Early Season Vegetable Insect Pests

Robert J. Bauernfeind, Horticultural Entomology Specialist

Several categories of insects are associated with early season vegetable production in Kansas. Most home gardeners have heard about or experienced plant damage caused by wireworms, flea beetles and cutworms. Gardeners also are aware that these pests tend to be sporadic and unpredictable. When they do appear, damaging populations may be restricted to certain areas within garden plots.

Wireworms

Wireworms are the larvae of beetles commonly called flipjacks or click beetles. When placed on their backs, click beetles right themselves by flipping into the air. An audible click accompanies these acrobatics.

The 800 species of North American wireworms vary in significance to vegetable producers, ranging from unimportant to capable of causing considerable damage.

Description

The four wireworm developmental stages (egg, larva, pupa and adult) are completed underground. Larvae and adults are the stages most frequently encountered by gardeners and vegetable producers.

Wireworm larvae (Figure 1) are shiny, slender, and hard-shelled. Coloration varies depending on the species and stage of development. Body colors include white, yellowish, light tan to reddish brown to dark brown. The last segment of many larvae is characteristically shaped (ornamented) and can be used to distinguish different species. Larvae may be up to 1½ inches long, depending on stage of development and species.

Figure 1

Click beetles are elongated, somewhat flattened, and rounded in front and back (Figure 2). The hind corners of a shield-like structure covering the area behind the head are pointed or spiny. Beetles may be rather drab or multicolored with distinct markings. They average 1 inch in length, but some species may reach 1½ inches.

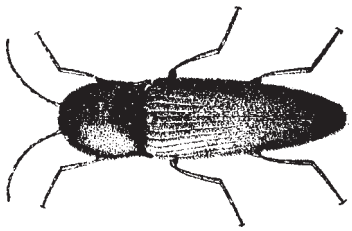

Figure 2

Seasonal Life History

No single description of seasonal life history is applicable to all species. Some complete a generation each year, while others may require more than five years. Overlapping generations and multiple species mean that a range of sizes may be encountered in a single field. Determination of exact species usually requires consulting a specialist and may be only of academic interest.

Damage

Click beetles feed on flowers, pollen and sweet plant exudations and are not cause for concern.

Indiscriminate feeding by wireworm larvae may cause economic damage in various ways. Feeding on ungerminated or newly germinated seeds results in gaps in plant stands or total stand failures. Healthy seedling plants may become spindly and stunted because of root pruning by wireworm larvae.

Established plants also can decline in vigor if wireworms enter and feed within root nodal areas or damage underground portions of stems.

Wireworm feeding on belowground vegetables such as potatoes, beets, carrots, radishes, onions, turnips, rutabagas, or on crops that lie on the soil surface for long periods of time, such as watermelons, cantaloupes and winter squashes may render them unfit for marketing.

Damaged produce is misshapen and riddled with pits or holes. The crop might not store well because fungal or bacterial soft-rot organisms entered through feeding wounds.

Management Options

Situations under which wireworm populations tend to be higher include:

- Long-standing pasture.
- Fields in continual small grain production.
- Grass or sod areas.

It is best not to plant vegetable crops for a season or two after working these areas.

Clean tillage (no crops or weeds) will reduce wireworm populations dramatically. But such a rotation is seldom possible and is not usually environmentally sound because it leaves the ground bare and susceptible to erosion.

Producing vegetables in wireworm-infested soils may require altering the commodity being grown. Avoid planting root crops, or crops where vegetables or fruits remain in contact with the soil for extended periods.

Instead, plant crops with vegetables and fruits held off the ground, such as beans, or crops that lie on the ground for only a short time before being harvested, such as cucumbers and summer squash.

Preplant insecticide treatments incorporated into the top 6 to 8 inches of soil can be used to reduce wireworm populations.

Flea Beetles

Now you see them, now you don't. "Flea beetle" is a generic name applied to many species of small jumping beetles. Some species are general feeders while others have a more restricted host range. For instance, the common pale-striped flea beetle feeds upon a variety of cultivated plants including watermelons, pumpkins, peas, beans, eggplants and potatoes, whereas spinach flea beetles are restricted to beets and spinach.

Description

Like wireworms, all flea beetle life stages are completed underground. Only the adults are commonly seen by gardeners and vegetable producers.

Flea beetles may be somewhat elongate to oval in shape, and vary in color, pattern and size. For instance, potato flea beetles (Figure 3) tend to be more oval, blackish, and about 1/16 inch long.

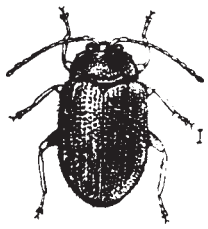

Figure 3

Striped flea beetles (Figure 4) are more elongate and dark with yellowish, crooked stripes, and measure about 1/12 inch long.

Figure 4

Spinach flea beetles (Figure 5) are both oval and elongate. They have a black head, antennae and legs. The collar behind the head is yellow to yellowish-orange. Wing covers have blackish-blue luster. They approach 1/5 inch in body length.

