

Cucumber, Squash, Melon & Other Cucurbit Diseases

Many diseases of cucurbits can be prevented or minimized in the home vegetable garden by using the following simple cultural controls:

- Plant certified disease-free seeds.
- Select varieties recommended for South Carolina, especially those with some degree of disease resistance (Table 1).
- Keep the garden and surrounding area free of weeds that harbor insects, which can spread viruses and bacterial wilt.
- Remove plant debris from the garden after harvest, since many diseases survive on plant debris from year to year.

More information about growing cucurbit plants is available in the fact sheets: [HGIC 1304, *Cantaloupe & Honeydew Melon*](#); [HGIC 1309, *Cucumber*](#); [HGIC 1321, *Summer Squash*](#); and [HGIC 1325, *Watermelon*](#). See also Fact Sheet [CE-6 *Cucurbit Diseases, an Aid to Identification*](#).

Bacterial Wilt

The main symptom of this disease is severe wilting of the vines, followed by rapid death of the plant. The disease is caused by the bacterium *Erwinia tracheiphila*, and at first may only affect a few vines on a plant. However, as the disease progresses, more leaves wilt, and eventually the entire vine is affected. Bacterial wilt is most severe on cucumber and cantaloupe and less severe on squash, pumpkin and watermelon.

Prevention & Treatment: There is no chemical control for bacterial wilt once plants become infected. The bacteria are carried from plant to plant by striped or spotted cucumber beetles. The beetles

spread the wilt bacterium by feeding on infected vines and then feeding on healthy plants.

Bacterial wilt can be reduced in your garden if the beetles are kept under control at the first sign of activity. Insecticides that control striped and spotted cucumber beetles in the home vegetable garden include carbaryl, bifenthrin, cyhalothrin or cyfluthrin (see [HGIC 2207, *Cucumber, Squash, Melon & Other Cucurbit Insects*](#)). Bees pollinate many of these vegetables, so spray all insecticides in the late afternoon. Apply all chemicals according to directions on the label.

Powdery Mildew

Powdery mildew causes a white powdery growth on the upper surfaces of leaves and on the stems of infected plants. Infected areas are often stunted and distorted and may drop prematurely from the plant. Fruits are usually not directly affected, but their size and growth may be stunted. Powdery mildew is caused by the fungi *Erysiphe cichoracearum* and *Sphaerotheca fuliginea*. Infection can occur when temperatures are between 50 and 90 °F, during dry weather with high relative humidity. The disease can be a particular problem on late-planted squash.

Prevention & Treatment: Powdery mildew-resistant varieties (Table 1) are available for most cucurbits, thus with proper planning, chemical control should not be necessary. Preventative fungicide treatments are available (Table 2) if disease becomes severe enough to warrant chemical control.



Powdery mildew on upper leaf surface.
Zachary Boon Snipes, ©2015 Clemson Extension

Downy Mildew

Downy mildew is one of the most important leaf diseases of cucurbits. Typically, symptoms begin as small yellow areas on the upper leaf surface. As lesions expand, they may become brown with irregular margins. Affected areas may grow together, and the entire leaf may wither and die. Infected plants also develop a gray mold on the lower leaf surface. The fruit is not affected, but in the case of cantaloupes, it will be less sweet. This disease is caused by the fungus *Pseudoperonospora cubensis* and is favored by moist conditions.



Downy mildew spores on lower leaf surface.
Zachary Boon Snipes, ©2015 Clemson Extension

Symptoms on watermelon are different than symptoms on other cucurbits. Leaf spots on watermelon are dark brown and irregular in shape, ranging from oval to angular to rectangular. Slight yellowing may be seen around the edges of the

spots or in small patches in other parts of the leaf. Leaves infected with downy mildew curl inward as the leaf dies. As on other crops, spores usually are found on the bottom of the leaf, although spores may be formed on top of the leaf in severe infections or foggy weather.



Downy mildew symptom on upper leaf surface of cucumber.
Zachary Boon Snipes, ©2015 Clemson Extension

Prevention & Treatment: Use varieties that are resistant to this disease (Table 1). Fungicides are available for the home vegetable garden if disease becomes severe enough to warrant chemical control (Table 2).

Gummy Stem Blight

Gummy stem blight is a stem and leaf disease of cucumber, cantaloupe, pumpkin and watermelon caused by the fungus *Didymella bryoniae*. This fungus also causes a fruit rot called black rot.

Symptoms include leaves with brown or tan spots of various sizes that may eventually cover the entire leaf. The stems may split to form open wounds called cankers. A brown, gummy substance may be evident on the surface of these open wounds. Infected vines usually wilt after the middle of the season. Infected stems die one after another, and seedlings and entire individual vines may be killed. Affected fruit have irregular circular spots, and a wet rot occurs where the fungus penetrates the rind.



