UT Extension
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Plant Diseases

Foliar Diseases of Tomato

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EARLY BLIGHT, also called Alternaria leaf blight, is caused by the fungus *Alternaria solani*. It is the most common disease of tomatoes in Tennessee. The fungus causes a leaf blight and may cause seedling disease, collar rot, stem canker or fruit rot. Stem cankers are dark, sunken areas containing concentric rings and are usually restricted to one side of a stem. Collar rot is a dark, sunken lesion that girdles the stem at the base of a young plant. Leaf spots begin on the lower leaves as small, brownish-black lesions. As the spots enlarge up to 1/2 inch in diameter, concentric rings may be observed (Figure 1). Leaves turn yellow and dry up when only a few spots are present. Plants can be defoliated, causing low-quality tomatoes that are prone to sunscald (Figure 2). Fruit rots caused by this fungus are usually dark, sunken, leathery lesions around the fruit stems or growth cracks. Like stem and leaf lesions, the fruit lesion often shows a target pattern.

The early blight fungus is spread by wind and splashing rain, and outbreaks are favored by warm, rainy weather. The fungus overwinters in crop debris and on seeds and can survive between crops on solanaceous crops and weeds.

Figure 1. Leaf spot cause by the early blight fungus.

Figure 2. Defoliation caused by early blight.

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To control early blight a combination of cultural practices is often needed. These practices, which also will help to reduce the risk of many other diseases, include the following:

- Follow crop rotation so that tomatoes or other solanaceous crops are grown in the same ground only every third year. Control solanaceous weeds during rotation years.
- Remove as much plant debris as possible in the fall (do not compost) and promptly plow under or bury the remaining residue.
- Do not sprinkler irrigate. Water only at the base of the plants. Stake and prune the plants to provide good drying conditions.
- Although there are no highly resistant varieties, the varieties shown in Table 1 have partial resistance to early blight. Note: The "resistant to Alternaria" designation for certain varieties by seed companies refers to Alternaria stem canker, which is caused by a different strain of the fungus. Those varieties have no resistance to early blight.
- Gardeners can escape the yield-reducing effects of early blight with sequential plantings. Older plants are discarded when defoliation becomes severe.
- The chances of bringing this and other diseases into a garden or field are less if you grow your own transplants or purchase them from local greenhouses.

Fungicides sprays applied every seven to 14 days, depending on the frequency of rainfall, help to slow the rate of early blight spread. Garden fungicide products containing chlorothalonil or mancozeb perform the best. Commercial growers should consult UT Extension publication W 141, Commercial Vegetable Disease Control Guide, for current recommendations.

SEPTORIA LEAF SPOT, caused by the fungus *Septoria lycopersici*, is a common blight of tomato in Tennessee. It is capable of destroying leaf tissue rapidly in rainy weather, spreading from the lower leaves to the new growth. Septoria leaf spot is characterized by small, dark, circular spots up to 1/8 inch in diameter that resemble bacterial spot or developing lesions of early blight. Many of the lesions eventually develop grayish-white centers. The light-colored centers and presence of fungal fruiting bodies that appear as tiny black specks (Figure 3) distinguish Septoria from other diseases.

Figure 3. Septoria leaf spot.

The control practices for early blight are effective against Septoria, with the exception of varietal resistance. No Septoria resistant varieties are yet available. Rotation with any crop other than tomato will reduce the inoculum level.

LATE BLIGHT, caused by the fungus *Phytophthora infestans*, can be very destructive and fast-spreading. However, it appears sporadically because the causal

Table 1. Tomato varieties with partial resistance to early blight.

Variety	Vine Type	Other resistance*
Large-fruited types		
Defiant	determinate	V F1,2 LB
Mountain Merit	determinate	V F1,2,3 N SW LB
Small-fruited types		
Mountain Magic	indeterminate	V F1,2 LB
Juliet	indeterminate	
Plum Crimson	determinate	V F1,2
Plum Regal	determinate	V F1,2 SW LB

*V = Verticillium wilt. F = Fusarium wilt, races 1, 2 or 3.
N = Root-knot nematode. SW = Tomato spotted wilt virus. LB = Late blight.

fungus requires mild, moist weather. Late blight is a regionally significant disease because of its ability to spread long distances.

