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Common Tomato Diseases in Georgia

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Buckeye Rot

Phytophthora parasitica, P. capsici, P. drechsleri

Symptoms:

The first symptoms appear as brown spots and are usually found on fruit that are in contact with the soil. Both green and ripe fruit are susceptible. As the lesion advances, a concentric ring pattern becomes obvious. The concentric rings may be confused with late blight; however, the late blight lesions become rough and sunken, whereas buckeye rot lesions are not sharply defined and may cover more than half of the fruit. Under moist conditions, the lesions rapidly decay and a white cottony growth will appear. There are no foliar symptoms.

Favorable Conditions:

Buckeye rot enjoys prolonged periods of warm, wet weather. Optimal temperatures for development are 65° F to 80° F, and spores can spread by splashing water and rain. Most damage occurs at the soil line where conditions are most favorable. Soil saturation for five hours or longer can induce infection.

Control:

Properly drain and amend soils should they become compacted or heavy. Monitor irrigation, and initiate practices such as staking or mulching. Rotate with crops outside of the tomato family.

Early Blight

Alternaria solani

Symptoms:

Early blight can occur on all parts of the plant except the roots, and can cause injury during any stage of plant development. The older foliage usually shows the first symptoms as small brown to black lesions. Often, a yellow halo surrounds the spot. As the spots enlarge, concentric rings may become apparent. Late in the season, lesions multiply and the plants may defoliate.

Stem lesions are small, dark, and slightly sunken. Stem lesions will grow to form concentric rings and will eventually girdle the plants.

Fruit can also be infected in either the green or ripe stage. Lesions can advance the entire fruit and concentric rings are apparent. The lesions are covered with a black, velvety mass (Figure 1).

Favorable Conditions:

Early blight can survive on crops, infected debris and seed. Infection occurs during rainy, warm conditions. Although 75° F to 84° F is optimal, the disease may be active at higher temperatures. Early blight can penetrate through wounds or directly through uninjured cuticle. Heavy dews and rains are also desirable for the disease.

Control:

Ensure healthy and resistant plants. Fertilize properly as high soil fertility reduces the severity of early blight. Sterilize soils if reusing planting beds.

Fusarium Wilt

Fusarium oxysporum

Symptoms:

On younger plants, the older leaves will curve downward and droop. The bases of the affected stems enlarge, and the vascular system becomes brown. On older plants, symptoms are apparent from blossoming to fruit maturation. The first symptom is chlorosis of the older leaves, usually on only one side of the plant. A browning of the vascular tissue extends up the stem while the pith remains healthy (Figures 2a, 2b). Gradually, the yellowing affects all of the plant, causing it to wilt during hot temperatures. Eventually the plants will die.

Favorable Conditions:
Fusarium wilt does well in warm weather (84° F and higher) with sandy, acidic soils. The pathogen lives in the soil and can remain there for years while infecting injured roots. The disease favors plants preconditioned with low nitrogen, high potassium, low soil pH and low light intensity. Micronutrients and phosphorus along with nitrogen increase the virulence of Fusarium. The disease is transmitted by seed, soil, stakes and transplants. Wind and water will transmit the disease locally.

Control:
Use resistant cultivars and pasteurize infested soil. Ensure soil pH of 6.5 to 7.0. Fertilize with nitrate nitrogen and stop movement of infested tools, vehicles, stakes, etc. Practice a good crop rotation plan.

Septoria Leaf Spot
Septoria lycopersici

Symptoms:
The first symptoms usually appear on the lower leaves after the first fruit sets. The spots are circular with tan to gray centers and dark margins. Often, the gray centers will have tiny black beads. Lesions will also produce a narrow yellow halo. The stem, petiole and calyx will have smaller lesions. If the infection is severe, leaves will turn brown and wither. Fruit is not infected.

Favorable Conditions:
Septoria survives on infected plant debris, weed hosts, gardening equipment and seed. The disease is spread by rain and overhead irrigation. Movement by people when the foliage is wet can also spread the pathogen, which penetrates stomates at temperatures of 68° F to 77° F. High humidity and extended leaf wetness are also beneficial for disease.

Control:
Rotate crops and control weeds. Ensure removal of all plant debris and proper irrigation intervals. Improve air circulation by staking plants, and keep out of the garden when the foliage is wet.

