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# LEAF SPOT DISEASES OF ORNAMENTAL TREES AND SHRUBS

Leaf spot diseases are probably the most common types of plant diseases in the Northeast and Connecticut. These diseases are most widespread after relatively cool, wet spring weather, since free water on leaf surfaces is usually necessary for infection. Most common ornamental trees and shrubs are hosts to one or more leaf-infecting pathogens. In most cases, leaf spots are considered to be more aesthetic than life-threatening problems, although they can result in significant and sometimes disconcerting premature leaf drop.

## CAUSAL AGENTS:

Most leaf spot diseases are caused by fungi, although other organisms, such as bacteria and nematodes, can also cause foliar diseases. Some of the fungi associated with leaf spots are *Alternaria, Ascochyta, Blumeriella, Cercospora, Colletotrichum, Entomosporium, Gnomonia, Guignardia, Mycosphaerella, Phyllosticta, Septoria, Tubakia,* and *Venturia.* Common bacteria associated with leaf spots are *Pseudomonas* and *Xanthomonas.* Foliar nematodes, *Aphelenchoides,* are the most common nematodes on woody ornamentals.

## SYMPTOMS:

Leaf spot symptoms vary with the plant host and the causal agent. However, typical leaf spots usually have fairly defined margins and brown, black, tan, or reddish centers (Figures 1-9). Spots vary from pin-head to several centimeters in diameter and can coalesce to encompass entire leaves. Some spots are circular and others are irregular in shape, some are raised, some spots drop out and give the leaf a shot-holed appearance (Figures 7 and 8), and some spots have distinct yellow haloes (Figure 8).

Figure 1. Didymosporina leaf spot of Norway maple.

Heavily infected leaves turn yellow and brown, shrivel, and drop prematurely. Partial to complete premature defoliation of a tree or shrub may occur under some circumstances. For example, crabapples heavily infected with scab are often defoliated by mid-July.

Figure 2. Cercospora leaf spot of mountain laurel.

Figure 3. Entomosporium leaf spot of hawthorn.

Figure 4. Septoria leaf spot of birch.

Figure 5. Scab of crabapple.

Figure 6. Cercospora leaf spot of rhododendron.

Figure 7. Shot-hole of cherry caused by the fungus *Wilsonomyces.*

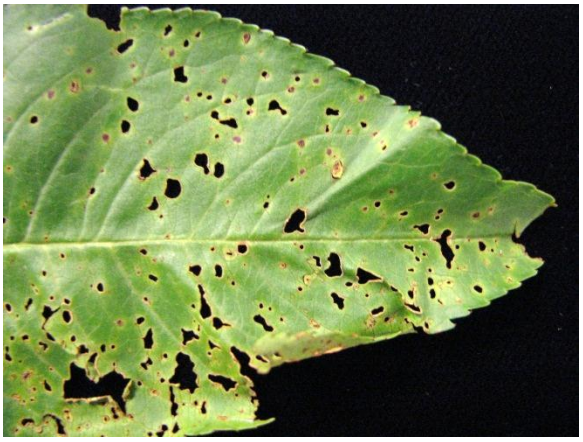

Figure 8. Bacterial (*Xanthomonas*) leaf spot of peach.

Figure 9. Bacterial leaf spot of PJM rhododendron. Note that the spots are irregular in shape.

## DISEASE DEVELOPMENT:

Although several different genera of fungi cause leaf spots, their disease cycles are similar. In most cases, the fungi overwinter on fallen leaves and plant debris. In spring, fruiting bodies mature to produce fungal spores (Figures 10 and 11) that are carried by wind or wind-driven or splashing rain to newly emerging leaves.

Figure 10. *Cercospora* fruiting bodies (pin-point clusters of black dots—arrows) overwinter in leaf spots of symptomatic mountain laurel leaves.

Figure 11. Oozing tendrils of spores (arrow) of Blumeriella leaf spot of cherry.

Once on the leaf surface, the spores germinate, penetrate, and infect the leaf. Although infections have occurred, there is usually a time lag before visible symptoms develop. Depending on the fungus, there may be one or several cycles (generations) of the pathogen in one growing season. Because of the time lag in symptom expression, by the time leaf spot symptoms are visible, it is usually too late to apply fungicides to manage the disease. Similar cycles occur with bacterial leaf spots, although bacteria are often spread throughout the season.

Most of the fungi that cause leaf spots are fairly host-specific and do not move casually to a wide range of different plant hosts. However, since they all require very similar environmental conditions for infection, they often appear on different hosts at about the same time. To the casual observer, they all look like the same infection "gone wild."

The presence and severity of leaf spot diseases can vary from year to year. This is influenced by the weather and the amount of inoculum. Leaf spots are most likely to develop when there are high levels of overwintering inoculum from heavy infections the previous season and when there are extended periods of cool, wet weather during April, May, and June when leaves are emerging.

## MANAGEMENT:

Leaf spots can be managed using a variety of strategies. They are rarely serious enough to warrant yearly chemical control and are often effectively managed by following good sanitary and cultural practices. In fall, it is important to rake and remove fallen leaves from the vicinity of the tree or shrub since many of the leaf-spotting fungi persist on fallen leaves and in plant debris. This practice reduces the overwintering inoculum and the number of spores available to infect emerging leaves in spring.

It is also helpful to follow sound cultural practices that promote plant vigor. These include proper watering, fertilizing (as needed or as suggested by a soil test), mulching, and appropriately timed pruning. Leaf spots are most severe under crowded and shaded conditions.

Leaf spots are especially problematic on new transplants or on weakened or stressed plants. In such cases, chemical control can be helpful, especially in cool, wet springs. However, accurate diagnosis of the specific leaf spot is often necessary to select the most efficacious fungicide for control. Among the fungicides registered for use in Connecticut are thiophanate-methyl, chlorothalonil, and mancozeb. Organic options include sulfur and copper compounds. Several biological products can also be used as protectants, some of which are acceptable for organic standards. These include *Trichoderma harzianum* Rifai strain KRL-AG2, *Streptomyces griseoviridis* strain K61, *Bacillus amyloliquefaciens* strain D747, and *Bacillus subtilis* strain QST 713. The pesticide labels contain information for use, including specific plant hosts and diseases, dosage rates, and safety precautions. Since most leaf-spotting fungi infect in spring as new leaves are emerging, the first fungicide spray is usually applied at bud break. Additional applications may also be necessary in unusually wet and prolonged springs. When symptoms are visible on the new leaves, it is usually too late for effective chemical control.

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