Water-soaked lesions appear on leaves and enlarge to form irregular, greenish-black blotches that become dry and resemble frost damage. A pale green halo is often observed around the leaf spots as they enlarge. White, downy fungal growth appears on the underside of the lesions (Figure 4). Under ideal conditions, the fungus can destroy an entire planting of tomato or potato. On tomato fruit, large, irregularly-shaped, brown blotches (Figure 5) lead to a rot of the entire fruit. Stem infections result in brown discolorations (Figure 5).

Figure 4. Late blight leaf lesion.

Figure 5. Late blight fruit rot and stem lesions.

Inoculum sources include infected tomato transplants or potato tubers, or the spores can be borne on prevailing winds from other areas.

The spray programs and moisture management techniques that aid in early blight control are also effective against late blight. Some varieties are resistant to certain strains of late blight (Table 1). Purchasing transplants from local greenhouses will prevent the importation of late blight and other diseases.

GRAY MOLD, caused by the fungus *Botrytis cinerea*, occurs primarily in greenhouses and the higher elevations of Tennessee. The signs include a brown to gray fungal growth on affected tissue. Cankers form on stems at pruning wounds (Figure 6). Infected leaves and blossoms wither and die. Infected fruit become soft and watery, and the flesh turns light gray.

Figure 6. Gray mold stem canker.

The gray mold fungus is found everywhere and infects plants through wounds when the relative humidity is above 90 percent and the temperature is lower than 77 F. The spores are readily transported in the air. Fungicides are available for control but, in greenhouses, are effective only if combined with humidity management.

LEAF MOLD, caused by the fungus *Fulvia fulva*, is primarily a greenhouse tomato problem but occasionally occurs on outdoor plants. Pale green or yellowish spots appear on the upper leaf surface. An olive-green to tan, velvety fungal growth appears on the lower surface of the spots (Figure 7). Under favorable conditions (long periods of humidity greater than 85 percent), complete defoliation can occur. Lowering greenhouse humidity, planting resistant varieties, and applying fungicides promptly can be helpful in leaf mold management.

Figure 7. Velvety spore masses of leaf mold on underside of leaf.

BACTERIAL SPOT is characterized by small, dark, circular to irregular lesions (Figure 8) that are easier to see on the undersides of the leaves than on the upper leaf surface. Lesions are more pronounced and appear water-soaked when wet with dew. On fruit, lesions are scabby and may be slightly raised, although some develop sunken centers (Figure 9). The causal bacterium is commonly brought into fields on infected transplants. It can survive on seeds, in plant debris and on tools.

Figure 8. Bacterial spot leaf lesions and blight.

Figure 9. Bacterial spot fruit lesions.

The leaf lesions of **BACTERIAL SPECK** (Figure 10) are difficult to distinguish from bacterial spot. Fruit lesions, however, are smaller than those of bacterial spot and do not penetrate the fruit deeply (Figure 11). As with bacterial spot and canker, the bacterium can be spread by splashing rain, machinery and on the hands of workers.

BACTERIAL CANKER is characterized by browning of the margins of leaves (Figure 12), wilting and death of entire plants and, occasionally, brown, longitudinal stem cankers that split open. Fruit spots have dark raised centers with white halos (Figure 13).

Figure 10. Bacterial speck on leaf.

Figure 11. Bacterial speck fruit lesions.

Figure 12. Marginal browning of leaves caused by bacterial canker.

Figure 13. Bacterial canker fruit lesions.

These bacterial diseases are difficult to control during periods of frequent rains. Fixed copper products may help in control efforts if mixed with mancozeb. Exclusion of these diseases from gardens and fields is highly dependent on obtaining transplants from local greenhouses. Avoid plants produced outside Tennessee.

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