

## Cucumber, Squash, Melon & Other Cucurbit Insect Pests

### Cucumber Beetles

The spotted, striped and banded cucumber beetles are very harmful to cucurbits (members of the gourd family, including cucumbers, melons, pumpkins and squashes), particularly young plants. Beetles commence feeding on plants as soon as they emerge and either kill the plants or greatly slow growth. In cucurbit plantings throughout South Carolina, beetles have been observed entering the soil through cracks and feeding on seedlings below the soil surface. Beetles are present throughout the growing season and feed on all parts of the plant including the flowers and fruit.

Cucumber beetles also transmit bacterial wilt of cucurbits. This disease overwinters (survives the winter) in the intestines of the beetles and is scattered from plant to plant as the beetles feed. Infected plants eventually wilt and die. Many new varieties of cucurbits have resistance to bacterial wilt. Cucumber beetle larvae (immature forms) feed on the roots and bore into both roots and stems of cucumber plants.



UGA1372022

Spotted cucumber beetle adult (*Diabrotica undecimpunctata howardi*). J.P. Michaud, Kansas State University, [www.insectimages.org](http://www.insectimages.org)

The yellowish-green adult spotted cucumber beetle (*Diabrotica undecimpunctata howardi*) has 11 black spots and a black head with black antennae. The yellowish-white larvae have brown heads and are  $\frac{3}{4}$  inch (19 mm) long when grown.



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Striped cucumber beetle (*Acalymma vittatum*). Clemson University - USDA Cooperative Extension Slide Series, [www.insectimages.org](http://www.insectimages.org)

The yellow adult striped cucumber beetle (*Acalymma vittatum*) is about  $\frac{1}{5}$  inch (5 mm) long with three longitudinal black stripes on the top wings. The whitish larvae are about  $\frac{1}{3}$  inch (8.5 mm) when grown.

The adult banded cucumber beetle (*Diabrotica balteata*) is yellowish green with three bright green stripes or bands running across the wing covers. In a home vegetable garden, control measures include the use of fabric row covers, such as spun-bonded polyester. These covers provide an effective barrier between the insect and young plants. Remember to remove the covers during flowering to ensure pollination. Handpicking to remove the beetles is time-consuming but effective. In addition, several

predators and parasites are enemies of cucumber beetles. Eliminate weeds in and around the garden.



Banded cucumber beetle (*Diabrotica balteata*).  
Ottens, University of Georgia, [www.insectimages.org](http://www.insectimages.org)

### Spider Mites

Two-spotted spider mites (*Tetranychus urticae*) can be a serious problem on cucurbits, especially watermelons and cantaloupes, during hot, dry weather. These tiny mites feed on the contents of individual cells of the leaves. This damage appears as pale yellow and reddish-brown spots ranging in size from small specks to large areas on the upper sides of leaves. Damage can develop very quickly and the mites can kill or seriously stunt the growth of plants. Because of their small size, spider mites are hard to detect until vines are damaged with hundreds of mites on each leaf. Certain insecticides applied at planting or as a foliar spray for insect control apparently contribute to severe outbreaks of mites on melons by killing their natural enemies.



Typical stippling damage to leaves from two-spotted spider mites (*Tetranychus urticae*). Whitney Cranshaw, Colorado State University, [www.insectimages.org](http://www.insectimages.org)



Extreme close-up of two-spotted spider mite (*Tetranychus urticae*). David Cappaert, Michigan State University, [www.insectimages.org](http://www.insectimages.org)

Insecticidal soaps generally offer adequate control when applied before the numbers are too high. Make two applications five days apart. Squash leaves are easily burned by insecticidal soaps, so use the most dilute concentration recommended, and use sparingly. Do not spray plants in direct sun or if plants are drought stressed. Spider mites can also be controlled with neem oil extract. Mites can be removed with a strong spray of water. Predatory mites and beneficial insects such as lady beetles and minute pirate bugs are important natural controls.

### Melon Aphids

Melon aphids (*Aphis gossypii*) and several other aphid species attack cucurbits, particularly melons and cucumbers. Melon aphids vary in size and color from light yellow to green to black. Some are winged, while others are wingless.