Leaf spots caused by gummy stem blight on watermelon leaf. Clemson University - USDA Cooperative Extension Slide Series, Bugwood.org

To distinguish gummy stem blight on watermelon from downy mildew, look at the size, shape, and position of leaf spots. Leaf spots of gummy stem blight are larger than individual spots of downy mildew. Some leaf spots of gummy stem blight have a ringed or target look. Gummy stem blight also can be found on the petioles (leaf stems) and the mid vein of leaves as a water-soaked or reddish-brown wet spot.

Prevention & Treatment: There are no varieties that are resistant to this disease. This disease may be seed-borne, so purchase seed from a reputable source. Remove and destroy all plant debris in the garden, since the disease can survive on plant debris from year to year. Rotate crops with nonhost plants, such as corn, for two or more years as an effective way of reducing the incidence of this disease. Avoid wetting the leaves when watering. If disease is severe enough to warrant chemical control, preventative fungicides are available (Table 2).

Anthracnose

Anthracnose is caused by the fungus *Colletotrichum obiculare*, and requires rainy, cool weather for several days for the disease to develop. The first symptoms of anthracnose are spots on the leaves that begin as yellowish or water-soaked areas. Spots enlarge and turn brown to black. The diseased tissue dries and the center of the spots fall out giving a "shot-hole" appearance. Infected fruits have black, circular, sunken cankers of different sizes.



Anthracnose on watermelon foliage. Zachary Boon Snipes, ©2015 Clemson Extension

Prevention & Treatment: Remove and destroy old cucurbit vines and residues, since this is where the fungus survives the winter. Rotation of crops in the garden is also important to minimize disease. Purchase seeds from a reputable source, since the disease can be seed-borne. If the disease is severe enough to warrant the use of fungicides, several are available for home garden use (Table 2).

Alternaria Leaf Spot

This disease is caused by the fungus *Alternaria cucumerina* and causes small, circular, tan spots to appear on the leaves, which later enlarge to 1½ inches or more in diameter. Definite concentric rings and margins appear that give the area a "bull's eye" appearance. Leaf drop can be severe. Bright sunshine, frequent dews or rain, and temperatures between 60 and 90 °F favor disease development.

Prevention & Treatment: Remove and destroy all infected plant residues at the end of the gardening season, since the fungus survives the winter on plant residue. The disease is easily spread by tools, wind, splashing water or insects. Rotation of crops and seed treatment will also help. When this disease occurs consistently in the garden, a preventative fungicide program can be followed (Table 2).

Cercospora Leaf Spot

Cercospora leaf spot is generally limited to the leaves but can affect petioles and stems in a favorable environment. Dark spots are usually first seen on older leaves and are circular to irregularly shaped, with lighter colored centers and darker margins. Tissue surrounding the spots often yellows. Centers of the spots may drop out, leaving holes in the leaves. As lesions expand they often merge, blighting entire leaves. Lesions don't form on the fruit, but if disease is severe enough for defoliation to occur, fruit may be smaller and of a lesser quality.

The fungus overwinters in crop debris and on weeds in the cucurbit family. The spores can be wind-blown or carried in splashing water. Free water on leaf surfaces is required for infection, which is favored by temperatures of 79 - 90 degrees F. The disease progresses rapidly at these temperatures and infections of new leaves can occur every 7 - 10 days.

Prevention & Treatment: To manage this disease, avoid overhead irrigation if possible, or water in the early morning hours when leaves are already wet with dew. Remove and destroy old cucurbit vines and residues, since this is where the fungus survives the winter. Keep the garden well weeded to prevent a buildup of humidity in the canopy and take special precautions to destroy weeds in the cucurbit family, such as bur cucumber and coyote gourd. Rotate away from cucurbits (melons, squash and cucumber) for 2 - 3 years, if possible. If the disease is severe enough to warrant the use of fungicides, several are available for home garden use (Table 2).

Fusarium Wilt

This disease is caused by the fungus, *Fusarium oxysporum* forma specialis *melonis*. It attacks the roots of the plant and moves into the stems. Older, established plants that are infected become stunted, wilt and eventually die. Wilt symptoms develop in one or more laterals, usually starting at the vine tips. A white mold may develop on dead vines. Affected seedlings will damp-off (rot at the soil line), wilt and die. On runners near the crown of the plant, brown streaks may be evident. Roots will have a honey brown discoloration inside.

