



# Pest e-alerts



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## **Plant Disease Corner, April: Fire blight, Pine tree blights, and Leaf spots**

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Cold weather has slowed the arrival of spring, but bud swell and flower bloom has finally arrived for many trees and shrubs. Spring diseases such as blight, leaf spot and anthracnose are common in years where spring is cool and wet. Often, heavy dews will provide enough moisture for these diseases to “bloom”. Trees and shrubs throughout Oklahoma have been under significant stress due to weather and stress predisposes plants to disease problems. Be on the lookout for the following diseases.

### **Fire blight**

Fire blight is a common disease in Oklahoma and is caused by the bacterium *Erwinia amylovora*. Many members of the rose family are hosts of this disease, most commonly apple, pear, crabapple, catoneaster, quince and hawthorn. Susceptibility is highly variable and some trees and shrubs are resistant. However, even resistant trees can show symptoms of fire blight in cool, wet years.

Symptoms appear shortly after bloom when a brown to black discoloration develops on flowers, leaves and twigs. The infection usually begins with the flower and spreads down the branch. Occasionally, leaves can be infected directly through the stomata (pores in the leaves) or wounds. The disease advances to the twig and the tip of the shoot may droop and produce a “shepherd’s crook” (Fig 1). Leaves, flowers and branches often take on a brown to black color which gives the disease the common name fire blight.

Symptoms of the fire blight can be similar to those caused by chemical injury and frost damage. Laboratory tests can determine if the cause of shoot tip dieback is due to the bacterial pathogen. Clients should submit symptomatic shoots for testing. Black to brown cankers can form at the base of blighted shoots (Fig 2). Reddish-brown discoloration may be visible in the

sapwood under the bark. The bark may become sunken and yellow-orange ooze may be visible around the canker site. The pathogen overwinters in cankers and cankers serve as the source of infection for the next season.

Control of fire blight is best achieved by planting resistant cultivars. If the disease develops, diseased twigs and branches should be removed as soon as they appear. During the growing season, wood should be pruned 12 to 14 inches below visible cankers. In fall or winter months, cankers may be removed 6 to 8 inches below the discolored areas. Pruning tools should be disinfested between each cut by to avoid spreading the bacteria. Disinfectants may include bleach solution (1 part household bleach and 9 parts water), isopropyl alcohol, or other disinfecting products. Fungicides containing copper may be applied for disease control, but they may cause russetting of fruit on some apple and pear cultivars. The antibiotic streptomycin provides better control under high disease pressure than copper. Chemicals should be applied as soon as bloom begins.



**Fig 1.** Typical 'shepherd's crook' symptom on a pear tree with fire blight disease.

(P.G. Psallidas, Benaki Institute, Athens, Bugwood.org)



**Fig 2.** Fire blight canker at the base of a blighted shoot.

(Florida Division of Plant Industry Archive, Florida Department of Agriculture and Consumer Services, Bugwood.org)

### **Diplodia Tip Blight and Dothistroma Needle Blight of Pine**

The most common disease on pine trees in Oklahoma is Diplodia tip blight and it is particularly common following periods of drought. Dothistroma needle blight is also quite common and occurs throughout Oklahoma. It is important to recognize the difference between these diseases because control methods differ.

Diplodia tip blight begins as the pine needles emerge in the spring. When the new needles begin to elongate, they are attacked by the fungus and are killed (Fig 3). Trees with Diplodia tip blight will exhibit stunted, brown shoot tips. The brown diseased needles do not drop and may remain attached for several years. The fungus will spread into the twigs and larger branches.

Cones may become infected and black fruiting structures may be visible on the cone scales (Fig. 4). Be sure to examine newer cones rather than those that have been on the ground for an unknown amount of time (Fig 5). Cankers may develop on branches and occasionally resinous ooze is present around these sites (Fig 6). A progressive dieback develops and limbs may be killed.



**Fig 3.** Discoloration and death of new needles as they were emerging in the spring.



**Fig 4.** Cone scales with black fruiting bodies of the fungus that causes Diplodia tip blight.



**Fig 5.** Examine the scales of newer cones for signs of Diplodia tip blight.



**Fig 6.** When infected shoot tips are not removed, *Diplodia* tip blight can spread into limbs and cause a canker which may exude resin.

Cultural methods of control for *Diplodia* tip blight include removing diseased shoots and branches by pruning. Tools should be disinfected between cuts to prevent disease spread. The best prevention is to water pine trees during periods of drought and maintain proper fertility.

In contrast, the symptoms of *Dothistroma* needle blight are first observed in the fall. Early symptoms include yellow spots or bands on the needles which will later turn reddish-brown (Fig 7). The tip of the needle may be killed so that the bottom of the needle is green and tip is brown (Fig 8). Occasionally, the brown tips will break so the needles appear stunted. In most cases, the disease is more severe on the lower portion of the tree. The needles will often cast prematurely, so the lower portion of the tree may be barren.

In the spring, the new needles will emerge as normal and only the older needles will show symptoms of the disease. It is not until late spring that the fungus matures and begins releasing spores that will infect the new needles. Careful timing of fungicide applications is critical for disease control.



**Fig 7.** The early symptoms of *Dothistroma* needle blight are visible in the fall as yellow spots or bands on the needles.



**Fig 8.** Symptoms of *Dothistroma* needle blight progress so that entire tips of needles are discolored while the base remains green.



