

2006 Florida Plant Disease Management Guide: Pepper ¹

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Specific Common Diseases

Anthracnose (*Colletotrichum acutatum*, *C. gloeosporioides*, *Colletotrichum* spp.)

Symptoms: Anthracnose or ripe rot is an increasingly important disease of pepper. Damage appears primarily on fruit. Fruit may be infected by spores of the fungus at any time of development, by symptoms usually expressed on mature fruit. Symptoms first appear as small, water-soaked lesions on fruit. These can rapidly develop into larger sunken areas. A dark growth of the fungus may be visible in these lesions, with tan to pink concentric circles of spores evident in some cases. Occasionally, leaf spots and stem dieback may occur.

Cultural Controls: Use pathogen-free seed. Avoid overhead irrigation whenever possible. Avoid injury to fruit. Crop rotation may be important in reducing primary inoculum.

Chemical Controls: See PPP-6.

Bacterial Spot (*Xanthomonas axonopodis* pv. *vesicatoria*)

Symptoms: Symptoms begin on leaves as small, water-soaked spots. These become up to 1/4 inch in diameter, turn dark brown and appear greasy. Scabby lesions may appear on the fruit. During periods of high rainfall or humidity, spots on leaves may coalesce causing "blight" symptoms and abscission. Bacterial spot can be a seedborne disease and can spread rapidly in the transplant bed.

Cultural Controls: Transplant production should be carefully monitored for disease occurrence. Do not use infected plants for field planting and do not work transplants when they are wet. Maintain a preventative bactericide schedule in the transplant bed as well as the field. Use cultivars with resistance to specific races of *Xanthomonas axonopodis* pv. *vesicatoria* known to occur in the production area. Avoid unnecessary foliar or soil applications of magnesium. See Plant Pathology Fact Sheet No. 3.

Chemical Controls: Maintain a preventative bactericide schedule in transplant production as well as the field. See PPP-6.

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Damping-Off (*Pythium* spp. and *Rhizoctonia solani*)

Symptoms: Pre-emergence damping-off or seedling death may occur as a result of soilborne fungal pathogens. Seedling plants will exhibit a necrotic collapse of the hypocotyl and root system when infected. Irregular areas of seedlings may be affected in the transplant bed corresponding to inadequate soil fumigation or subsequent contamination of fumigated soil by run-off water or soil. In our experience, damping-off problems commonly occurring in early fall crops in southern Florida are almost exclusively caused by *Pythium* spp.

Cultural Controls: In the transplant bed, avoid planting in low, poorly drained areas or into land previously in peppers. Employ multi-purpose soil fumigation for vigorous transplant production. In the field, avoid setting into land with residual, undecomposed plant debris. Do not set unthrifty plants. See Plant Pathology Fact Sheet No. 1.

Chemical Controls: See PPP-6.

Bacterial Soft Rot (*Erwinia carotovora* pv. *carotovora*)

Symptoms: This disease is characterized by soft, often "mushy" rot of the pepper fruit that occurs primarily after harvest and during shipment. The rot often occurs on the stem of the fruit, and advances from that point into the stem end of the fruit. This decay can progress quickly in transit. Field symptoms are quite obvious as fruit soften and sag from the pedicel like a balloon filled with water. Softened areas usually are gray in color. The invasion by numerous organisms will confer a characteristically foul odor to infected fruit.

Cultural Controls: In the field, maintain adequate insect and disease control. Insects can move the soft rot bacteria fruit to fruit during feeding. Severe outbreaks of foliar diseases can expose fruit to sunscald injury and to subsequent soft rot. Avoid harvesting while plants are wet. Do not let harvested fruit set in the sun. Avoid fruit bruising and wounding.

In the packinghouse, avoid washing fruit whenever possible. When fruit must be washed, use chlorinated water. All fruit should be dried (forced air) prior to packing to lessen likelihood of soft rot. Maintain good quality control in the culling lines. See Plant Pathology Fact Sheet No. 12.

Chemical Controls: See PPP-6.

Frogeye Spot (*Cercospora capsici*)

Symptoms: Lesions are roughly circular leaf spots (approximately 1/4 inch in diameter) with light tan to white centers and narrow dark borders. Leaf lesions may often appear zonate. Heavy infection may cause abscission of leaves and subsequently reduce yield. See Plant Pathology Circular No. 946.

Chemical Controls: Apply fungicide in the transplant bed at first disease appearance and in the field as disease severity warrants. This disease is more important in northern Florida. See PPP-6.

Gray Leaf Spot (*Stemphylium solani*)

Symptoms: More or less circular spots on leaves, the spots are at first brown, later turning light tan to white with sunken centers, and reddish-brown margins. Spots can also appear on stems, petioles and fruit pedicels, but have not been observed on fruit or flower petals. This disease is a rare occurrence in Florida.

Chemical Controls: See PPP-6.

Phytophthora Blight (*Phytophthora capsici*)

Symptoms: This is one of the most common and serious diseases of pepper in Florida. This disease can affect all parts of the pepper plant. It causes a seedling death as well as a root rot, stem canker, leaf blight, and fruit rot in older plants. Stem infection at the soil line is common. Affected plants exhibit sudden wilting and death. The initial canker is dark green and water-soaked but turns brown as the plant dies.

When mature plants are affected, individual branches become infected at forks killing whole branches. Individually infected leaves exhibit small circular to irregular leaf spots that appear scalded.

The affected areas are dry and bleached to a light tan color with a papery consistency.

Fruit are usually infected from the stem end first. A progressive margin of water-soaked tissue proceeds from the pedicel into the fruit. The fruit surface will shrivel and during moist conditions may exhibit the white fungal growth of the causal fungus.