Prevention & Treatment: This fungus can survive in the soil for many years. Planting resistant varieties (Table 1) is critical in preventing this disease. Careful water management is also important in minimizing root stress. There are no chemical treatments available for control.

Viruses

There are several common viruses that can affect cucurbits, including *Cucumber mosaic virus* (CMV) and *Watermelon mosaic virus* (WMV). Infected plants may be stunted or have leaves that are mottled, crinkled, or a light green color. Fruits may be irregular in shape, mottled or warty. Various insects transmit these viruses.

Prevention & Treatment: There are no chemicals available to kill viruses. Chemical control of the insects that spread the viruses may minimize the disease. This control method is difficult, because infection occurs immediately after an insect feeds, and insects migrate freely between plants. A good control strategy is to maintain healthy and vigorous plants, plant recommended varieties and monitor your garden for any unusual symptoms as they occur. Keep the area clear of weeds that can harbor insects. Choosing separate areas for early and late plantings may help to reduce virus severity in the late plantings.



Cucumber mosaic virus (CMV) on squash.
Division of Plant Industry Archive, Florida Department of
Agriculture and Consumer Services, www.insectimages.org

Blossom-End Rot

Blossom-end rot appears as a dark-colored dry rot on the end of the fruit where the flower was. The problem is caused by a lack of calcium in the developing fruit. It is an indication that calcium is lacking in the soil or that the plant does not have the

ability to take up enough calcium. When growth is rapid, not enough calcium may be delivered to the blossom end of the developing fruit.

Prevention & Treatment: Help prevent blossom-end rot by having your soil tested through your local county Extension office before planting, and lime according to recommendations, usually to pH 6.5. Always maintain an adequate supply of moisture, especially during fruit growth. Mulch plants to prevent rapid drying of the soil and water plants during extended dry periods. Apply 1 to 2 pounds of gypsum per 100 square feet as a supplement to liming on calcium deficient soil. Lime and/or gypsum should be applied before planting.

Do not over-fertilize plants with excessive nitrogen or potassium. Excess amounts of these nutrients reduce the uptake of calcium in the plant. When plants are dark green, extra fertilizer should not be applied.



Blossom end rot on watermelon. Clemson University - USDA Cooperative Extension Slide Series, Bugwood.org

Irrigate with 1 inch of irrigation water per week if there is inadequate rainfall. Cultivation near crops should be shallow to avoid root injury. Removing fruit with symptoms is recommended.

Table 1. Some Disease-Resistant Varieties for South Carolina.

Cantaloupe	
Ambrosia	Resistant to some powdery mildews
Mission	Tolerant to downy and powdery mildew
Cordele	Resistant to some powdery mildews and Fusarium wilt
Earlidew	Resistant to Fusarium wilt
Cucumber, slicing	
Ashley	Resistant to some powdery mildews and downy mildew
Burpless	Resistant to some powdery mildews
Poinsett8 76	Resistant to downy mildew, powdery mildew, angular leaf spot, anthracnose and scab
Supersett	Resistant to downy mildew
Dasher II	Resistant to powdery mildew, angular leaf spot, anthracnose, scab and cucumber mosaic virus
Cucumber, pickling	
Regal	Resistant to downy mildew, powdery mildew, angular leaf spot, anthracnose, scab and cucumber mosaic virus
Squash, summer	
Multipik	This yellow-fruited variety does not show greening of fruit caused by viruses (CMV, WMV)

Watermelon	
Charleston Gray Crimson Sweet Jubilee II Starbrite Tiger Baby	All of these varieties have some resistance to anthracnose and Fusarium wilt.

Table 2. Preventative Fungicide Treatments for Cucurbit Diseases.