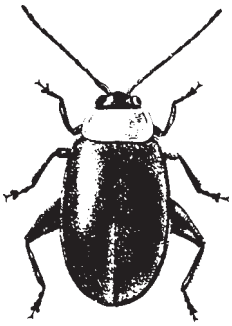

Figure 5

Seasonal Life History

The following generalized life history description is applicable to most species of flea beetle: adults overwinter underground or beneath plant debris and other surface trash both within fields or in adjacent fence rows, roadside ditches, edges of tree lines, etc. During April and May, they become active, mate and deposit eggs.

Egg-laying varies depending upon species. Some deposit individual eggs while others deposit eggs in clusters. Egg sites may be in soil, on leaves, on leaf petioles, or within holes chewed into stems.

Eggs typically hatch in 10 days. Larval and pupal development take place during the summer. "New" adults emerge and feed during late summer and fall before seeking overwintering sites.

Damage

Larvae feeding on underground portions of plants may result in decreased plant vigor. In some instances, crops produced underground may be scarred because of larval feeding activities.

The feeding damage of an individual flea beetle is unimportant. But the cumulative effect of many flea beetles, especially when feeding on seedlings, can be devastating. Plants may be killed. Small circular gouges taken mainly from bottom leaf surfaces give plants a peppered or shot-holed appearance. Corn flea beetles feed between veins on upper leaf surfaces, resulting in a silvery and streaked appearance.

Flea beetles also transmit Stewart's Bacterial Wilt to corn.

Management Options

Cultural practices used to reduce flea beetle populations include:

- Weed control in and around planting sites to deprive larvae of food sources needed for successful development.

- Removal of old crop debris and other surface trash to deprive overwintering beetles of protective cover.
- The use of later planting dates when warmer temperatures assist plants in outgrowing or overcoming flea beetle feeding damage.
- The rotation or isolation of current-year plantings from those of the previous year.

Insecticides may be required to reduce flea beetle populations. Planting-time treatments may help to eliminate life stages located in the soil. Foliar treatments can reduce populations of foraging adults.

Cutworms

"Cutworm" is a generic term used to describe plump, soft-bodied caterpillars (larvae) that sometimes feed on vegetable plants. Relatively few of the 2,900 species of cutworms recorded in North America are of economic concern. Cutworm problems generally occur sporadically. Factors influencing cutworm populations include weather, predators, parasites and disease organisms. Naturally occurring factors do not always suppress cutworm populations to subeconomic levels. In these instances cutworms become pests.

Description

Species that have been documented as vegetable pests and that are known to be present in Kansas include the army, black, bristly, claybacked, dark-sided, dingy, dusky, granulate, mottled gray, pale-sided, spotted, spotted-legged, and variegated cutworms. Specific identification may be of academic interest only.

Even within the same species cutworms (Figure 6) vary in size, color and body pattern. They may be plain or feature stripes, spots, or another design. Additional factors aiding in identification are the time of occurrence and behavior.

Figure 6

Damage

The principal damage associated with cutworms is the seemingly indiscriminate shearing off of seedling plants at ground level. More mature plants are somewhat immune because their larger and tougher stems hinder cutworm feeding.

Cutworms are most active at night. Their presence may first become known only after cut plants are seen while working in the garden during the day. Worms responsible for cutting plants often can be located by digging in the soil near the base of cut plants, or where foliage protrudes from the soil. (Tunnel-making cutworms have the habit of dragging cut plants into their tunnels.) The appearance of foliar-feeding damage may indicate the presence of climbing cutworms.

Management Options

It may be possible to reduce cutworm populations without using insecticides. The elimination of winter weeds in and around planting sites will deprive overwintering larvae of both food and harborage. In small plantings, it may be practical to inspect daily for evidence of feeding, then locate and destroy individual cutworms.

In small-scale plantings such as home gardens, cutworm damage can be deterred by placing barriers around the stems of individual plants.

Monitoring moth flights with species-specific pheromones, or blacklight traps can confirm the presence of moths and alert gardeners to scout their plots for the presence of cutworm larvae.

In gardens with histories of frequent cutworm problems, preplant soil insecticides can be applied. But because damaging populations of cutworms are so unpredictable, the automatic use of such materials is not recommended. Rather, plants should be closely inspected, and rescue insecticide treatments applied only when needed.

Definitive economic thresholds have not been established for cutworms on most vegetable crops. Recommendations often state: "Treat for cutworms when present in damaging numbers."

Insecticides

Active ingredients may be available under different trade names. See list on page 4.

Active Ingredient	Wireworms	Flea Beetles	Cutworms
azadirachtin		x	x
carbaryl		x	x
cyfluthrin		x	x
diazinon	x	x	x
disulfoton		x	
endosulfan		x	x
esfenvalerate		x	x
horticultural soap		x	
permethrin		x	x
spinosad			x

It is the responsibility of the end user to read the product label to ensure the legality of its intended use.

Target insect and crop: Many companies use the same active ingredient to formulate their product lines. Furthermore, a single company may choose to incorporate an active ingredient into a half dozen or more different products. Retail outlets may carry a narrow or wide range of product lines. The active ingredient is rarely incorporated into a product's trade name. Individuals must visit local retail outlets to determine product availability.

Postharvest interval (PHI): One must consider how close a commodity is to being harvested. If projected harvests fall within a labeled PHI, a different product with an accommodating PHI should be used.

Publications from Kansas State University are available on the World Wide Web at: http://www.oznet.ksu.edu

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

MF-1016 May 2003