Southern Blight
Sclerotium rolfsii

Symptoms:
Evidence of southern blight can be found on plant parts in, on or near the soil. Brown or black lesions of the stem at the soil line is the most common symptom. The entire plant will wilt as the lesion girdles the stem. Under moist conditions, a white cottony growth develops on the lesion and grows along the stem. After a few days, tan or brown seed-like structures will appear on the white growth (Figure 3). The disease will then attack fruit in contact with infested soil and appear slightly yellow with a ruptured outer skin. Often the lesion is soft and star-shaped. The fruit will disintegrate three to four days later and a white growth will fill the cavity. Foliage in contact with the soil may have brown lesions.

Favorable Conditions:
The tan to brown seed-like structures mentioned above enable the disease to survive for many years in soil and plant debris. The pathogen is favored by moist conditions and warm weather (86° F to 95° F).

Control:
Control is difficult when the pathogen is present and weather conditions are conducive for infection. Rotate crops and deep turn soil to bury survival structures. High calcium and ammonium fertilizers provide some suppression. Using plastic as a physical barrier may protect stems.

White Mold
Sclerotinia sclerotiorum

Symptoms:
Symptoms of white mold usually begin to appear when tomatoes start to flower, and infection begins between leaf axils and stems where fallen petals are lodged. Stems become soft and turn bleached to light gray. A cottony white growth (mycelia) is apparent during moist, cool weather. An elongated seed-like structure (sclerotia) will develop on the white growth, as well as inside the stem.

The pathogen can also attack at the soil line. Once infected, the mycelium causes the disease to spread to plants that are in close proximity to each other. In the garden, severe infection causes large areas to die in a circular pattern.

Fruit symptoms include an overall gray color and a rapid deterioration. The sclerotium mentioned previously can be found around the calyx.

Favorable Conditions:
Moist, cool conditions with high humidity and free moisture favor white mold development. Optimal temperatures are 59° F to 70° F. Primary infection occurs by wind, and secondary infection occurs through sclerotium and mycelium.

Control:
Increase air circulation by staking and decrease excessive water and prolonged leaf wetness. Sterilize soil if used in container beds or purchase new soil.

Bacterial Spot

Xanthomonas campestris

Symptoms:

This disease affects stems, petioles, leaves and fruit. Spots are generally circular and brown and become water-soaked during rainy periods or heavy dews. Spots remain small and may be confused with early blight. There are no concentric rings with bacterial spot, and there is no halo around bacterial spot as there is with early blight. When infection is severe, the foliage becomes chlorotic and epinastic. Plants may appear scorched as dead leaves remain on the plant.

Symptoms on fruit are tiny raised blisters (Figure 4). As the lesions enlarge, they resemble a scab and may be sunken in the middle.

Favorable Conditions;

Bacterial spot can survive on infected plants, plant debris and seed. Development occurs with free moisture at 75° F to 86° F. The disease is spread by rain, workers and tools. Penetration occurs through stomates and wounds.

Control:

Rotate crops and field sites. Remove any plant debris and eliminate potential hosts. Ensure healthy transplants or disease-free seeds.

Tomato Spotted Wilt Virus

Tospovirus

Symptoms:

Young leaves show symptoms by turning bronze and having many small, dark spots. Tips may die back and stems may be streaked. Stunting usually occurs with drooping leaves and wilting. If infected early, no fruit will be produced, and if fruit is produced, there will be symptoms of chlorotic ring spots (Figure 5). The concentric rings on green fruit are faint, becoming more obvious as the fruit ripens (Figures 6, 7).

Favorable Conditions:

Since this virus has more than 800 hosts, the optimal conditions for TSWV are weedy fields with a high thrips population. (Thrips are an insect that carry the disease from plant to plant as they feed.)

Control:

Once infection has occurred, plants must be removed. Control weed populations and use reflective mulches to repel thrips. Insecticides are ineffective against thrips.

References:

American Phytopathological Association, www.apsnet.org
Clemson University, www.clemson.edu
Cornell University, www.cornell.edu
Rutgers University, www.rutgers.edu
University of Georgia, www.uga.edu
Virginia Tech, www.vt.edu
The University of Florida, www.plaza.ufl.edu
The World Vegetable Center, www.avrdc.org

Figure 1.
Round lesions containing concentric rings

Figure 2a.
Yellowing caused by Fusarium wilt

Figure 2b.
Vascular discoloration caused by Fusarium wilt

Figure 3.
White, cottony growth on stem and seed-like structures on fruit

Figure 4.
Small spots on leaves that are irregularly shaped and surrounded by a yellow halo

Photos courtesy of David Langston, UGA Plant Pathologist

Figure 5.
Foliar symptoms of spotted wilt

Figure 6.
Fruit symptoms from TSWV

Figure 7.
Fruit symptoms from TSWV

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