Common Fungal Tomato Diseases in Colorado

Quick Facts……

- Common fungal diseases of tomato are Early Blight, Septoria Leaf Spot, and Fusarium or Verticillium Wilt.
- Proper watering and fertilization can help keep the plant growing vigorously and reduce potential disease issues.
- Crop rotation and proper plant spacing can also help alleviate potential disease issues.

Tomatoes are among the most popular garden vegetables to grow in Colorado. Although tomatoes are susceptible to problems caused by deficiency of nutrients, fungal, bacterial or viral diseases and insects, good cultural care and garden sanitation can alleviate many of these problems.

Contrary to its name, Early Blight on tomatoes is generally a late summer problem. Early Blight is caused by the fungi, *Alternaria solani* or *Alternaria tomatophila*. Symptoms on the plant start with the lower leaves turning yellow, followed by target-like brown lesions on the leaves. Often this pathogen appears to 'move up' the plant because water splashed on infected lower leaves transports spores to upper leaves.

High soil fertility can reduce the severity of Early Blight. Soil tests before planting to determine nutrient levels, especially nitrogen, are important so fertilization amounts can be calculated correctly. Current recommendations are to fertilize with nitrogen at planting, flowering, fruiting and perhaps once more during the growing season to make sure the plants are not nutrient deprived. Rotation out of tomatoes for at least 2 years, soil solarization or pasteurization, and the use of soil-less planting mixes can help reduce future problems with Early Blight.

Fusarium Wilt is caused by *Fusarium oxysporum* Schltdl.:Fr. f. sp. *lycopersici*. The most common symptoms include wilting of the plant and yellowing of the foliage. Chlorotic symptoms begin to appear on one-half of the plant. Fusarium wilt is a warm weather disease, with wilting of the plant more common in the warmest part of the day. A characteristic symptom of Fusarium wilt is the reddish-brown discoloration of the vascular tissue at the base of the plant. As the fungus colonizes the vascular tissue and prevents water and nutrients from being transported throughout the plant, the plant will exhibit wilting symptoms.

Figure 1: Tomato leaf with classic Early Blight symptoms

Figure 2: Foliage symptoms of Early Blight

Figure 3: Foliage symptoms of Septoria Leaf Blight

Since *Fusarium* is a soilborne pathogen and can survive in the soil for 3-5 years, even in the absence of tomato production, rotation is key to preventing disease. Resistant cultivars are also available that can help reduce disease incidence. Calcium nitrate fertilizers can help reduce disease severity on some soil types.

Septoria leaf spot (*Septoria lycopersici* Speg.) often resembles Early Blight, but the lesions on the leaves are smaller and this pathogen can cause more severe damage to the foliage of tomatoes. This pathogen starts as circular lesions on the lower leaves after the first fruit sets. A narrow, yellow halo is often associated with Septoria leaf lesions. As with Early Blight, the pathogen spreads upwards from the lower leaves, often by rainfall or overhead irrigation. Fruit infection is rare, but severe foliage blight can reduce photosynthesis and fruit set. Septoria overwinters on infected debris or solanaceous weed hosts. Crop rotations (2 years) and susceptible weeds should be controlled or removed. Infected crop debris should be removed from planting areas (small plantings and gardens) and destroyed.

Verticillium wilt (*Verticillium albo-atrum* or *Verticillium dahliae*) is often confused with Fusarium wilt as the above-ground plant symptoms are similar. In the early stages of infection, wilting during the warmest part of the day may occur, but plants appear to recover at night. As the disease progresses, the leaves may develop necrotic, V-shaped lesions. Highly susceptible plants may show stunting, defoliation and premature death. Vascular discoloration may occur in the lower stem, but is rarely seen in the petioles or pith. Verticillium wilt is a disease of relatively cool weather. The disease also seems more severe in neutral to alkaline soils.

Both of the Verticillium pathogens are poor soil competitors, but can survive for extended periods of time as dark, resting mycelium or microsclerotia in infected plant debris. Long rotations between crops are recommended, although solanaceous weeds can also be good hosts for the pathogen. Removal and destruction of infected plant debris can reduce the amount of inoculum. Soil solarization and/or fumigation can be used in commercial plantings to reduce inoculum levels. There are also resistant cultivars of tomatoes available.

Figure 4: Tomato stem showing vascular discoloration due to Fusarium Wilt

Figure 2: Foliage symptoms of Fusarium Wilt

Figure 3: Foliage symptoms of Verticillium Wilt