UT Extension

W206

Vegetable Pests

Pickleworm

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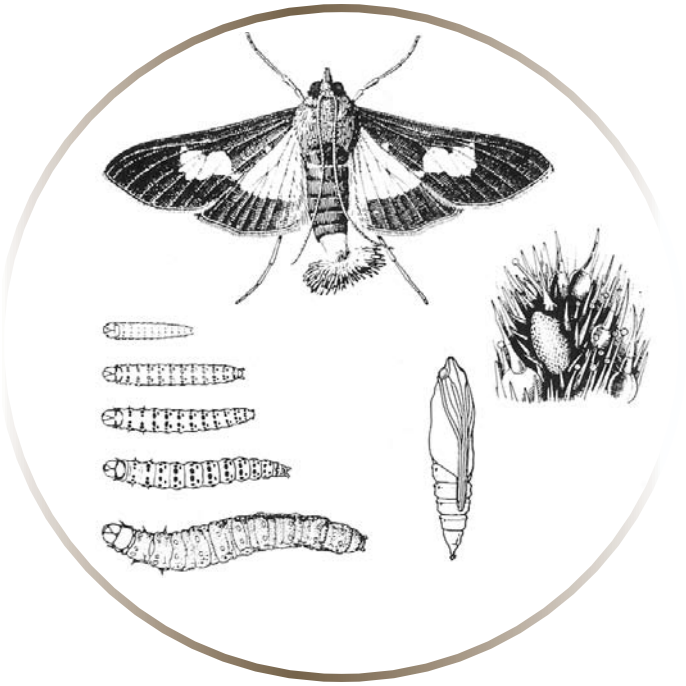
The pickleworm, *Diaphania nitidalis* (Stoll) (Family Crambidae, previously Pyralidae), is found from Canada into parts of South America, and as far west as Oklahoma and Nebraska. It is an important pest of numerous cucurbits. Summer squash is the preferred host, but it also feeds on cantaloupe, cucumber, pumpkin and winter squash. Late-planted cantaloupes are heavily attacked in some areas.

Figure 1. Pickleworm larvae, adult, pupa and egg (enlarged) (Images courtesy of North Carolina Cooperative Extension Service).



Damage

The destructive stage of this insect is the larval stage. Larvae feed on, and tunnel into, the flowers, vines and fruits. Young larvae usually feed on internal portions of blossoms, leaf buds or growing tips of vines. Older larvae, on the other hand, will bore into the fruit of the plant, depositing excrement (frass) as they feed and move throughout the fruit. Damaged fruit usually sours, spoils and rots. Vine damage occurs when larvae bore into the vine, preventing its growth and causing its ultimate death. Numerous feeding holes may be found along the vines. In the Southeastern United States, damage from pickleworms is not usually seen until late August or early September.

Description and Life Cycle

Adults are small moths with a wingspan of about 1¼ inches and a large, light-colored to yellow spot near the center of each dark-colored forewing. The tip of the abdomen contains a cluster of brush-like hairs. The small, white to pale-colored eggs are laid singly or in small clusters directly on the foliage. Pickleworms undergo five larval instars; all larvae have three pairs of legs near the head and five pairs of fleshy prolegs. Newly hatched larvae are colorless; as the larvae get older, they undergo several different colorations and patterns. The younger larvae have a row of small dark tubercles, each with a dark seta (hair) on each segment. The more mature larvae, which are light yellow to green, lose the dark coloration of the tubercles. Larvae usually form a silken cocoon on the foliage, where they pupate. Pupae are brown and about 0.6 inch long.

Figure 2. Adult and larva of the pickleworm (Photographs courtesy of J. L. Capinera, University of Florida).

Adult

Larva

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The pickleworm does not overwinter in our area. It overwinters in semi-tropical areas, like the southernmost areas of Florida and Texas, migrating northward in the spring. The time between egg and adult emergence is 17-20 days. Eggs are deposited on cucurbit surfaces during midsummer. In approximately three days, pickleworm larvae hatch and begin to feed; about two weeks later, the larvae begin to roll leaves together where they will pupate inside the rolled leaves or within the silken cocoon attached to the foliage or plant debris on the ground. Adult moths will emerge about one week later. There are usually two or three generations per year, depending upon temperature and environmental conditions.

Control

Non-chemical Controls

Several non-traditional methods are available to help to reduce populations of pickleworms. These include the use of resistant varieties, cultural control, mechanical control and biological control. Planting varieties of cucurbits resistant to pickleworms is effective for those plants where resistant varieties are available. For example, experiments in North Carolina have shown distinct differences in the susceptibility or resistance of squash varieties to pickleworms. (More resistant varieties are Butternut 23, Summer Crookneck, Early Prolific Straightneck and Early Yellow Summer Crookneck; more susceptible varieties are Cozini, Black Zucchini Caserta, Zucchini, Shrot Cofozella and Benning Green Tint Scallop.)

Cultural controls include planting the crop early – this early-planting enables growers to harvest most of the crop before the pickleworm can cause excessive losses. Early plantings are seldom damaged, depending upon the arrival of the pickleworm into Tennessee from southern areas. Some mechanical controls also have been shown to be effective. For example, susceptible plants can be covered with screened material (floating row covers) to prevent adult moths from laying eggs on the plants. However, this method can add expenses to the production budget due to purchase of additional materials. To reduce numbers of subsequent generations in a given season, growers can destroy infested vines and unused or rotting fruits as soon as the crop is harvested. Stems infested with pickleworms can be slit and the borers removed. Soil can then be placed over the injured stem to encourage rooting.

Established biological control organisms, such as predators, reduce populations of pickleworms but cannot be depended upon to prevent infestations. Effective scouting for pest and biological control organism populations can help you determine their effectiveness in your cropping system. Unfortunately, no effective commercial biological controls for pickleworm are readily available at this time. The use of the nematode *Steinernema carpocapsae* Weiser is promising, as it has been shown to suppress pickleworm injury in squash. Research also is underway to evaluate a variety of generalist predators against pickleworm, such as *Calosoma* spp. and *Harpalus* spp.

Chemical Controls

Applications of a registered and approved insecticide should begin immediately when pickleworm larvae are first found in blossoms or buds or when their damage first appears. Pickleworms must be killed before they enter the fruit. Several chemical insecticides give good control, but timing is critical. When applying an insecticide to a specific crop, always follow the preharvest interval (PHI) on the insecticide label. The PHI states when the last insecticide application can be made prior to harvest. Commercial vegetable growers have access to more chemical control options. If possible, it is best to apply chemical insecticides in early evening when blossoms are closed to minimize toxic effects to bees.

The availability of chemical pesticides changes regularly. Always consult your local county Extension agent for a list of currently approved and recommended chemical insecticides. The following links provide access to listings of recommended chemical control options for homeowners and commercial production growers:

- "UT Extension Insect and Plant Disease Control Manual" (vegetables, home garden insects): http://eppserver.ag.utk.edu/redbook/pdf/homegardeninsects.pdf

- "Southeastern U.S. Vegetable Crop Handbook" (commercial growers): https://content.ces.ncsu.edu/southeastern-us-vegetable-crop-handbook

Always use pesticides according to the label; also use protective clothing and dispose of remaining pesticide in a properly approved manner.

References (and Internet Sites)

North Carolina State University, Insect and Related Pests of Vegetable Crops (edited by K. A. Sorensen and J. R. Baker):
http://ipm.ncsu.edu/AG295/html/index.html
http://www.ces.ncsu.edu/depts/ent/notes/Vegetables/veg001e/veg001e.htm

University of Florida:
http://creatures.ifas.ufl.edu/veg/pickleworm.htm

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