Anthracnose of Deciduous Shade Trees

Michigan State University
Cooperative Extension Service
Carla S. Thomas, Former Graduate Assistant, Department of Botany and Plant Pathology
Gerard C. Adams, Extension Specialist, Department of Botany and Plant Pathology

May 1986
6 pages

MICHIGAN STATE UNIVERSITY • COOPERATIVE EXTENSION SERVICE
EXTENSION BULLETIN E-1099 (Revised 5-86)

Woody Ornamental Tips

ANTHRACNOSE OF DECIDUOUS SHADE TREES

By Carla S. Thomas and Gerard C. Adams*

Anthracnose is a major foliar disease of shade trees in Michigan. It causes leaf spots and defoliation of ash, elm, hickory, linden, maple, butternut, black walnut, birch, catalpa, dogwood, oak, yellow poplar and tulip trees. It is a more serious disease on sycamore and white oak. Buds, twigs or entire branches may be killed on sycamores or white oaks, causing distortion of the leaves and dieback. Repeated defoliation and dieback will weaken a tree, making it more susceptible to insect pests, diseases and winter injury.

*Thomas is a former graduate assistant; Adams is an extension specialist, Dept. of Botany and Plant Pathology.

Anthracnose is most severe in cool, moist springs with repeated rainfall.

Anthracnose is caused by several closely related species of fungi usually in the genus *Gnomonia* (sexual stage) and in the genera *Gloeosporium*, *Discula*, *Marssonina* or *Colletotrichum* (asexual stages).

SYMPTOMS

Symptoms of anthracnose occur on the leaves of all susceptible trees but symptoms on the flowers and fruits occur primarily on dogwood, walnut and butternut. Leaf lesions appear as small, circular or irregular, tan, brown, purple or black spots, usually along the midribs and veins (leaf blight, Fig. 1). When infection is severe, spots expand into patches and grow together resulting in large necrotic regions. Young leaves are especially susceptible to the fungus. As infected leaves grow, they become distorted (Fig. 2) or drop off the twig. Individual branches or entire trees may be defoliated (Fig. 3). If the tree refoliates in late spring or early summer, the tree usually regains a normal appearance with minimal ornamental damage. However, an early fall frost can kill leaves and branches if a flush of leaf growth occurs late in the season.

Sycamores, maples, and oaks may exhibit several symptoms. The fungus often kills the bud and surrounding woody tissue before the bud opens in the spring. Woody tissue may be killed causing small branches to die in the spring before leaf emergence (branch blight, Fig. 4). When terminal branches are killed repeatedly, abnormal branching may give the tree a gnarled, angular appearance or a broomy effect (witches brooming, Fig. 7). The abnormal branching destroys the ornamental value of infected trees. Trees commonly affected with witches brooming include dogwood, elm, hickory, maple, oak, sycamore, butternut and walnut.

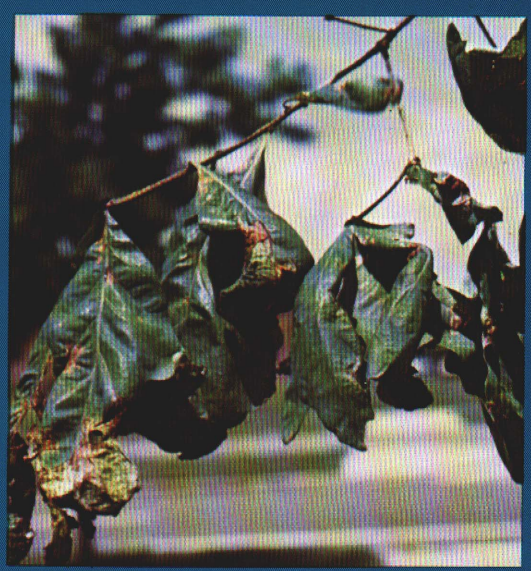
Shoot blight occurs when a new shoot is infected as it emerges (Fig. 5). This infection pattern causes a sudden death of the entire shoot; the leaves die and drop off. Shoot blight is the most noticeable disease symptom and is often mistaken for frost damage (Fig. 6A). Frost damage can be distinguished from shoot

1. Leaf blight lesions caused by anthracnose. Some lesions have grown together causing larger, irregularly shaped areas of necrosis.

Oak

Sycamore

Maple



2. Necrosis and distortion of oak leaves where anthracnose lesions have expanded.

3. Defoliation of sycamore in spring caused by anthracnose. Tufts of leaves unaffected at the top of the tree or at the ends of branches have escaped the downward spread of disease by rain-splashed spores.

