

Extension Plant Pathology

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Tomato leaf spot diseases - Two different fungi which cause leaf spots on tomatoes have recently been identified in the NMSU Plant Diagnostic Clinic: early blight, caused by *Alternaria solani*, and Phoma rot, caused by *Phoma destructiva*. These two leaf pathogens occur under similar environmental conditions and produce similar symptoms on plants. **Test, don't guess!** These diseases look similar to each other, and in fact, look similar in appearance to other tomato diseases not discussed in this factsheet, a laboratory test is recommended to properly identify the causal agent. Samples can be submitted to the NMSU – Plant Diagnostic Clinic through the [NM County Extension Offices](#).

Early blight symptoms – Early blight may occur on the foliage, stems and fruit. On leaves, the disease begins as small, brownish black spots (Fig. 1). The tissue around the spot may turn yellow and when spots are abundant on the leaf, the whole leaf may turn yellow. Spots rapidly increase in size. As they enlarge, concentric rings may become visible in the dark brown tissue. As the disease advances, leaves may become blighted and necrotic (Fig. 2) and the plant may drop leaves prematurely. On stems, lesions are circular to elongate in shape with pronounced concentric rings and light colored centers (Fig. 3). Stem lesions, especially when they occur on seedlings or small plants, may girdle the plant resulting in plant death. This phase of the disease is often referred to as collar rot. Fruit is usually infected through the calyx, also known as the stem attachment. Fruit lesions may become quite large, sometimes involving the whole fruit, and usually have concentric rings (Fig. 4). The diseased areas become leathery and may be covered in a mass of characteristic black spores (Fig. 5).



Figure 1: Initial leaf spots caused by early blight (Photo: J. French, NMSU - PDC).



Figure 2: Middle (left) and late (right) symptoms of early blight (Photos: Louisiana State University and J. French, NMSU-PDC).



Figure 3: Stem lesions caused by early blight (Photo: Cornell University).



Figure 4: Fruit symptoms caused by early blight (Photo: Louisiana State University).



Figure 5: Characteristic, long beaked, spores of *Alternaria solani*, the causal agent of early blight (Photo: J. French, NMSU-PDC).

Phoma rot symptoms – Phoma rot may also occur on the leaves, stems and fruit. On leaves, irregularly shaped, sunken lesions develop on both the upper and lower leaf surfaces (Fig.6). As the lesions expand, they become ‘zonate’ (an appearance of concentric rings) (Fig. 7).



Figure 6: Initial leaf spots caused by Phoma rot (Photo: N. Goldberg, NMSU-PDC).

The tissue around the lesions may become yellow or necrotic. Over time, lesions may grow together resulting in leaf blight (Fig. 8) and premature defoliation. Pycnidia embedded in the leaf lesions are visible with a dissecting microscope (Fig. 9A) and may be visible with a good hand lens. These round to egg shaped fruiting bodies contain numerous single celled spores (Fig. 9B), which serve as inoculum for new infections.



Figure 7: Zonate lesion on a tomato leaf infected with Phoma rot (Photo: N. Goldberg, NMSU-PDC).



Figure 8: Blight developing on leaves infected by Phoma rot (Photo: N. Goldberg, NMSU-PDC).

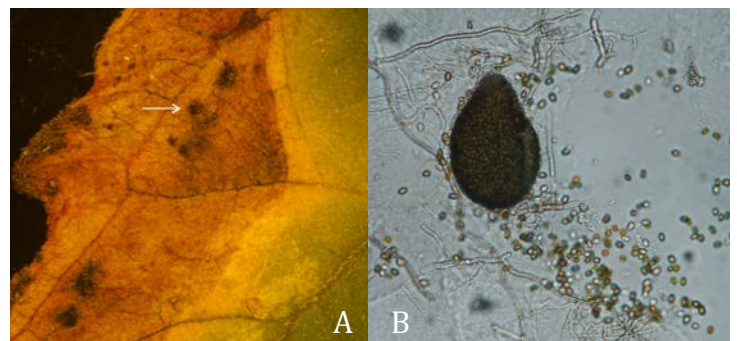


Figure 9: Pycnidia embedded in plant tissue (A) and pycnidia with single celled spores (B) (Photo: N. Goldberg, NMSU-PDC).

Stem and fruit symptoms are very similar to early blight. Lesions on stems are dark and elongate with concentric rings. Stem lesions may completely girdle the stems resulting in death. On fruit, lesions may occur in any location as the fungus invades openings created through cracks, stem scars, mechanical injuries or insect feeding sites. Dark, lesions with concentric rings may develop over portions of the fruit (Fig.10). The lesions become leathery with time and are distinguished by the development of pycnidia in the diseased tissue.



Figure 10: Fruit lesion caused by Phoma rot (Photo: University of Florida).

Conditions for Disease – Both of these diseases begin on older foliage and are favored by warm temperatures, high humidity or leaf wetness. Moisture on leaves may occur due to frequent rains and cloudy weather, or can be created or compounded by overhead irrigation and overcrowded conditions. Spores produced by these fungi are disseminated by wind and/or water splash. The disease progresses on the plant from the bottom up infecting leaves as they reach maturity.

Management – For homeowners, cultural practices that reduce humidity and leaf wetness are essential for good management: avoid overcrowding and avoid wetting the foliage. If plants are irrigated in a manner that wets the foliage, water early in the day so that the leaves dry quickly. When conditions are highly favorable for disease development, fungicides may be helpful in reducing the severity of the disease. Both organic and synthetic fungicides are registered to help manage these diseases. If fungicides are used, all label instructions should be followed very carefully. Some tomato cultivars are tolerant of early blight and are recommended in areas with this disease is common.

For more information, contact: Natalie Goldberg, Extension Plant Pathologist (ngoldber@nmsu.edu), or Jason French, Plant Diagnostician (jfrench@nmsu.edu).