Entomology 506

Early-Season Vegetable Insect Pests

Robert J. Bauernfeind, Extension Specialist, Horticultural Entomology

Several categories of insects are associated with early-season vegetable production in Kansas. Most producers have heard about or experienced plant damage caused by wireworms, flea beetles and cutworms. Producers also are aware that these pests tend to be sporadic and unpredictable, meaning they do not appear on a year in, year out basis. And, when they do appear, damaging population levels may be limited to certain fields or portions of fields.

Wireworms

Wireworms are the larvae of beetles commonly called skipjacks, snapping beetles or click beetles. When placed on their backs, wireworm beetles have the ability to 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."

Figure 1

Coloration varies depending upon 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 upon stage of development and species.

Wireworm beetles characteristically are elongated, somewhat flattened on the bottom, and rounded in front and back (Figure 2). The hind corners of a shield-like

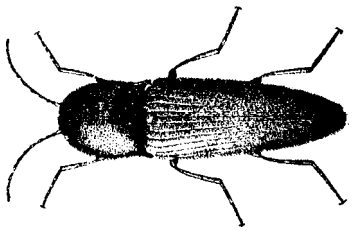

Figure 2

structure covering the area behind the head are pointed or spiny. Beetles may be rather drab in appearance or multicolored with distinct markings. They generally average an inch in length, but some species may reach 1½ inches.

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

Adult wireworms (beetles) feed on flowers, pollen and sweet plant exudations, and, thus, are not cause for concern.

Indiscriminate feeding by wireworm larvae causes economic damage in various ways. Feeding on ungerminated or newly germinated seeds may cause 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.

Produce can be rendered unfit for marketing by direct wireworm feeding upon below-ground vegetables such as potatoes, beets, carrots, radishes, onions, turnips, rutabagas, or crops such as watermelons, cantaloupes and winter squashes which lie on the soil surface for long periods of time.

Damage causes produce to be misshapen and riddled with pits or holes. Furthermore, the crop might not store well because fungal or bacterial soft rot organisms gained entrance 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.

Thus, it might be prudent not to plant vegetable crops for a season or two after working up these areas.

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

Producing marketable 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 like beans, or crops with produce in contact with the ground for only a short time before being harvested such as cucumbers and summer squash.

Soil fumigations are another option if root crops must be planted in fields heavily infested with wireworms. Or, preplant insecticide treatments can be incorporated into the top 6 to 8 inches of soil.

Flea Beetles

Now you see them, now you don't. "Flea beetle" is a generic name applied to many species of small jumping beetles commonly seen early in the gardening season. 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,

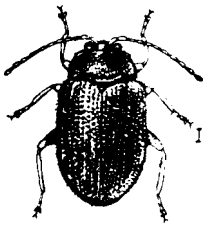

Figure 3

and about 1/16 inch long. Striped flea beetles (Figure 4) are more elongate and dark with yellowish crooked

Figure 4

stripes, and measure about 1/12 inch long. Spinach flea beetles (Figure 5) are both oval and elongate. They have a black head, antennae and legs.

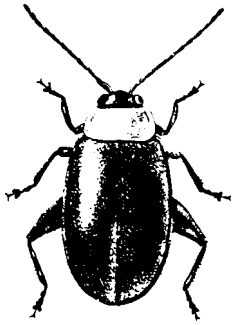

Figure 5

The collar behind the head is yellow to yellowish-orange. Wing covers have blackish-blue luster. They approach 1/5 inch in body length.

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 treelines, 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. However, 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 cause plants to take on 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 population levels. Planting-time treatments may help to eliminate life stages located in the soil. Foliar treatments can lower populations of foraging adults.

Cutworms

"Cutworm" is a rather generic term used to describe plumpish, soft-bodied caterpillars (larvae) which 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 on a sporadic basis. 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, then, cutworms become pests.

Description

Species which have been documented as vegetable pests and which 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.

Cutworms (Figure 6), even within the same species, will vary in

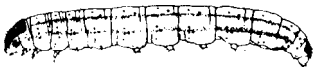

Figure 6

size, color and body pattern (stripes, spots, other designs, or plain). Additional factors aiding in identification are the time of occurrence and behavior.

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 typically are more active during the nighttime. Thus, their presence may first become known only when cut plants are seen. Individual 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

Cutworm population reductions may be possible without the use of 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 conduct daily inspections for evidence of feeding, and then subsequently locate and destroy individual cutworms.

In small-scale plantings such as home gardens, the cutting off of plants can be deterred by placing wrappings or barriers around the stems of individual plants.

Monitoring moth flights with species-specific pheromones, or with blacklight traps can be useful in confirming the presence of moths. Producers would thus be alerted to scout their fields for the possible presence of cutworm larvae.

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

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

Insecticides

Active ingredients may be available under different trade names.

Active Ingredient	Cut-worm	Flea Beetle	Wire-worm	Trade Names
azinophosmethyl		×		Guthion, Azinophas-M
Bacillus thuringiensis	×			Dipel
carbaryl	×	×		Sevin, Carbaryl
diazinon	×	×	×	Diazinon
disulfoton		×	×	Disyston
endosulfan		×		Thiodan, Endosulfan
esfenvalerate	×	×		Asana
ethoprop	×		×	Mocap
fonophos	×	×	×	Dyfonate
methamidophos	×	×		Monitor
methomyl	×	×		Lannate
parathion (encapsulated methyl)	×	×		Penncap-M
permethrin	×	×		Ambush, Pounce
phorate		×	×	Thimet
terbufos	×	×	×	Counter
trichlorfon	×			Dylox

Various factors will influence the choice of chemical to be used:

Classification: Home gardeners will not have access to some products designated as restricted-use pesticides (RUP's). These chemicals may only be purchased and utilized by certified personnel. Such products are readily identifiable by the "Restricted Use Pesticide" nomenclature prominently displayed on the product label. It may be that only certain formulations of an active ingredient are RUP's.

Target insect and crop: Specific product labels must be checked to determine whether that product is registered for use against a specific target pest on a specific crop.

Availability: Certain products may be regionalized according to their main areas of use. For instance, Monitor (although registered for use in Kansas) is marketed in those geographical areas of more intense commercial vegetable production.

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.

Cost: Treatment costs will vary depending on basic product costs, rates to be used, number of required applications. Chemical availability will affect costs as well as varying costs between chemical distributors and retailers.

IT IS THE RESPONSIBILITY OF THE END USER TO READ THE LABEL OF THE PRODUCT IN HAND TO ENSURE THE LEGALITY OF ITS INTENDED USE.

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

MF 1016 March 1998

File code: Entomology—10 3-98—5M