently the only crops that are growing in the early spring when army cutworm feeding is at its peak. Sugarbeets and early-planted corn have been damaged by army cutworms migrating from adjacent fields or surviving tillage of weeds or cover crops before planting. It is likely that any crop present during the early spring could be a potential host.

Figure 3. Adult pale western cutworm. (Photo courtesy of Colorado State University Entomology Slide Collection.)

Pale Western Cutworm: The pale western cutworm is primarily a problem in winter wheat. However, it can cause problems on several other crops, including sugarbeets, corn, alfalfa and other small grains. Its host range is very broad, even including many weed species. It is a subterranean cutworm in that it primarily feeds below the soil surface. The depth at which it feeds is regulated by the moisture line in the soil. These cutworms avoid moisture and stay just above this moisture line. Under wet conditions the cutworms will actually come to the surface and feed on the above-ground part of plants. This activity increases the rate of predation by birds and other insects, and parasitization. Increased moisture at the surface also increases disease incidence in the population.

Because of the feeding habits of the pale western cutworm, fewer larvae are necessary for severe damage to result. These cutworms cut the plant off below the soil surface by notching or completely severing the stem. This damage appears in winter wheat as dead or wilted tillers *(Figure 4)*. If these tillers can be easily pulled and no roots are attached, the damage is probably from the pale western cutworm. Since the cutworms habitually eat only a small portion of the plants they cut, their potential for significant damage is greatly increased. Damage often continues along a row or expands in patches until few tillers are left. Severe infestations can completely destroy a stand. Infestations within a field are usually spotty, and first evident in the lighter soils on knolls or hills, or areas with a southern exposure *(Figure 5)*. Later, as these areas are destroyed, the cutworms move out into the surrounding areas. Early feeding by small larvae or feeding on other crops such as sugarbeets or corn appears as shot holes or ragged edges on the leaves.

Management

Army Cutworms: There are few management options available to reduce the severity or damage potential of the army cutworm. The primary tool available is scouting the field to be aware of the cutworm situation.

In alfalfa, army cutworms will feed at the soil line on the developing new leaves just as they are emerging. Alfalfa should be monitored as it is breaking dormancy and beginning to grow. Any delay in green-up is a sign of problems, and the cause should be determined immediately. If cutworms are present, thorough sampling is required to identify the extent of the problem throughout the field and the average density of the cutworms.

Figure 4. Close-up of pale western cutworm damage to wheat. Note the dead and dying tillers.

Army cutworms feeding on alfalfa may cause delayed green-up, resulting in delayed harvest and possibly reduced forage yields. If the delay continues for extended periods of time, the stand may be in jeopardy, particularly newly established stands. For established stands of alfalfa, four or more army cutworms per square foot are required to cause significant losses. However, newly seeded stands have fewer root reserves,

and delayed spring green-up may be more injurious. Therefore, only two larvae per square foot could result in economic damage in new stands. If the alfalfa is growing well and recovering quickly from feeding damage, the cutworm infestation is probably inconsequential, and treatment is unlikely to be beneficial.

Wheat fields should be monitored periodically during late winter and early spring when the winter wheat is breaking dormancy. Army cutworms are not always easy to detect. Larvae hide in loose soil at the base of the plants or under soil clods during the day, and they can be found feeding on the plants only in the evenings and on cloudy days. The density of cutworms, the condition of the wheat, and the extent of regrowth are important considerations in determining the need for treatment. During the vegetative growth stages, healthy wheat can withstand substantial defoliation. However, if green foliage is lacking, the cutworms may feed down to and injure the crown of the wheat plants. In wheat, early feeding under dry conditions will result in the most significant damage. Also, if wheat is under moisture stress and is coming out of dormancy slowly, the effects of army cutworm feeding damage will be dramatic. Under these conditions, **two or more cutworms per square foot** may cause economic damage. If wheat is not thin or stressed, **four or more larvae per square foot** may be needed to cause significant damage.

A number of parasites, predators and diseases are important influences on army cutworm populations. There is little doubt that these parasites have an effect on the overall population level. However, the impact that these natural enemies have on damage potential is unknown. Probably the most effective predators are the various types of birds that feed on these insects when they are abundant.