Cultural methods to control *Dothistroma* needle blight include raking up fallen needles and thinning the tree to allow for better air circulation. The tree should be watered during periods of drought and overhead irrigation should be avoided.

Preventative applications of copper fungicides may be used for both *Diplodia* tip blight and *Dothistroma* needle blight, but the time of application differs. Fungicides for *Diplodia* tip blight should be applied just before or as the needles begin to emerge and elongate, which usually occurs in April. If the spring is especially cool and wet, a second application should be made 7 to 10 days following the first application. Fungicides for *Dothistroma* needle blight should be applied roughly 6 weeks following emergence of needles. Most applications are applied in mid-May. If weather remains rainy, a second application in late May or early June should be applied.

### Leaf spots and Anthracnose diseases

Trees and shrubs that are under stress are more likely to be affected by leaf spot problems. Both leaf spots and anthracnose are more common in cool, wet springs. The moisture may be in the form of free rainfall, fog, or heavy dews.

Leaf spot and anthracnose diseases in general have a narrow host range. Although a grower may observe leaf spot or anthracnose on many trees and shrubs in the landscape, the pathogens are not likely to be the same organism unless the plants are closely related. For instance, a grower may observe *Entomosporium* leaf spot of red-tipped Photinia and black spot of rose in the same landscape, but the pathogens are not the same (Figs 9-10). In this situation, it suggests that the environment is moist and temperatures are moderate. Although the pathogens vary, most leaf spot and anthracnose diseases have similar recommendations for control.



**Fig 9.** Typical symptoms of *Entomosporium* leaf spot of red-tipped Photinia.

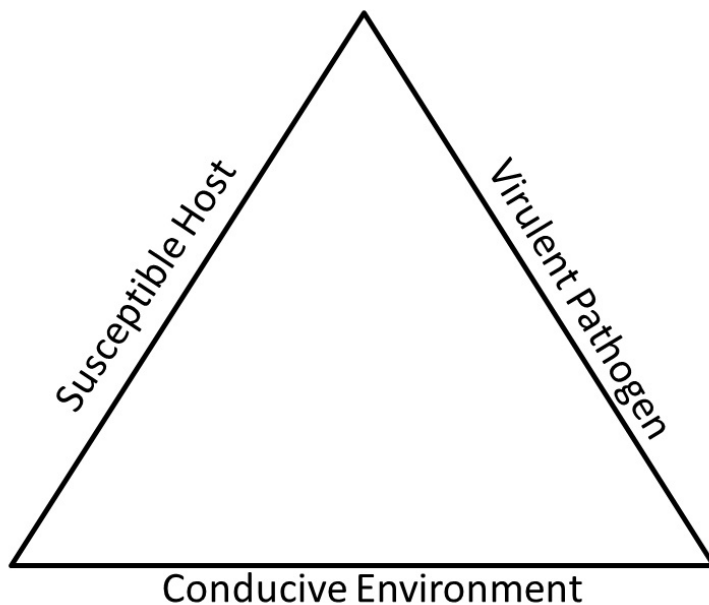
(Paul Bachi, University of Kentucky Research and Education Center, Bugwood.org)

**Fig 10.** Lesions due to black spot disease of rose.

(Clemson University - USDA Cooperative Extension Slide Series, Bugwood.org)



If we refer to the plant disease triangle, the three requirements for disease are susceptible host, virulent pathogen and conducive environment (Fig 11). By manipulating these factors (and the size of the triangle), we can reduce or eliminate the disease.



#### Susceptible Host

When choosing plants, it is best to select varieties with resistance to common plant diseases. The plant tag may reflect this or you may need to take the time to do research to confirm that you are making a good choice. Plants should be installed properly into locations with appropriate light and pH requirements, and well-drained soil. Maintain proper fertility and irrigate as needed during establishment or periods of drought.

### Virulent Pathogen

As new plants are added to the landscape, only select and install healthy plants. Avoid plants with spots, dieback, root rot or those that are otherwise unthrifty. If disease develops, treat the problem as quickly as possible. It may be helpful to use a fungicide to achieve disease control following the label directions. Diseased plant material should be removed and placed in the trash (not composted). Avoid overhead irrigation because it wets the foliage and can spread the pathogen. When plants are severely diseased, it may be best to remove and replace the plant.

### Conducive Environment

Most plant pathogens are fungi and they thrive under moist conditions and moderate temperatures. By manipulating the moisture levels, you may be able to reduce or eliminate the pathogen. Avoid watering the foliage of plants and target irrigation directly to the roots. Overhead irrigation will increase splash dispersal of fungal pathogens and it should be avoided. If possible, apply irrigation early or mid-day. Avoid irrigating plants in the evening since the plants will remain wet all night. Maintain proper fertility, but do not apply excess nitrogen. Utilize proper plant spacing to allow for air circulation between plants. Use a disinfectant to sanitize pruning tools between cuts.

In most years, plants with leaf spot or anthracnose will recover in late spring or early summer. Warm, dry conditions are unfavorable for most leaf spot and anthracnose diseases. Diseased leaves are often dropped and should be removed. The plants will produce a second flush of leaves, but vigor may be reduced. It may be helpful to apply additional fertilizer to promote plant health and replenish nutrient supplies. Most plants will make a recovery through the summer. The disease may return in the fall when cooler temperatures and moisture levels increase.

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