Melon aphids, also known as cotton aphids (*Aphis gossypii*). Mississippi State University Archive, Mississippi State University, [www.insectimages.org](http://www.insectimages.org)

They are found chiefly on the underside of the leaves, where they suck the sap from the plants and cause a reduction in the quality and quantity of the fruit. Infested leaves curl downward and may turn brown and die. The melon aphid also is one of the chief agents in transmitting *Cucumber mosaic virus*. Usually, cucurbits are not attacked by aphids until the vines form runners.

Consider natural controls when making treatment decisions. Beneficial insects are extremely important in keeping aphid populations in check. Infestations usually are higher in hot, dry summers following cool, dry springs, which have reduced the efficiency of the natural enemies. In addition to natural enemies, you can spray leaves with soapy water, then rinse with clear water. Spraying with insecticidal soap, planting in aluminum foil-covered beds and filling yellow pans with water to trap the aphids are also effective control measures.

## Squash Bugs

The squash bug (*Anasa tristis*) is one of the most common and troublesome pests in the home vegetable garden. Squash plants frequently are killed by this sap-feeding pest. Leaves of plants attacked by the bugs may wilt rapidly and become brittle. Winter varieties of squash, such as Hubbard and Marrows, are much more severely damaged by the squash bug than other varieties. Control is required to protect squash in the home garden.



Older squash bug nymphs (*Anasa tristis*).  
Whitney Cranshaw, Colorado State University,  
[www.insectimages.org](http://www.insectimages.org)

The adult squash bug is rather large, brownish black, and flat-backed. It is about  $\frac{5}{8}$  inch (1.6 cm) long and approximately  $\frac{1}{3}$  as wide. The young, called nymphs, are whitish to greenish gray, with

black legs. They vary in size from tiny, spider-like individuals when first hatched, to maturing nymphs, which are nearly as large as the winged adults.



Squash bug egg clusters (*Anasa tristis*).  
Whitney Cranshaw, Colorado State University,  
[www.insectimages.org](http://www.insectimages.org)

Squash bugs overwinter in protected places as unmated adults. They appear rather slowly in the spring. They mate and begin laying egg clusters about the time vines begin to grow and spread. Eggs are yellowish brown to brick red in color and are laid in clusters of a dozen or more on the leaves. They hatch in about 10 days into nymphs that become adults in four to six weeks. Only one generation of bugs develops each year. New adults do not mate until the following spring.

The squash bug is secretive in its habits. Adults and nymphs may be found clustered about the crown of the plant, beneath damaged leaves, and under clods or any other protective ground cover. They scamper for cover when disturbed. The secretive nature of squash bugs can be used to your advantage in controlling these pests. Place a small, square piece of old shingle or heavy cardboard under each squash plant. As bugs congregate under it for protection, simply lift the trap and smash them with your hoe (or shoe). Other control methods include early planting and removing eggs and nymphs by hand.

Remove and destroy vines and discarded fruit after harvest to eliminate overwintering sites. Early detection of squash bugs is very important, as they are difficult to control and can cause considerable damage. Apply insecticides when nymphs are small, as adults are difficult to kill.

## Squash Vine Borers

The squash vine borer (*Melittia cucurbitae*) ranges from Canada to Argentina and is the most serious enemy of squashes and gourds. It causes much trouble where only a few plants are grown in gardens. It rarely attacks cucumbers and melons. Great variations exist in the susceptibility of squash and pumpkin varieties. Butternut and Green-Striped Cushaw varieties are practically immune to attack, but Hubbard squash is highly susceptible.



Squash vine borer larva (*Melittia cucurbitae*) and damage. Alton N. Sparks, Jr., University of Georgia, [www.insectimages.org](http://www.insectimages.org)

Damage is caused by larvae (immature forms) tunneling into stems. This tunneling often kills plants, especially when the larvae feed in the basal portions of vines. Sometimes fruits are also attacked. Sudden wilting of a vine and sawdust-like insect waste coming from holes in the stem are evidence of attack.



