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Anthracnose Diseases of Shade Trees

Maple anthracnose
Sycamore anthracnose
Ash anthracnose
Elm black spot
Oak anthracnose
Walnut anthracnose
Marssonina Leaf Spot of Cottonwood

Anthracnose diseases affect a wide variety of shade trees and are common each spring in Kansas. Maple, sycamore, ash, elm, oak, walnut, cottonwood and other trees are susceptible to injury from this disease. The term 'anthracnose' is a general term that describes several different diseases caused by many species of fungi.

Many of these diseases develop in the spring and have similar leaf symptoms (blotchy leaf spots), but the common thread to all anthracnose diseases is the fact that the fungi which cause them produce similar, cup-like fruiting structures (spore-producing structures) called acervuli.

These fungi also are host specific. For example, the fungus which causes anthracnose on maple will not cause injury to black walnut, and vice-versa.

Symptoms of anthracnose vary considerably. Certain anthracnose diseases result in branch dieback and extensive blighting of leaves, while others cause small circular lesions on the leaves and fruit. Anthracnose diseases may result in premature defoliation. Often damage to the trees appears severe; however, these diseases rarely kill trees. In fact, most shade trees in vigorous condition recover rapidly from anthracnose. infections. Specific anthracnose diseases and their symptoms are listed below, followed by a general discussion of anthracnose diseases and their management.

Environmental stress

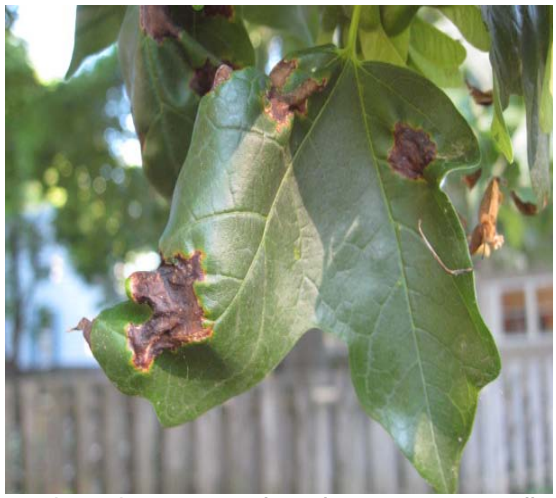
Before discussing the various anthracnose diseases it is important to first mention environmental stress, also called abiotic stress, since it is not caused by a biological pathogen such as a fungus. Young, developing leaves are sensitive to freezing temperatures, high winds, or other sudden weather changes. Affected leaves develop irregular lesions, tattering of leaf margins, or leaf distortion. This "spring scorch" damage is restricted to leaves exposed at the time the stressful conditions occurred and does not cause serious injury to the tree; leaves that emerge afterwards develop normally. Summer scorch, associated with hot, dry summer conditions and inadequate soil moisture causes a scorching or browning of the leaf margins that tends to be very similar (uniform) from leaf to leaf, compared to the irregular blotchy lesions associated with anthracnose.

Environmental scorch symptoms. Note how uniform the damage is compared to the anthracnose symptoms in the rest of this publication. *Photos by Judy O'Mara.*

Maple Anthracnose

Anthracnose, caused by several types of fungi (*Kabatiella, Discula*, and others) spp., is a common springtime problem on maple, especially in eastern Kansas. Red to black spots or blotches form on leaves, particularly during wet, cool spring weather. Typically, the spots are formed on or near leaf veins and progress

along the veins towards the petiole or stem. The disease also may cause twisting, crinkling, or other leaf malformations. Premature defoliation resulting from anthracnose is common in some years, although the disease does not kill the trees or cause permanent damage.



Maple anthracnose. *Photo by Megan Kennelly*

Sycamore Anthracnose

Sycamore anthracnose, caused by the fungus *Apiognomonia veneta* (also called *Discula platani*) is the probably the most striking of the anthracnose diseases because of the dramatic defoliation that can occur. More than 90% of the new shoot growth can be girdled and killed by the fungus in wet springs. Nevertheless, damage is restricted to the new shoot growth in spring and most trees fully recover by mid-summer.

The anthracnose fungus can infect and kill small twigs and dormant buds in late fall after leaf drop. The dead buds dry and shrivel and the twigs may break off the tree. Small black fruiting structures of the fungus, called acervuli, may dot the blighted tissue. Buds also may be damaged by fungal infection before shoot expansion begins in early spring. As tree dormancy is broken, further infection occurs on expanding shoots resulting in a rapid wilting.

Leaves that do fully expand may develop elongated tan to brown lesions parallel with the midrib and veins. This symptom is relatively rare in Kansas.