Cultural Controls: Avoid low, wet fields for pepper planting. Pump down fields rapidly after heavy rains. Practice crop rotation.

Chemical Controls: See PPP-6.

Sclerotinia Stem Rot (*Sclerotinia sclerotiorum*)

Symptoms: This disease can be damaging some years, especially in cool, damp winters in fields near or following susceptible crops. The causal fungus infects the stem at the soil line, individual petioles of leaves, and occasionally fruit close to the soil surface. Stem infections frequently girdle the stem causing plant wilt and death. When weather is moist, the white mycelium will often grow up the stem surface several inches above ground.

Petiole or bud infections proceed rapidly downward in the plant. Entire branches may be girdled in this manner. Fruit infected directly from the soil surface or downward through the pedicel, rot quickly into a watery mass. The fungus survives as sclerotia formed in stems and lesions associated with diseased fruit. These sclerotia are black, irregular in size (1/8"-3/4"), and highly resistant to environmental conditions when in plant debris or soil.

Cultural Controls: Avoid rotations involving susceptible crops such as cabbage, celery, lettuce, potatoes or tomatoes. Deep plow fields with a previous history of this fungus to bury fallen sclerotia. Fields may be flooded with several inches of water for six weeks in the off-season in order to kill sclerotia. An emergency exemption for use of thiophanate methyl on pepper is currently in effect. See Plant Pathology Fact Sheet No. 22.

Chemical Controls: See PPP-6.

Southern Blight (*Sclerotium rolfsii*)

Symptoms: This is a warm, humid-weather disease. Infected plants exhibit a progressive wilt due to root and stem invasion prior to death. During moist weather, a white collar of coarse white fungal mycelium can be observed on the stem at the soil line. Numerous white nodules form on this mycelium. These structures (sclerotia) mature to a tan color, and are the size of mustard seed. They provide an overseasoning mechanism for this fungus as they are incorporated into the soil.

Cultural Controls: Rotate to a grass crop in fields with a high infestation of this fungus. Deep plow infested crop debris to place the sclerotia below the root zone of the next crop. Wind, water, or equipment that can move soil can spread this fungus in the field. See Plant Pathology Fact Sheet No. 4.

Chemical Controls: See PPP-6.

Viruses (*Cucumber mosaic, Pepper mottle, Potato Y, Tobacco etch, Tobacco mosaic, Tomato Spotted Wilt*)

Symptoms: It is difficult to distinguish single or multiple virus infections in the field. Most of these viruses induce degrees of mosaic, mottle, vein banding, and plant stunting. Malformation, leaf cupping, and fruit distortion may also be encountered. Accurate diagnosis is dependent on laboratory tests involving serology or viral inclusion examination.

Tobacco mosaic virus is commonly mechanically transmitted during transplant production, harvesting, and setting. Pepper mottle, potato Y, and tobacco etch are primarily transmitted by aphids during feeding.

Tomato spotted wilt virus (TSWV) is transmitted by thrips. Western flower thrips is the important vector in north Florida for TSWV. Minute pirate bug (*Orius insidiosus*) is an effective predator that suppressed populations of western flower thrips in north Florida.

These viruses are known to survive in numerous weed hosts such as ground cherries (*Physalis* spp.), nightshades (*Solanum* spp.) common groundsel (*Senecio* sp.), wild tobacco (*Nicotiana* sp.), toadflax (*Linaria* sp.), sicklepod (*Cassia* sp.), and jimson weed

(*Datura* sp.).

Cultural Controls For:

Tobacco Mosaic Virus

Use resistant varieties. Workers handling pepper plants should wash hands with strong soap and water or 70% alcohol before handling plants. This is most important for workers who use tobacco. This will assist in controlling *tobacco mosaic virus*.

Pepper Mottle, Potato Y, Tobacco Etch

To reduce insect transmission of viruses (*tobacco etch virus*, *potato Y virus*, and *cucumber mosaic virus* from wild host plants (nightshade, ground cherry and others) several practices are suggested.

1. Eradicate wild host plants in fence rows and on ditch banks during seasons when crops are not growing.
2. Destroy old infected crops well before planting subsequent crops along side them.
3. Plant barrier crops around pepper fields. A 50-foot strip of a non-susceptible crop (corn, sugarcane, etc.) tends to trap insects flying in until they become non-infective.
4. Spray barrier crop with suitable insecticide at least weekly to reduce population of insect vectors.
5. JMS Stylet Oil has received a Florida state label for control of *tobacco etch*, *potato Y*, and *cucumber mosaic viruses* on pepper. This product interferes with the acquisition and/or transmission of a virus by the aphid in the field. Application requirements are highly specific and must be followed precisely to achieve control. See section on chemical control.

Tomato spotted wilt

1. Monitor crops for thrips, especially vector thrips to time insecticide applications.
2. Locate fields as far away as possible from very susceptible crops such as tomato, peanut and tobacco.

Chemical Controls: See PPP-6. For TSW management, use insecticides specific to vector thrips and not effective on the thrips predator *Orius* sp.

Wet Rot (*Choanephora cucurbitarum*)

Symptoms: This disease produces a blossom blight as well as a fruit rot stage and occasionally a leaf blight. Blossoms exhibit a lack of turgidity as petals begin to wilt. Stiff whisker-like strands of the causal fungus, topped with black heads (sporangia) grow off the infected blossoms causing a blossom drop. Young fruit may become infected, soften and abort with the same fungal growth apparent on the fruit.

Cultural Controls: Plant crop to the proper spacing to maintain adequate air circulation. Use of fungicides to control other disease will aid in control of wet rot.

Chemical Controls: There are no materials labeled for this disease on this crop at this time.