Close-up of squash vine borer larva (*Melittia cucurbitae*). Clemson University - USDA Cooperative Extension Slide Series, [Bugwood.org](http://Bugwood.org)

The adult is one of the moths known as “clear wings” because the hind wings are almost without scales. It is 1½ inches (3.8 cm) in wing expanse and metallic greenish black in color. Hind legs are fringed with black and orange hairs, and markings of similar color occur over much of the abdomen. The moths are day fliers and are often mistaken for wasps. Larvae are white, heavy-bodied and considerably over 1 inch (2.54 cm) long when fully grown.

The insect overwinters in the soil as a larva or pupa (a non-feeding stage where the larva changes to an adult) enclosed in a cocoon. Moths emerge in early summer and lay eggs on the stems of the plants, usually late May in the South. Upon hatching, larvae bore into vines and complete their development in four or more weeks. Then they leave the plant, crawl into the soil, spin a cocoon and transform to a pupa. There are two generations in South Carolina.

In a vegetable garden, various measures can be taken to control this pest. Till the soil in late winter to expose overwintering insects. Rotate squash to another location in the garden each season. Destroy vines that have been killed to break the life cycle. You can slit the infested vine lengthwise and remove borers or kill them with a long pin or needle. Place soil over slit stem after removing the borer to encourage root development, and keep plants well watered. Plant as early as the weather allows since borers do not emerge until early summer.

## Pickleworms

The pickleworm (*Diaphania nitidalis*) severely damages cucumbers, cantaloupes, summer squash and pumpkins. It also feeds on other cucurbits, such as winter squash, and watermelons, but usually does little damage.

Pickleworm damage occurs when the caterpillars tunnel in flowers, buds, stems and fruits. They prefer the fruits. Frass (sawdust-like insect waste) often protrudes from small holes in damaged fruits. At times, damaged fruits cannot be recognized until they are cut open. Damaged fruits are not edible. Flowers, buds and sometimes entire plants may be killed.



Pickleworms bore into cucurbit fruit, and their frass is pushed out.

Joey Williamson, ©2016 HGIC, Clemson Extension

In South Carolina, pickleworms starve or freeze to death during the winter. They overwinter in Florida and spread northward each spring. Severe damage usually does not occur before summer in South Carolina. Heavy populations generally do not build up before the first flower buds open; however, late crops may be destroyed before blossoming. The pickleworm has complete metamorphosis, passing through four distinct stages (egg, larva, pupa and adult) during development.



Pickleworm larvae (*Diaphania nitidalis*) inside fruit.  
Clemson University - USDA Cooperative Extension Slide Series, [www.insectimages.org](http://www.insectimages.org)

Eggs are yellow, irregularly shaped and resemble grains of sand. They are laid singularly or in small groups on leaves and hatch in three to four days.

Larvae feed first on buds, blossoms and tender terminals, but soon move to the fruits. These brown-headed caterpillars molt (shed their skin) four times before they become about  $\frac{3}{4}$  inch (1.9 cm) long and fully grown in nine to 28 days. The body is yellowish white at first, but many reddish-brown spots appear on the back after the first molt. After the last molt, the caterpillar loses its spots and becomes solid green or copper. Finally, the caterpillar stops feeding, becomes pink to pale green and spins a thin silk cocoon around itself, usually within a folded-over portion of a leaf where it pupates (becomes a pupa).

Pupae (non-feeding stage where the larva changes to an adult) are light to dark brown and slightly more than  $\frac{3}{4}$  inch long. Pupae are usually found in a rolled leaf. However, they have been found inside cantaloupe and summer squash in rare instances. Adults usually emerge after seven to 10 days.

Adults are brownish-yellow moths that have a rounded brush of hairs at the rear of the body. The brownish-yellow wings have a purplish sheen, translucent yellow-white centers and a spread of about 1 inch (2.54 cm). Moths are active at night.

Select early maturing varieties and plant as early as possible before pickleworm population peaks. Destroy damaged fruit and crush rolled sections of leaves to kill pupae. The more resistant varieties are: Butternut 23, Summer Crookneck, Early Prolific Straightneck, and Early Yellow Summer Crookneck.