Pale Western Cutworm: The first step in managing the pale western cutworm is to determine the potential for outbreaks. Several factors influence the population growth of this insect. It has been found that during wet springs, pressure from parasites, predators and disease causes populations to decline sharply. The number of days with at least 0.25 inch of rainfall ("wet days") is used to determine the potential impact of rainfall on the pale western cutworm population. If 12 or more "wet days" occur during the spring (March-June), the pale western population will be reduced to the point that it will take two or more dry springs to allow the population to rebuild to significant levels. If there are 10 or fewer "wet days," the pale western cutworm population is likely to increase, and the potential for damage the next year is increased.

Figure 5. Pale western cutworm damage in wheat field.

The moth population in the fall can be determined by using light traps or pheromone traps to monitor moth flights. This information can be used to predict the risk of serious infestations the following spring. Pheromone traps *(Figure 6)* may be easier to use to monitor for the pale western cutworm, because the lure used is specific only to the pale western cutworm. Pheromone sources can be obtained from Great Lakes IPM, 10220 Church Road NE, Vestaburg, MI. Light traps collect a number of other species of moths and other insects, making moth identification difficult. If traps are used they should be set up in mid-August and monitored through September.

Figure 6. Pheromone trap used to monitor pale western cutworm moths.

Estimating the severity of an infestation of pale western cutworms in wheat is difficult. Infestations tend to be spotty throughout the field. Scouting should be done early to avoid severe damage in localized areas. When scouting, look for leaf damage that occurs early. Another indication is the presence of a few dead or wilting tillers in wheat. Population density can be assessed by digging and screening the soil from 1 foot of row. The sample should be dug to a depth of at least 3 inches and extend from row center to row center. Several samples at different sites should be dug for a reliable estimate of population density and area of infestation. Often an area of severe infestation may not be extensive, and such areas could be spot-treated to avoid the cost of a complete field application.

In other crops, pale western cutworms can become a problem in spring-planted fields where plants are emerging and beginning to establish. In this situation, damage can be very severe because the cutworms are partially grown and consumption rates will be much higher. This situation usually occurs in row crops where a small grain cover crop was planted in the fall but destroyed in the spring before planting the row crop. Larvae are able to survive up to a month without food. If present in the cover crop, they may be able to survive tillage and planting operation to attack emerging crop plants.

The threshold for insecticide treatment is **1-2 pale western cutworms per foot of row**. If the wheat has a high yield potential, the threshold would be closer to 1. If the wheat is poor and has a low yield potential, the higher threshold should be used. In crops other than wheat, no thresholds have been developed. Row crops should be scouted early and often during establishment. The extent of infestation and damage should be assessed and action to treat should be taken immediately. Feeding of larger but immature larvae in row crops can result in extensive damage in only a few days.

A number of insecticides are effective in controlling these cutworms in alfalfa and wheat. However, the products available for use may vary, depending on current registration status. Please refer to the current issue of EC-1511, *Insect Management Guide for Nebraska Alfalfa, Soybeans, Wheat, Range and Pasture*, for specific information on pesticide use.

Table 1. Threshold and treatment considerations for army and pale western cutworms.

	Threshold (worms per square foot)	***Factors to consider in treatment decisions***
Army cutworm alfalfa-new stand	2 or more	1. Is damage primarily from leaf feeding? 2. How many cutworms per square foot? 3. What is the stress level of the crop? 4. Will it recover if cutworms are controlled? 5. Is the plant growth rate greater than the defoliation rate? 6. What is the cost of control? 7. What is the yield potential (value) of the crop? 8. What size are larvae? Will they pupate soon? 9. Does the infestation cover the entire field? 10. Will a treatment of only the infested area of the field be practical? Cost effective? 11. What will temperature and moisture conditions be like after treatment? Will insecticide be effective at low temperatures?
alfalfa-established	4 or more	
wheat-thin stand	2 or more	
wheat-good stand	4 or more	
Pale western cutworm wheat	1-2 per ft. of row	1. Are tillers wilting or dead? Are tillers cut off and easily pulled up? 2. Is the infestation confined to hilltops? 3. Are infestations spreading to other areas? 4. Are cutworms surviving well? (see numbers 2-11 above)

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