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SP503-A-Squash Vine Borer

The University of Tennessee Agricultural Extension Service

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Insects

Squash Vine Borer

Frank A. Hale, Professor
Entomology and Plant Pathology

Damage

Squash vine borers, *Melittia cucurbitae* (Harris) [Order Lepidoptera, Family Sesiidae] use their chewing mouthparts to bore into stems of their host plants. Squash, pumpkin and gourds are commonly attacked. Hubbard squash is preferred over other hosts, while butternut squash is less susceptible than other types of squash. Melons and cucumbers are usually not attacked. The larvae are usually found in the lower 3 feet of the stem. Their continuous feeding girdles stems so that water and nutrients taken up by the roots cannot reach the rest of the vine. This damage causes infested plants to weaken and often die. Injured vines will often decay, appearing wet and shiny. The larva pushes yellow, sawdust-like excrement (frass) out of its expanded entry hole in the stem. The frass, mixed with decaying plant tissue, often oozes from the wounded stem as a wet, curdled, greenish-yellow exudate.



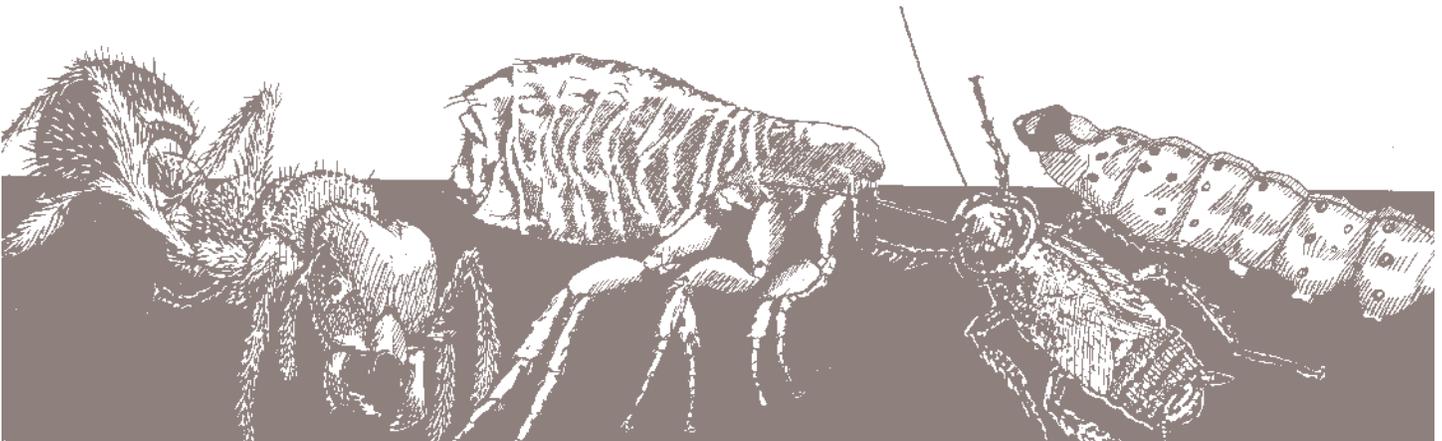
Larva visible in the vine.
Frank A. Hale

Appearance, Lifecycle and Behavior

The oval, flattened, dull-red to brownish eggs are 1mm (1/25 inch) in diameter. They are laid singly, usually on the main stem near the base. They can also be found on leafstalks or on the underside of leaves

The larva has a whitish wrinkled body, a brown head, three pairs of short legs and five pairs of fleshy prolegs on its abdomen. There are two transverse rows of minute curved spines (crochets) on each proleg. The fullgrown larva is 25mm (1 inch) long. The pupa is brown and 16mm (5/8 inch) long. The pupa is found in the soil, inside an earth-covered black silk cocoon that is 19mm (3/4 inch) long.

The adult is a clear-winged moth that looks like a wasp. The front wings have greenish-black scales, while the hind wings are clear with a brown border of scales. The abdomen of the moth is ringed with orange and black stripes. The feathery legs are predominately





The male and female moths mating. The male is on the left and the female is the larger one on the right.

Alan Windham

orange with black and white markings. The moths fly during the day and rest on leaves at night. This behavior differs from most other type of moths that are active at night. The moths fly in a zig-zag pattern and land on leaves and stems to rest or lay single eggs. The moths are active for about one month.

Squash vine borers overwinter as fully grown larvae or pupae in cocoons in the soil 2.5 to 7.5 cm (1 to 3 inches) deep. The adult moths emerge in May. Throughout May and June, single eggs are laid on stems and leaf petioles. Eggs hatch in seven to nine days. The larvae bore into the stems and feed for four to six weeks before leaving their burrows and tunneling into the soil, where they spin cocoons. The new moths emerge two to three weeks later, giving rise to a second generation of larvae during August.