### Squash Beetles

The squash beetle (*Epilachna borealis*) is one of two species of Coccinellidae known to occur in the United States that eat plant material rather than other insects. The squash beetle feeds upon the leaves of cucurbits. The other species, the Mexican bean beetle (*Epilachna varivestis*), a close relative of the squash beetle, is a serious bean pest.

The adult of the squash beetle overwinters in crop debris. All other lady beetles are beneficial because they feed on insect pests such as aphids and scale insects.



Adult squash beetle (*Epilachna borealis*), with spiny larva at left. Clemson University - USDA Cooperative Extension Slide Series, [www.insectimages.org](http://www.insectimages.org)

Destroy crop residues after harvest and reduce overwintering sites by tilling.

### Control of Cucurbit Insects

Table 1 lists the natural and conventional contact insecticides for the control of insect pests of cucumbers, squash and melons. However, limit the use of broad-spectrum contact insecticides, such as malathion, bifenthrin, cyhalothrin, cyfluthrin,

permethrin, carbaryl and pyrethrin, all of which kill beneficial predators and parasites of insect pests. Monitor the vegetables for the buildup of insect pests. Natural, less toxic pesticides may give good control and should be tried first.

Table 2 lists examples of available brands and products of natural and contact insecticides labeled for use on cucumbers, squash and melons. It also gives the pre-harvest interval (PHI) for each insecticide, which is the number of days to wait between insecticide application and harvest.

For aphids or spider mites use insecticidal soap sprays first. Control heavy populations of aphids or spider mites with sprays of neem oil extract. Cucumber beetles or squash beetles can be controlled effectively using carbaryl (Sevin), but wait three days after spraying before harvest.

For vine borers and pickleworms control after mid-June, apply carbaryl (Sevin) or neem oil extract weekly, and spray in the evening to not kill pollinating insects. Wait three days after spraying carbaryl before harvest. Bifenthrin, cyhalothrin or cyfluthrin will control cucumber beetles, squash bugs, squash vine borers and pickleworms, but wait 3, 3 or 7 days, respectively, after spraying before harvest.

**Table 1. Natural, Less Toxic Pesticides & Contact Pesticides to Control Cucurbit Insect Pests.**

Pests	Natural, Less Toxic Pesticides	Contact Pesticides
Melon Aphids	Insecticidal soap Neem oil extract Pyrethrin	Bifenthrin Malathion Cyhalothrin Cyfluthrin
Cucumber Beetle	Pyrethrin Neem oil extract	Carbaryl Bifenthrin Cyhalothrin Cyfluthrin
Squash Beetle	Pyrethrin Neem oil extract	Carbaryl Bifenthrin Cyhalothrin Cyfluthrin Malathion
Pickleworms	<i>Bacillus thuringiensis (B.t.)</i> Pyrethrin Neem oil extract Spinosad	Carbaryl Bifenthrin Cyhalothrin Cyfluthrin

Squash Vine Borer	Neem oil extract	Bifenthrin Cyhalothrin Cyfluthrin
Squash Bugs	Neem oil extract	Bifenthrin Cyhalothrin Cyfluthrin Malathion
Spider Mites	Insecticidal soap Neem oil extract	Malathion Bifenthrin