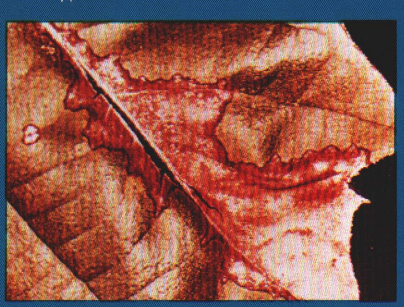
5. Leaf and shoot blight stage (sycamore). Shoot blight occurs when the fungus attacks the shoots as the leaves emerge. Note the small leaves and wilting typical of shoot blight. Some older leaves have escaped injury.

4. Branch blight occurs when the fungus girdles and kills branches before leaf emergence (oak).

A

6. Comparing other causes of leaf injury to anthracnose. A) Frost injury of maple. Leaf development is normal except that holes develop between veins where cells were killed by frost. Affected tissues appear translucent or water soaked at first, then become dry and papery. B) Drought scorch on maple. Yellowing and browning is restricted to leaf margins and areas between veins; veins remain green. C) Anthracnose on sycamore. Dead areas follow the midribs (major veins).

B



C

7. Broomy appearance of branches on trees with chronic anthracnose infections caused by extensive lateral branching of twigs after the terminal growing tip has been killed.

8. Anthracnose branch cankers on sycamore.

blight by looking at the leaves on the dead shoots. Frost causes death of tissue between leaf veins, not along veins, as does anthracnose.

Drought stress can also be confused with anthracnose. However, leaf scorch, caused by drought stress, kills tissue located along the leaf margins (Fig. 6B), rather than along the veins as in anthracnose (Fig. 6C).

Anthracnose seldom kills an entire tree, but repeated defoliation can kill large branches or predispose the tree to pests such as insect borers and root rot.

Disease cycle in sycamore, maple and white oak.

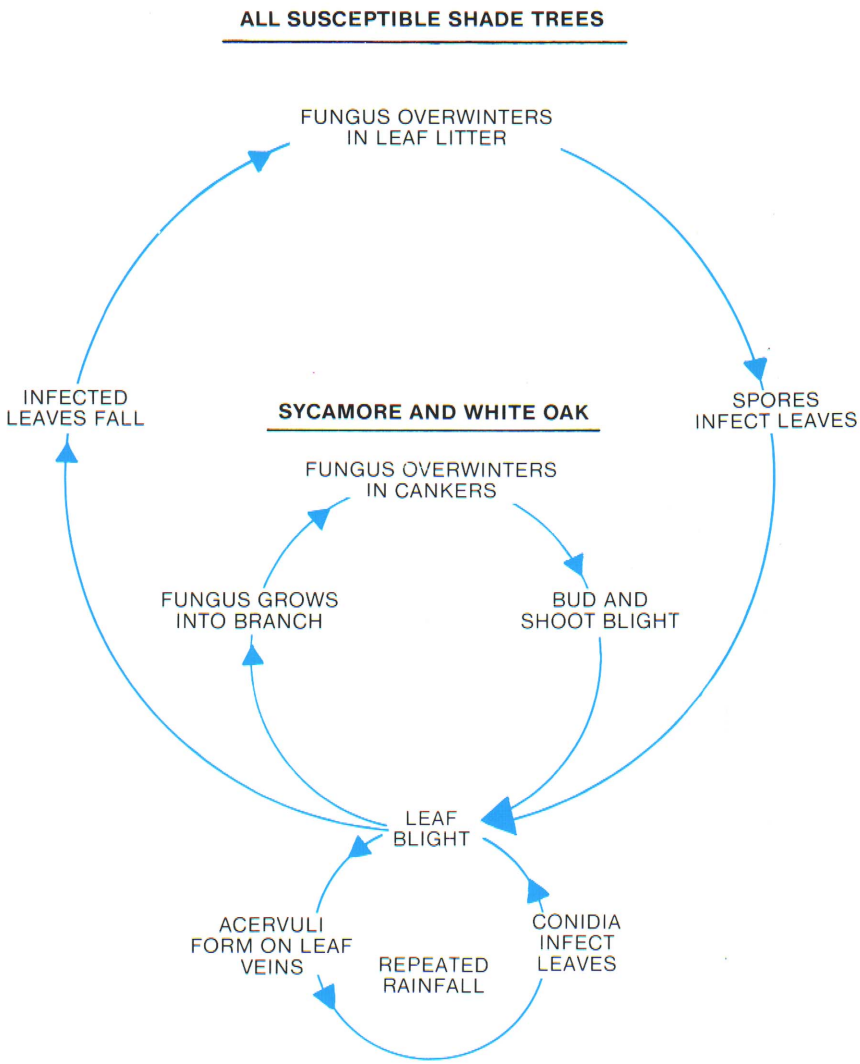
The fungus overwinters in cankers on dead branches (Fig. 8). In the spring, the overwintering fungus in the canker grows when average daily temperatures are 50-60°F. Small, black, asexual fruiting bodies (acervuli) form on nearby bark. Asexual spores, called conidia, are discharged from these structures and are spread by wind and rain. The conidia infect emerging shoots and leaves causing shoot blight and leaf blight.