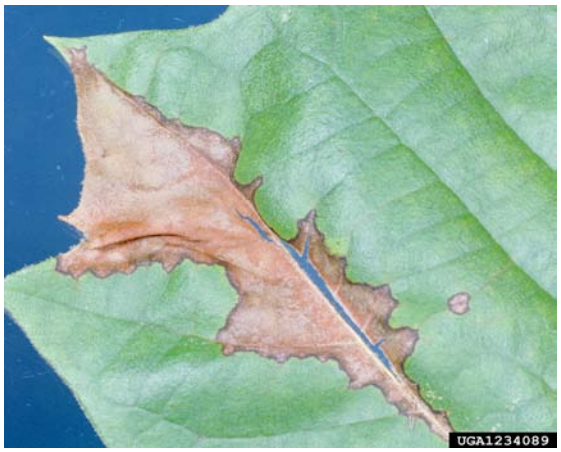
The combination of bud, shoot and leaf blighting can result in an almost complete death of new growth in early May. In fact, many homeowners mistakenly believe that their sycamore trees have been killed. Nevertheless, sycamores have a remarkable ability to recover from severe anthracnose infection. A new set of shoots and leaves begin to develop in late May and by mid-June, most trees have fully recovered. Damage is less severe on the regrowth because temperatures are usually too warm for high infection levels.

During the summer, the tree seals off twig cankers with a layer tissue called callus. This prevents further canker expansion. Nevertheless, the quiescent fungus may

Sycamore anthracnose, twig blight. *Photo courtesy Joseph O'Brien, USDA Forest Service, Bugwood.org*

continue to survive in twig cankers and serve as inoculum source for fall and spring infections.

Although sycamore anthracnose rarely kills, it can cause tree damage. Repeated killing of young twigs results in abnormal branching and gives the tree a ragged appearance.



Sycamore anthracnose. *Photo courtesy Clemson University - USDA Cooperative Extension Slide Series, Bugwood.org*

Ash Anthracnose

This disease, incited by the fungus *Gnomoniella fraxi*ni (also called *Gloeosporium aridum* or *Discula fraxinea*), is common in Kansas, although it seldom causes severe damage to trees. The fungus attacks the leaves, expanding shoots, and occasionally, small twigs. Early spring infection results in shoot and leaf distortion. Irregular brown blotches or spots develop on leaves; these spots commonly are associated with leaf veins or margins. In severe cases, twig and shoot blight can occur. Anthracnose infections may continue through early summer if the weather remains cool and moist.

Elm Black Spot (Elm anthracnose)

Black spot, caused by the fungus *Stegophora ulmea*, is sometimes called anthracnose. Symptoms of black spot first appear as small whitish flecks on the upper surface of the leaf in early spring. Eventually, the lesion expands and

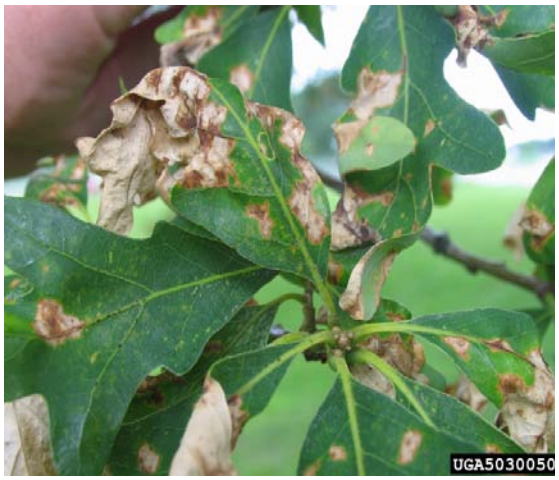
Ash anthracnose causes blotchy lesions and leaf distortion. *Photo courtesy Joseph O'Brien, USDA Forest Service, Bugwood.org*

Elm black spot starts as small white flecks (*upper photo, courtesy Paul Bachi, University of Kentucky Research & Education Center, Bugwood.org.)* then turns dark and crusty *(lower photo by Judy O'Mara).*

develops a black, uneven crust-like surface. Numerous spots may form on the same leaf. Heavily infected leaves turn yellow and drop prematurely. Defoliation may be extensive during wet summers. Although the disease is unsightly, it seldom causes extensive damage to the tree.

Oak Anthracnose

This disease is most serious on white and bur oaks. It is less severe on red or black oaks. Individual trees can be severely damaged from repeated infection. The causal fungus is known by several names (*Gnomonia quercina, Apiognomonia errabunda, Discula quercina*).



