



Pepper Production Guide for Florida: Disease Control¹

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Peppers are subject to attack from many disease-causing organisms including fungi, bacteria, and viruses. In addition, many physiological disorders, such as blossom-end rot can cause serious losses in pepper crops. Information on specific diseases and disorders is presented below. For more specific control information, such as pesticide recommendations, consult the Disease Management Guide in hard copy or electronic format through the County Extension Offices. In addition, control information can be found in the Florida Cooperative Extension Service Publication SP 170 "Commercial Vegetable Production Guide for Florida."

Specific Diseases and Disorders

Damping-off. Certain fungi usually present in the soil, such as *Rhizoctonia solani* and *Pythium* species, rot seed or damage seedlings. Plants attacked shrivel at the ground line and usually die. The disease is worse during damp conditions and can be serious in transplant production houses.

Losses from the diseases can be reduced by using fungicide-treated seed. In the transplant house, the soil should be fumigated and can be wetted with approved fungicides after seeding. Fumigation in the field also helps reduce this disease. For more details on the control of these organisms, see Plant Pathology Report No. 25.

Bacterial spot. This bacterial disease is the most prevalent disease of peppers in the field. Small, yellow, slightly raised spots appear on young leaves. On older leaves, the spots are dark, water-soaked, and not noticeably raised. The spots can enlarge to 1/8 to 1/4 inch and become brown with a dark margin. Infected leaves with numerous spots become distorted, turn yellow, and fall. Seedlings lose lower leaves with only a few leaves at the top remaining. On the fruit, the small, blisterlike spots are nearly circular and may be one-fourth inch in diameter. During damp weather, secondary organisms may enter these wounds and cause fruit to rot.

Bacteria can be seedborne and can survive between crops in plant refuse. Plants infected in the seedling house can carry the disease to the fields. Severe outbreaks can occur during warm, moist weather, especially when heavy rain damages the plants and spreads the bacterium.

Control of the disease starts with good sanitation practices in the plant house and field. Removal of volunteer tomato and pepper plants, and strict control of the disease in the plant house, are two of the most effective means of reducing problems in the field. The use of varieties with resistance to the predominant races of this organism is an important approach to disease control. Handle the plants only when they are dry to avoid spreading the organism.

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Chemical means of control with approved bactericides is possible, provided proper amounts of water and proper timing are used. Premixing of copper and maneb is not necessary, and the spray pressure need not be higher than 100 psi. The spray program should commence when the first bacterial spot lesions are noticed or when rainy periods begin.

Frogeye spot. Sometimes called *Cercospora* spot, this disease is distinguished by large, circular or oblong leaf lesions which have light gray centers and dark brown margins. Field infection can often be traced to infected seedlings grown from contaminated seed.

Clean seed is the first course of action against the disease. In the field and seedling houses, labeled fungicides can be used.

Southern blight. This fungal disease caused by *Sclerotium rolfsii* attacks the stem, girdling it at the ground. The plant wilts and a white mat of mycelium is noticeable on the infected area, on which there may be embedded, small, brown or salmon-colored bodies (sclerotia). The fungus persists in the soil as sclerotia for many years and is most active in poorly drained fields, during hot weather.

Control measures should include crop rotation, since the resting bodies are difficult to control by chemicals or fumigation. Locate seedbeds on new land or where southern blight has never occurred.

Phytophthora blight. The infected plant is girdled at the soil line, causing sudden wilt and death. A diseased stem will be dark green or black and will shrivel. All parts of the plant can be attacked. The fruit show water-soaked areas that can become covered with white mycelium during wet periods. The use of disease-free transplants and rotation are important components of a control program. Fumigation and certain fungicides may help reduce the levels of the organism. Avoid planting in low, poorly drained fields.

Erwinia soft rot. Caused by *Erwinia carotovora* subsp. *carotovora*, this disease is a mushy, wet fruit rot occurring primarily after harvest and during shipment. In the field, the fruit soften and sag from the plant. The rot is accompanied by a foul odor. Control in the field centers around reducing fruit damage from any source, especially insects. Avoid bruising the fruit during harvest. In the packinghouse, use chlorinated water for washing and pack only unblemished and sound fruits.

Gray leafspot. This disease, caused by *Stemphylium solani*, appears as circular spots on leaves. The spots are at first brown, later turning tan, and then white, with sunken centers and reddish margins. The symptoms can appear on stems and pedicels but have not been observed on fruit. This disease is not very common in Florida but can be controlled by foliar fungicides.

Sclerotinia stem rot. The causal fungus, *Sclerotinia sclerotiorum*, attacks the plant near the soil, or individual leaf petioles, or occasionally, fruit near the ground. The disease is worse during moist weather periods when white mycelium grows over stems several inches above ground. Fruit can rot into a watery mass. The fungus survives as black bodies (sclerotia) which can be found in and around infected plant parts. Control is similar to that for southern blight.

Wet rot. The causal organism, *Choanephora cucurbitarum*, causes blossom blight in addition to fruit rot. The blossoms wilt and stiff, whisker-like strands of the fungus with black heads (sporangia) cover the infected area. Young fruits also may be infected.

To control the disease, maintain proper plant spacing for adequate air circulation.

Viruses. Several viruses, including pepper mottle, potato Y, tobacco etch, and tobacco mosaic, can infect peppers. It is difficult to distinguish single or multiple infections in the field. Most viruses produce various degrees of leaf mosaics, mottling, plant stunting, and malformation of leaves and fruit. Accurate diagnosis must be done in a laboratory. Tobacco mosaic is commonly transmitted mechanically during transplanting and harvesting. The remaining viruses are transmitted by aphid vectors. These viruses are known to survive in several weeds, including ground cherry, nightshades, common groundsel, wild tobacco, toadflax, sicklepod, and jimson weed.

To control tobacco mosaic, use resistant varieties where possible and have workers who handle plants wash with strong soap or 70 percent ethyl alcohol, especially those who use tobacco products. To reduce insect transmission of the other viruses, eradicate weed hosts and destroy infected crops. Sprays of an oil (JMS® stylet oil) have been approved in Florida for certain viruses. The oil interferes with the feeding by the aphid, thus inhibiting its ability to spread the virus.

Blossom-end rot. A common problem of peppers, this disorder is not caused by bacteria or fungi. Blossom-end rot is related to low-water stress and calcium deficiency, often in association.

To control blossom-end rot, maintain adequate soil moisture and calcium levels. Avoid late season cultivation which damages root systems and reduces the ability to obtain calcium. Calcium moves in the water stream in the plant, so it does not move preferentially to fruits, but to leaves. Excessive nitrogen can lead to excessive vegetation and encourage low calcium transport to fruits.

Sunscald. Sun burning of pepper fruits occurs when they are exposed for even short periods to direct sunlight. The first evidence is a light-colored area that is soft and slightly wrinkled. The area may cover as much as one-third of the fruit. The affected area dries and becomes sunken, having a white appearance. Such spots are commonly invaded by various fungi that grow on the dead tissue, often turning the area black with spores and often leading to rot.

To control sunscald, keep the plants vigorous with adequate foliage coverage of fruit. To accomplish this, select cultivars that produce a sufficient canopy, and maintain adequate soil moisture and fertilizer levels in addition to proper foliar disease control practices.