Anthracnose Diseases of Shade Trees

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Anthracnose diseases affect a wide variety of shade trees and are common each spring in Kansas. Ash, cottonwood, elm, maple, sycamore, black walnut and other trees are susceptible to injury from this disease. Actually, 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 may have similar leaf symptoms, but the common thread to all anthracnose diseases is the fact that the fungi that cause them produce similar, cup-like fruiting structures called acervuli. These fungi also are host specific, meaning the fungus that causes anthracnose on maple will not cause injury to black walnut or other ornamental plants.

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:

ASH ANTHRACNOSE

This disease, incited by *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 **(Figure 1).** In severe cases, twig and shoot blight can occur. Anthracnose infections may continue through early summer if the weather remains cool and moist.

MARSSONINA LEAF SPOT OF POPLARS

Marssonina leaf spot can be found on most native poplars, including eastern cottonwood. 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.

Figure 1. Ash anthracnose. *(Photo courtesy of J. Walla, North Dakota State University)*

ELM BLACK SPOT

Black spot, caused by the fungus *Stegophora ulmea* is also 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 develops a black, uneven crust-like surface **(Figure 2).** 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.

MAPLE ANTHRACNOSE

Maple anthracnose is a common springtime problem, especially in eastern Kansas. Red to black spots or blotches form on leaves, particularly during wet, cool spring weather **(Figure 3).** 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

Figure 2. Elm black spot.

Figure 3. Maple anthracnose.

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.

Anthracnose is often confused with leaf damage resulting from adverse environmental conditions. Young developing leaves are sensitive to freezing temperatures, high winds, or other sudden weather changes. Affected leaves develop water-soaked, irregular lesions, tattering of leaf margins, or leaf distortion.

This "spring scorch" malady is restricted to leaves exposed at the time adverse conditions occurred and does not cause serious injury to the tree. Summer scorch, associated with hot, dry summer conditions and inadequate soil moisture, causes a scorching or browning of the leaf margins rather than browning along the veins as with anthracnose.

OAK ANTHRACNOSE

This disease is most serious on white and bur oaks. Individual trees can be severely damaged from repeated infection by the fungus *Apiognomonia errabunda.* Individual leaves develop irregular brown, dead areas and may be slightly cupped or distorted **(Figure 4).** The fungus also attacks and kills leaf buds and new shoots. Repeated attacks will cause a stunted, brooming effect to diseased branches.

Figure 4. Oak anthracnose.

SYCAMORE ANTHRACNOSE

Sycamore anthracnose is the most serious of the anthracnose diseases in Kansas. The most conspicuous symptom of the disease in early spring is death of twigs and new shoots. Small black fruiting structures of the fungus break through the dead bark of blighted, one-year-old shoots. **(Figure 5).** Repeated killing of young twigs results in abnormal branching and gives the tree a ragged appearance. After bud break, sycamores show a scorching and wilting of new shoots and leaves. Later, fully expanded leaves develop

Figure 5. Browning of tissue along leaf veins resulting from sycamore anthracnose.

Figure 6. Small black fruiting bodies of the sycamore anthracnose fungus break through the bark of dead twigs.

elongated tan to brown lesions parallel with the midrib and veins **(Figure 6).** This should not be confused with summer scorch of sycamore (also a common problem), which causes a burning of the leaf margins.

WALNUT ANTHRACNOSE

Symptoms of the disease, incited by *Gnomonia leptostylya,* 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 **(Figure 7).** 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. 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.

Figure 7. Walnut anthracnose.

Disease Development

Anthracnose fungi overwinter in leaf debris on the ground and/or 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.

Control

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 susceptibillty to other disease or insect problems in areas where trees are attacked year after year.

Several cultural practices can reduce the severity of anthracnose. Remove dead leaves in the fall to help limit the amount of fungal inoculum present for infection of new leaves the following spring. 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. Many trees recover rapidly from anthracnose if they are maintained in a vigorous condition. Water and fertilize trees regularly. Nitrogen fertilization may increase the tree's tolerance or resistance to anthracnose, but avoid overfertilization.

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.

Chemical sprays normally are not necessary to control anthracnose except on those trees that have had a history of the problem. Several fungicides, including thiophanate, chlorothalonil, liquid lime-sulfur, Bordeaux mixture, and other fixed coppers, are labeled for certain anthracnose diseases.

Thorough coverage and proper timing of the sprays are essential for adequate control. For ash, elm, maple, oak and sycamore anthracnose, begin applying a fungicide at bud swell and make l-2 additional sprays at 10-14 day inter-

vals. Early sprays are critical for control. For walnut anthracnose, apply the fungicide when leaves are one-half to fully expanded and make two additional applications at 3- to 4-week intervals. Consult Extension publication C-674, *Tree Diseases in Kansas*, or individual fungicide labels for more information on timing and rates of fungicide application.

Certain fungicides are labeled for systemic injection into sycamore trees for the control of anthracnose. The procedure involves drilling small holes into the trunk or root collar of the tree in the fall and injecting systemic chemicals (for two consecutive years). The chemical is carried through water-conducting system of the tree to the branches and foliage and will protect against early-season infection.

Unfortunately, systemic injection requires that holes be drilled in the tree; this may eventually result in decay or other long-term damage to the tree. Tree injection should only be attempted by a professional arborist or by someone who is familiar with tree anatomy and injection techniques.

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