Anthracnose of Shade Trees

Figure 1. Defoliation of sycamore

Anthracnose is one of the most common and important foliage diseases of shade trees in Iowa. Symptoms of anthracnose are often referred to as "leaf blights" or "leaf spots" and are most serious on sycamore, ash, maple, white and bur oak, and walnut. Linden, hickory, elm, red and black oak, and other deciduous trees also are susceptible, although anthracnose is less common and damaging on these species.

Tree owners often become concerned about the possibility of permanent damage to tree health when anthracnose develops. In most cases, although symptoms may appear serious, damage caused by anthracnose is minimal and does not seriously harm established shade trees.

Anthracnose is caused by a number of different but closely related fungi in the genera *Gnomonia* and *Gloeospotium*. Each fungus is specific to the host tree it affects. This means that a fungus that attacks one tree genus will not infect other tree genera or groups of plants. For example, the ash anthracnose fungus affects only ash and will not spread to other tree species, shrubs, or plants.

Symptoms caused by the anthracnose fungi are often confused with symptoms of wilt, canker, or other foliage diseases. Recognizing anthracnose symptoms and understanding how the disease develops should help home owners and tree care specialists manage the disease properly and minimize its impact in the future.

Symptoms

Anthracnose symptoms vary with the tree species affected and the time of year the disease is observed. Foliar symptoms are the easiest to identify. Anthracnose also can affect expanding buds, petioles, twigs, and seeds on certain shade trees. The specific symptoms encountered on the major tree species affected are outlined in table 1.

Biology and Disease Development

All fungi that cause anthracnose have similar life cycles and require water from rain, dew, or fog to infect a tree. Because of this, anthracnose is usually most severe in years with extended periods of rainy weather in the spring and early summer.

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Table 1. Symptoms of anthracnose on the major tree species affected in Iowa.

▼ Sycamore

Failure of sycamore trees to leaf out in the spring is due to the blighting or death of buds and young shoots (figure 1). Severe bud and shoot blight produces sparsely foliated trees with leaves only at branch tips. Foliar symptoms are small to large reddish brown to brown areas, centered on or directly adjacent to and following leaf veins. Cankers on small diameter branches and twigs are elliptical, rough areas in the bark with depressed centers and raised margins (figure 2). Repeated infection of shoot tips results in gnarled or bushy branch growth (witches brooming).

Figure 2. Sycamore anthracnose

▼ Ash

Leaves develop irregular water soaked or blackish green blotches that eventually turn black or brown (figure 3). The blotches develop from the margin inward and are usually limited only by the midvein. Leaflets curl toward the blighted area. Ash anthracnose symptoms develop in mid spring and are often followed by sudden premature drop of affected leaflets.

Figure 3. Ash anthracnose

▼ Maple

Large brown to tan areas of leaf tissue develop in mid to late spring and may cover much of the leaf surface (figure 4). Death of leaf tissue is limited by the major leaf veins. Affected tissue becomes papery and leaves may appear tattered or shredded later in the growing season.

Figure 4. Maple anthracnose

▼ Oak

Large, irregular, brown to light tan areas concentrated along or following leaf veins develop in late spring and early summer. A significant amount of the leaf surface may be killed when the disease is severe. Affected leaf tissue becomes lighter colored and papery later in the season (figure 5). Small brown fruiting bodies along leaf veins may become visible if viewed with a hand lens.

Figure 5. Oak anthracnose

▼ Walnut

Small (less than $1/16$ inch in diameter) to large ($1/2$ inch and greater) black spots that often merge together appear in midsummer (figure 6). Yellowing of foliage and extensive leaf loss or defoliation occurs in the latter part of the summer. Symptoms also appear on the husks and may cause nutmeats to shrivel. Small black bumps, the fruiting bodies of the fungus, may be evident when lesions are observed with a hand lens.

Figure 6. Walnut anthracnose

Anthracnose fungi overwinter in infected leaves on the ground. in the case of sycamore, anthracnose also overwinters in buds, cankered branches, and twigs on the tree. Large numbers of microscopic spores are produced from these tissues in April, May, and June. These spores can be carried long distances by air currents or spread shorter distances by splashing rain.