**Table 2. Examples of Insecticides for Cucumber, Squash & Melon Pest Control.**

Pesticide Active Ingredient	Pre-Harvest Interval (PHI) in Days	Examples of Brand Names & Products
<b>Natural, Less Toxic Insecticides</b>		
<i>Bacillus thuringiensis</i> (B.t.)	0	American Brand Thuricide Concentrate Bonide Thuricide <i>B.t.</i> Concentrate Hi-Yield Thuricide Concentrate Monterey <i>B.t.</i> Concentrate Organic Laboratories Organocide Worm & Caterpillar Control Concentrate Safer Caterpillar Killer with <i>B.t.</i> Concentrate Garden Safe <i>B.t.</i> Worm & Caterpillar Killer Concentrate Southern Ag Thuricide Spray Concentrate Tiger Brand Worm Killer Concentrate
Insecticidal Soap	0	Bayer Advanced Natria Insecticidal Soap RTU Bonide Insecticidal Soap Multi-Purpose Insect Control Conc.; & RTU <sup>1</sup> Espoma Earth-tone Insecticidal Soap Concentrate; & RTU <sup>1</sup> Natural Guard Insecticidal Soap Concentrate; & RTU <sup>1</sup> Safer Brand Insect Killing Soap Concentrate; & RTU <sup>1</sup> Garden Safe Insecticidal Soap Insect Killer Concentrate; & RTU <sup>1</sup> Whitney Farms Insecticidal Soap RTU
Neem Oil Extract	0	Bonide Neem Oil Fungicide, Miticide & Insecticide Concentrate; & RTU <sup>1</sup> Concern Garden Defense Multi-Purpose Spray Concentrate Ferti-lome Rose, Flower & Vegetable Spray Concentrate Garden Safe Fungicide 3 Concentrate; & RTU <sup>1</sup> Monterey 70% Neem Oil Fungicide, Insecticide & Miticide Conc.; & RTS <sup>2</sup> Southern Ag Triple Action Neem Oil Concentrate Safer BioNeem Insecticide & Repellent Concentrate
Pyrethrin	0	Bonide Pyrethrin Garden Insect Spray Concentrate Spectracide Garden Insect Killer Concentrate (with Piperonyl Butoxide) Southern Ag Natural Pyrethrin Concentrate GardenTech Worry Free Insecticide & Miticide Conc.; RTS <sup>2</sup> ; & RTU <sup>1</sup> Monterey Take Down Garden Spray Concentrate; & RTU (w/ canola oil)

Spinosad	3	Bonide Captain Jack's Dead Bug Brew Concentrate; & RTS <sup>2</sup> ; & RTU <sup>1</sup> Bonide Colorado Potato Beetle Beater Concentrate Ferti-lome Borer, Bagworm & Leafminer Spray Concentrate Monterey Garden Insect Spray Concentrate Natural Guard Spinosad Landscape & Garden Insecticide RTS <sup>2</sup> Southern Ag Conserve Naturalyte Insect Control Concentrate
<b>Contact Insecticides</b>		
Bifenthrin	3	Ferti-lome Broad Spectrum Insecticide Concentrate
Carbaryl	3	Garden Tech Sevin Concentrate; & RTS <sup>2</sup> ; & RTU <sup>1</sup>
Cyfluthrin	3	Bayer Advanced Vegetable & Garden Insect Spray Concentrate
Cyhalothrin (lambda)	7	Bonide Caterpillar Killer RTS <sup>2</sup> Bonide Beetle Killer RTS <sup>2</sup> Martin's Cyonara Lawn & Garden Concentrate; & RTS <sup>2</sup> Spectracide Triazicide Insect Killer for Lawns & Landscape Conc.; & RTS <sup>2</sup>
Malathion	1	Bonide Malathion Concentrate Gordon's Malathion 50% Spray Concentrate Hi-Yield 55% Malathion Insect Spray Concentrate Martin's Malathion 57% Concentrate Ortho Max Malathion Insect Spray Concentrate Spectracide Malathion 50% Insect Spray Concentrate Southern Ag Malathion 50% EC Tiger Brand Malathion 50% Spray Concentrate
<b>PHI</b> = Pre-harvest interval or number of days to wait after spraying before harvest. <sup>1</sup> <b>RTU</b> = Ready to Use (pre-mixed spray bottle) <sup>2</sup> <b>RTS</b> = Ready to Spray (hose-end applicator)		

Pesticides updated by Joey Williamson, HGIC Horticulture Extension Agent, Clemson University, 10/16. Revised by Joey Williamson, HGIC Horticulture Extension Agent, Clemson University, 03/14. Originally prepared by Randall P. Griffin, Extension Entomologist, Clemson University. New 03/99. Images added 05/09 & 06/16.

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