A sticky trap baited with the borer's sex pheromone is a useful tool in determining when moths are active. The Extension factsheet "Commercial Sources of Predators, Parasitoids and Pathogens" (SP290-Z) lists commercial sources for the sex pheromone and traps.

Natural Enemies

Parasitic wasps can attack the most susceptible stage of the squash vine borer, the egg stage. Unfortunately, most years the parasitic wasps do not destroy significant numbers of squash vine borer eggs. Ground beetles can attack the larvae but do not cause significant mortality. **Natural control is thus marginal at best.**

Cultural Control

- Vines should be destroyed soon after harvest to destroy any larvae inside the stems.
- Disk the soil in the fall to expose the cocoons. Plow deeply the following spring to destroy surviving pupae in cocoons.

- Since the insect spends the winter in the ground, squash or pumpkins should not be replanted in the same or adjacent field the following year.
- In gardens, cover vines with a shovel of soil at one or more locations along each vine to encourage the formations of secondary roots. These may be necessary to support the plant if the main stem is injured.
- A trap crop of very early-planted Hubbard squash will attract the moths. They will then lay most of their eggs on the Hubbard squash and fewer on the other cucurbits.
- Staggered squash plantings can often escape the peak egg-laying periods and much of the resulting damage. Still, marketing considerations should be paramount when setting planting dates and projected harvest dates.
- Weakened, nonproductive plants can be removed, giving younger plants more room to grow, or damaged plants can be replaced.

Physical Control

The following are suitable for small plantings such as gardens:

- Larvae can be removed with forceps or tweezers after making a longitudinal slit in the injured vine with a sharp knife. Then cover the area just above the point of injury with moist soil to promote new root formation.
- Cover the lower 3 feet of the stems with a barrier such as cheese cloth or strips of nylon stockings to prevent egg-laying.
- Catch and destroy the moths found resting on the upper side of the leaf bases at dusk or in the early morning.
- Hand-pick and destroy eggs prior to hatch.



The wilted vine.
Frank A. Hale

Chemical Control

While cultural and physical control strategies are part of an integrated pest management (IPM) approach, the use and proper timing of insecticide applications are essential for effective control of the squash vine borer. Pheromone-baited sticky traps can be used soon after planting to monitor the activity of the adult moths. Start inspecting plants closely for squash vine borer eggs as soon as moths are caught in the traps. The first application of insecticide should occur when eggs begin to hatch or just prior to hatching. Applications should be made in afternoons or evenings after flowers close to reduce the spraying of valuable pollinators, especially bees.

If pheromone-baited sticky traps and egg monitoring are not performed, a preventive treatment should be applied when vines begin to run. Re-apply insecticide every seven days for four to five weeks. Direct the insecticide mixed in 30 gallons of water per acre to the base of plants, crowns and runners. The squash vine borer larva will not be chemically controlled if it enters the vine without first coming in contact with insecticide. Continue monitoring the pheromone-baited sticky traps into August to detect the emergence of the new moths. When moths are caught, inspect plants for second-generation eggs and begin the insecticide applications when eggs first begin to hatch or just prior to hatching.

Insecticide used for squash borer control in gardens include carbaryl (Sevin® 50 WP, ferti-lome Liquid Carbaryl Garden Spray 23.7%), esfenvalerate (Ortho Bug B Gon Multi-Purpose Insect Killer 0.0033%), spinosad (ferti-lome Borer, Bagworm, Leafminer & Tent Caterpillar Spray 0.5%, Monterey Garden Insect Spray 0.5%) and permethrin (Eight Insect Control 2.5%, Bonide Total Pest Control Concentrate 13.3%).

Restricted-use insecticides used for squash vine borer control include permethrin (Pounce® 3.2 lb./gal. EC, Pounce® 25% WP, Ambush® 2 lb./gal. EC, Ambush® 25% WP), bifenthrin (Capture® 2 lb./gal. EC) and esfenvalerate (Asana® XL 0.66 lb./gal. EC). Endosulfan (Phaser® 3 lb./gal. EC, Phaser® 50% WP, Thiodan® 3 lb./gal. EC, Thiodan® 50% WP) is labeled for agricultural or commercial use only.

References

Carter, C.C., & K.A. Sorenson. 1983. Cucurbits, pp. 69-80. K.A. Sorenson and J.R. Baker [eds.], **Insect and Related Pests of Vegetables, Some Important, Common, and Potential Pests in the Southeastern United States**. The North Carolina Agricultural Extension Service, North Carolina State University, Raleigh, NC.

Welty, C. 1992. **Squash Vine Borer**. Ohio State University Extension Factsheet HYG-2153-92, Columbus, Ohio.

Precautionary Statement

To protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed by the label. Persons who do not obey the law will be subject to penalties.

Disclaimer Statement

This publication contains pesticide recommendations that are subject to change at any time. The recommendations in this publication are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used. The label always takes precedence over the recommendations found in this publication.

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