Vegetable	Disease	Fungicide
Cantaloupe	Downy mildew	chlorothalonil or mancozeb ¹ or copper fungicide ⁴
	Powdery mildew	sulfur ² or chlorothalonil or horticultural oil + baking soda ³
	Gummy stem blight	chlorothalonil or mancozeb ¹
	Alternaria leaf spot	chlorothalonil or mancozeb ¹
	Anthracnose	chlorothalonil or mancozeb ¹
	Bacterial wilt	no chemical control
Cucumber	Anthracnose	chlorothalonil or mancozeb ¹
	Downy mildew	chlorothalonil or mancozeb ¹ or copper fungicide ⁴
	Powdery mildew	sulfur ² or chlorothalonil or horticultural oil + baking soda ³
	Gummy stem blight	chlorothalonil or mancozeb ¹
	Alternaria leaf spot	chlorothalonil or mancozeb ¹ or copper fungicide ⁴
	Scab	mancozeb ¹ or chlorothalonil
	Cercospora leaf spot	chlorothalonil or mancozeb ¹
Squash	Anthracnose	chlorothalonil or mancozeb ¹ or copper fungicide ⁴
	Downy mildew	chlorothalonil or mancozeb ¹ or fixed copper ⁴
	Powdery mildew	sulfur ² or chlorothalonil or horticultural oil + baking soda ³
	Gummy stem blight	chlorothalonil
Watermelon	Bacterial leaf spots or fruit blotch	mancozeb ¹ plus fixed copper ⁴
	Anthracnose	mancozeb ¹ or chlorothalonil ⁵
	Gummy stem blight & black rot (of fruit)	mancozeb ¹ or chlorothalonil ⁵
	Cercospora leaf spot	mancozeb ¹ or chlorothalonil ⁵
	Powdery mildew	sulfur ² or chlorothalonil ⁵ or mancozeb ¹
	Downy mildew	mancozeb ¹ or fixed copper ⁴
All Vegetables	Postharvest rots	Sodium hypochlorite (5.25% commercial bleach). Mix 1 teaspoon of bleach in 1 gallon of water. Dip fruit into solution and rinse. Replenish bleach periodically as needed.

¹ Wait 5 days after spraying before harvest.

² Do not apply sulfur when temperatures are above 85 °F. Sulfur should be used on muskmelons very carefully because some varieties will be damaged by this chemical.

³ 3 tablespoons of horticultural oil in a gallon of water and add 3 tablespoons of baking soda. Never apply an oil spray within 2 weeks of a sulfur spray, and do not apply oils when temperatures are above 90 °F or to drought-stressed plants.

⁴ Fixed copper does not control downy mildew nearly as well as the other fungicides listed. Caution is advised, as copper can be phytotoxic to cucurbits, if applied at temperatures above 90 °F.

⁵ Spray at first appearance and then at 7-14 day intervals. Avoid late-season application after plants have reached full maturity and fruit have begun to size, or cover the watermelon fruit to prevent contact with fungicide, or use mancozeb. Do not mix chlorothalonil with a copper fungicide in the sprayer.

Table 3. Examples of Fungicides Labeled for use in Home Vegetable Gardens on Cucurbits.

Fungicide	Examples of Brands & Products
Chlorothalonil	Ortho MAX Garden Disease Control (29.6%) GardenTech Daconil Fungicide Concentrate (29.6%) Bonide Fungonil Concentrate (29.6%); & RTU ¹ Hi-Yield Vegetable, Flower, Fruit & Ornamental Fungicide (12.5%) Southern Ag Liquid Ornamental & Vegetable Fungicide (12.5%) Tiger Brand Daconil (12.5%) Ferti-lome Broad Spectrum Landscape & Garden Fungicide (12.5%); & RTU ¹ Monterey Fruit Tree, Vegetable & Ornamental Fungicide (29.6%)
Copper fungicides	Bonide Copper Fungicide Spray or Dust (wettable powder with copper sulfate) Southern Ag Liquid Copper Fungicide Concentrate Monterey Liqui-Cop Copper Fungicide Garden Spray Concentrate; & RTS ² Bonide Liquid Copper Concentrate (a copper soap) Camelot Fungicide/ Bactericide Concentrate (a copper soap) Natural Guard Copper Soap Liquid Fungicide Conc.; & RTU ¹ Bonide Liquid Copper Fungicide RTU ¹ (a copper soap)
Horticultural oil	Bonide All Seasons Spray Oil Concentrate; & RTU ¹ Ferti-lome Horticultural Oil Spray Concentrate; & RTS ² Monterey Horticultural Oil Concentrate; & RTS ² Southern Ag Parafine Horticultural Oil
Mancozeb	Bonide Mancozeb Flowable with Zinc Southern Ag Dithane M-45 Concentrate
Sulfur	Bonide Sulfur Plant Fungicide (dust or spray) Ferti-lome Dusting Sulfur (also wettable for spray) Hi-Yield Wettable Dusting Sulfur Safer Brand Garden Fungicide Concentrate Southern Ag Wettable or Dusting Sulfur
¹ RTU=Ready to Use (a small pre-mixed spray bottle) ² RTS=Ready to Spray (a hose-end spray bottle)	

Pesticides updated by Joey Williamson, HGIC Horticulture Extension Agent, Clemson University, 10/16. Revised by Joey Williamson, HGIC Horticulture Extension Agent 03/14. Originally prepared by Nancy Doubrava, HGIC Horticulture Specialist, James H. Blake, Extension Plant Pathologist, Clemson University, and Anthony P. Keinath, Vegetable Pathologist, Clemson University Coastal REC. New 09/99. Images added by Zachary Boone Snipes 07/15.

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