Oak Anthracnose. *Top photo courtesy Joseph O'Brien, USDA Forest Service, Bugwood.org. Bottom photo courtesy Robert L. Anderson, USDA Forest Service, Bugwood.org*

Individual leaves develop irregular brown, dead areas and may be slightly cupped or distorted. The fungus also attacks and kills leaf buds and new shoots. Repeated attacks may cause a stunted, witches-broom effect to diseased branches.

Walnut Anthracnose

Symptoms of the disease, incited by *Gnomonia leptostyla*, are most noticeable on the leaves and nuts, although the fungus may occasionally attack the leaf rachis. Leaf lesions first appear as small, dark circular areas, commonly surrounded by a yellow margin or halo. Individual lesions vary greatly in size, and often coalesce to kill large irregular portions of the leaf. Extensive spotting of the leaflets will result in yellowing of the foliage and premature defoliation. Infection may occur throughout the summer.

Affected nuts develop multiple brown to black sunken spots on the husk. Husk infection can result in incomplete nut development and a reduction in meat quality.

Marssonina Leaf Spot of Cottonwood

Marssonina leaf spot can be found on most native poplars, including eastern cottonwood (*Populus deltoids*). Small black to purple spots appear on leaves in the spring. Individual lesions are small, but they may coalesce to cause irregular dead patches on the leaves.

During wet weather, a buff-colored gelatinous matrix containing fungal spores may be observed oozing from leaf lesions. Severe leaf infections during wet years may cause premature defoliation, but the disease generally is not a significant problem in Kansas, except on certain eastern cottonwood clones and hybrid poplars.

Anthracnose diseases: Life cycles

Anthracnose fungi overwinter in leaf debris on the ground and/or in dead areas of the bark on the tree, called cankers. In early spring, spores of the fungus are produced in fruiting structures and are dispersed by splashing rain. These spores infect expanding leaf buds, shoots, or in some cases young leaves.

The infection process is favored by relatively cool temperatures and prolonged periods of leaf wetness. Therefore, the disease tends to be more severe during wet, cool springs. After infection, the anthracnose fungus colonizes leaf tissue and begins to produce new fruiting structures and spores capable of reinfecting expanding leaf tissue. Disease development may continue throughout the spring into early summer if favorable weather persists. These diseases tend to be less of a problem during hot, dry summer weather.

Disease management

Anthracnose rarely causes significant damage to shade trees in Kansas; consequently specific control measures generally are not required. Nevertheless, the disease may be unacceptable in certain high visibility landscape settings. The disease also can increase susceptibility to other disease or insect problems in areas where trees are attacked year after year.

Several cultural practices can reduce the severity of anthracnose.

•Removing dead leaves in the fall will help limit the amount of fungal inoculum present for infection of new leaves the following spring. However, this practice rarely eliminates the problem, especially for those anthracnose fungi that may also survive in blighted twigs on the tree.

•Proper tree spacing and placement to promote good air circulation reduces the number of hours leaf surfaces remain wet, and decreases the likelihood of fungal infection.

•Stressed trees are more susceptible to the disease. Therefore, trees should be watered, fertilized, and pruned appropriately. Avoid soil compaction around the tree.

•Use less susceptible trees. There is considerable variation in the susceptibility of various tree species or cultivars to anthracnose. For example, London Plane is more resistant to anthracnose than sycamore; red oaks tend to have fewer problems with the disease than the white oak group; and there appears to be variation in individual elms and black walnuts to their respective anthracnose diseases. Avoid planting highly susceptible trees in areas with poor air circulation.

Fungicides:

Fungicide sprays normally are not necessary for anthracnose. Occasionally, trees with a history of severe anthracnose may show aesthetic benefits from treatment. If fungicides are used, thorough coverage and proper timing (early in the season) of the sprays are essential for adequate control.

For ash, elm, maple, oak, and sycamore anthracnose, fungicides are generally recommended to be applied just before or at budbreak, with 1 to 2 additional sprays at 10 to 14 day intervals. For walnut anthracnose, it is generally recommended to apply the fungicide when leaves begin to unfold, with several additional applications at labeled intervals. **Consult individual fungicide labels for information on timing and rates.** Read labels carefully: Products labeled for oak anthracnose may not be labeled for ash anthracnose, for example. Several products with the active ingredients copper, propiconazole, mancozeb, and chlorothalonil are labeled for different anthracnose diseases, and there may be others. Check carefully to make sure the product is labeled for your intended use.

Several fungicides are labeled for systemic injection into sycamore trees for control of anthracnose. Although injection can reduce the severity of sycamore anthracnose, it is not usually required for long-term health of the tree. This procedure must be done by a trained arborist or other tree-care professional following all label instructions.

Pesticide labels can change at any time. The user must read and understand the entire label and follow all instructions. Mention of any materials in this document does not reflect endorsement, nor does lack of mention reflect non-endorsement.

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