Water is required for spores to germinate and infect buds, leaves, branches, and other tree parts. Major spore release and infection periods are closely related to weather conditions and the stage of development of the particular tree host.

The timing of spore release and infection periods are somewhat different for each of the different anthracnose fungi. Successful chemical control requires that fungicide sprays be applied just before and during the major infection periods.

A problem with chemical control of anthracnose is that the timing and extent of major infection periods vary widely from year to year and are difficult to predict. Therefore, effective chemical control of the disease is difficult to achieve.

Some of the fungi that cause anthracnose also produce a repeating spore stage on affected leaf and branch tissues during the summer. These spores can reinfect the tree during the remainder of the growing season when proper moisture and temperatures prevail. Reinfection of the tree by the repeating spore stage is responsible for increased anthracnose symptoms during summer. This occurs most commonly with oak, sycamore, and walnut anthracnose fungi.

Damage

Damage to tree health caused by shade tree anthracnose is usually minimal because occasional defoliation seldom has a long-lasting impact on tree health.

Healthy, established shade trees can survive even severe attacks by anthracnose. In fact, in years when anthracnose is severe, a tree may lose a large portion of its foliage in the spring, but produce a second flush of leaves later in the spring. This gives the tree a recovery period for the remainder of the growing season. Defoliation from walnut anthracnose occurs in the latter part of the growing season. Some research has shown that the loss of leaves at the end of summer also has little impact on the health and growth rate of black walnut.

However, damage caused by anthracnose can be important in certain situations. Repeated annual defoliation from the disease may weaken the tree and predispose it to attack by insect borers, canker fungi, or winter injury. Repeated attacks on sycamore result in gnarled or bushy growth and produce branch dieback. Defoliation accompanied by drought or stress from poor site or growing conditions can contribute to the development of decline diseases. In situations where trees are being used primarily for ornamental value, anthracnose can greatly decrease the aesthetic value of the tree in the landscape.

Management of Anthracnose

There is no single approach to the management of anthracnose that will give consistent, acceptable control of the disease. In most cases, active disease management practices probably are not needed because the overall impact of the disease on tree health is minimal. The following suggestions will aid in decreasing the severity of anthracnose and minimizing its impact on tree health. Taken alone, however, any one of these practices will probably have little impact on anthracnose control.

- Clean up and destroy as many of the fallen leaves as possible in the fall. This will help reduce the overwintering population of anthracnose fungi.

- Prune the tree to remove diseased twigs and branches (primarily for sycamore anthracnose) and to open up the canopy for better air circulation and light penetration.

- Maintain tree vigor with proper watering, fertilization (if needed), and other cultural practices, such as wrapping the main stem of young trees in the fall of the year, avoiding damage to the tree bark by lawn mowing equipment, and making proper pruning cuts.

- Apply a labeled fungicide when warranted. The use of fungicides can be justified in relatively few cases where anthracnose occurs. A number of fungicides are labeled and often recommended as foliar applications for anthracnose control. These include benomyl, bordeaux mixture, chlorothalonil, copper hydroxide, basic copper sulfate, lime sulfur, and liquid copper resin. Follow label directions for the host (the tree species for which the product is labeled), rate, and timing of applications. Most of these fungicides are available to home owners or can be applied by a tree care specialist.

Research and experience show that fungicide control of anthracnose is rarely warranted because anthracnose usually does not seriously damage tree health and adequate control of the disease is seldom achieved when fungicides are used. The large size of many shade trees also makes adequate coverage difficult with most spray equipment and greatly increases the chances of spray drift and hazards to the environment. Applying fungicides to trees also can be dangerous if applicators do not use proper protective gear.

Other methods of fungicide application, such as injection of fungicides into the tree, also are labeled for anthracnose control. These methods have not been thoroughly tested and in most cases have given erratic and unsatisfactory control of the disease.

- Where trees are used primarily for ornamental or aesthetic value, select species that are resistant or less susceptible to anthracnose. Select the proper tree for the proper site.

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