The fungus grows down an infected vein, through the petiole, and into the branch. Then, asexual fruiting bodies are produced in the bark. These exude conidia during rainy periods throughout the season. The conidia are spread by rain to leaves, causing secondary infections. After the fungus grows down into the branch, it forms a canker (Fig. 8). The top of a tree may escape the downward spread of the disease.

Disease cycle for trees other than sycamore, maple and white oak.

The disease is always less severe in trees other than sycamore, maple and oak because few cankers or dead twigs are formed. The first new infections in spring are caused by sexual spores produced by fruiting bodies, called perithecia, which overwintered in the leaf litter. In the spring, the fruiting bodies discharge the spores which are spread by wind to newly emerging leaves. Wet leaf surfaces are necessary for infection of leaves to occur.

Asexual fruiting structures (acervuli) form on the veins and midrib of blighted leaves. The acervuli release asexual spores in



DISEASE CYCLE OF ANTHRACNOSE ON SHADE TREES.

rainy weather which infect young leaves throughout the year until temperatures average above 60°F. Blighted leaves fall to the ground and sexual fruiting structures develop on the underside of the leaves along the veins and midrib in winter.

CONTROL

The best way to avoid anthracnose is to plant resistant species. Also, inspect nursery planting stock before buying and do not buy plants with signs of anthracnose. Red and black oaks *(Quercus rubra, Q. velutina, Q. palustris, Q. coccinea, Q. acutissima)* and the 'Bloodgood' London Plane tree *(Platanus x acerifolia* 'Bloodgood') are resistant to anthracnose. These trees should be planted in preference to susceptible trees in urban areas. They are tolerant of city conditions and possess desirable ornamental characteristics for shade trees.

Trees which are well maintained and fertilized regularly (see MSU bulletin E-786, "Fertilizing Shade and Ornamental Trees") are able to quickly produce vigorous new growth after attack by anthracnose. By midsummer, such a tree is usually hard to tell from an uninfected tree. Recent reports suggest that fertilization with soil applied nitrogen (N) fertilizers can reduce anthracnose levels. However this protection is reduced if potassium (K) or phosphorus (P) is also aplied. Ammonium nitrate applied at a rate of 18 lbs/1,000 sq. ft. or urea applied at 13 lbs/1,000 sq. ft. is recommended.

Anthracnose spores require moisture to infect leaves and shoots. Therefore, thinning the crown of the tree by pruning will promote penetration of sunlight and air circulation to quickly dry excess moisture. Sycamore, maple, and oak anthracnose cankers may be pruned out to remove the overwintering fungus. Bury or burn diseased twigs and branches after they are removed from the tree.

Spraying is usually not necessary if resistant trees are planted. Planting resistant varieties will be more economical and effective in disease control than fungicides. If infected trees are young and not well established, or if they are located in aesthetically critical settings, a spray of benomyl (0.25 lb/100 gal or 1 Tbsp/4 gal) may be useful. Benomyl is registered for use on all shade trees for controlling anthracnose. Other effective fungicides are also registered for use on specific shade trees. If the fungicide product label directions allow, spray once every 10-14 days in the spring beginning at bud swell. Continue treatment until temperatures are greater than 60°F. and conditions are no longer favorable for disease (this may require several sprays).

A single spray during leaf and shoot emergence may give the most economical fungicide protection, but usually will not prevent disease development entirely. Early protection of the first crop of spring leaves helps the tree accumulate the food reserves needed for refoliation following successive disease attacks. No matter which spray program you use, spraying is expensive and time consuming. If temperatures and rainfall are not favorable for disease, sprays may not be needed. Temperatures favoring anthracnose are 50-60°F. for the 2 weeks during leaf and shoot emergence, and leaf wetness is needed for infection.

NOTES:

Pesticides must be registered with the U.S. Environmental Protection Agency and the Michigan Department of Agriculture before they can be legally used (according to their label directions) in Michigan. This bulletin suggests using pesticides in the management of disease and insect pests. Purchase only those pesticide products that are labeled for, 1) the crop you wish to use it on and 2) the pest you wish to manage on that crop. Remember that the pesticide label is the legal document on pesticide use. The label must be read carefully and all instructions followed closely. The use of a pesticide in a manner not consistent with the label can lead to the injury of crops, humans, animals, and the environment. The use of a pesticide inconsistent with the label directions can also lead to civil fines and/or condemnation of the crop. Pesticides are good management "tools" for the control of pests on crops but only when they are used in a safe, effective and prudent manner, according to the label.

Major Revision 5:86-10M-KMF-HP, Price 45¢
FILE: 24.55