

7. *Gloeosporium* and *Gnomonia* Leaf Diseases of Broadleaf Trees

Robert W. Stack and Kenneth E. Conway

Many trees are affected by diseases caused by fungi of the genus *Gnomonia* and its asexual stage *Gloeosporium*. Diseases caused by these fungi are commonly called 'anthracnose.' The site of infection, kinds of symptoms and signs, and severity of anthracnose disease varies from species to species and often from year to year. The only symptom commonly found on maples and elms may be leaf spot or leaf blight (figs. 7-1, 7-2). In other species, such as sycamore and white oaks, the entire range of anthracnose symptoms may occur, including bud, twig, and shoot blights, leaf spots, and stem cankers.

Hosts and Distribution

Gnomonia-caused diseases are widespread throughout the native and planted ranges of their respective hosts. The pathogens and their hosts growing on the Great Plains are summarized in table 7-1.

Each species of *Gnomonia/Gloeosporium* is specific for a particular host genus, with little or no cross pathogenicity as far as is known. For each host, the symptoms may differ based on the part of the tree attacked (table 7-1). The taxonomy of *Gnomonia/Gloeosporium* has been revised, but the more familiar names for the anthracnose pathogens are presented.



Figure 7-1. Black leaf spot of elm caused by *Gnomonia ulmea*.



Figure 7-2. Symptoms of maple anthracnose caused by *Gloeosporium apocryptum*.



Figure 7-3. Leaf distortion and necrosis of green ash caused by *Gloeosporium aridum*.



Figure 7-4. Acervuli of *Gnomonia quercina* on midvein of oak.

Symptoms and Signs

Leaf infections early in the season result in blotching, distortion, and large necrotic areas. These symptoms are typical of ash, oak, and sycamore anthracnose (fig. 7-3 through fig. 7-6). Later leaf infections result in discrete small to large spots, often surrounded by a dark ring or a chlorotic halo. Such spots are the principal symptoms in basswood, elm, and maple (figs. 7-1, 7-2). Severe leaf spot infection may cause extensive defoliation, especially in ash and walnut.

On sycamore and oak, four phases of anthracnose can be distinguished—twig blight, bud blight, shoot blight,

and leaf blight; leaf blight is already described above. In the twig blight phase, small, 1- or 2-year-old twigs are girdled and killed (fig. 7-5). Later, larger twigs and branches may be cankered and killed. In the bud blight phase, buds are penetrated by the fungus and killed before they expand. In the shoot blight phase, new young shoots and expanding leaves are suddenly killed. In sycamore (and probably other hosts), severe shoot blight depends on temperature, with infection greatest when temperatures are 50° to 59° F. In walnut, optimal infection temperature is 70° F.

Table 7-1. *Gloeosporium* and *Gnomonia* anthracnose pathogens and host trees on the Great Plains.

Host	Pathogen	Parts of tree attacked
Ash, esp. green	<i>Gloeosporium aridum</i>	Leaves, twigs
Basswood	<i>Gnomonia tiliae</i>	Leaves, twigs
Elm	<i>Gnomonia ulmea</i>	Leaves
Maple	<i>Gloeosporium apocryptum</i>	Leaves
Oak, esp. white	<i>Gnomonia quercina</i>	Leaves, twigs, shoots, buds
Sycamore and London plane-tree	<i>Gnomonia platani</i>	Leaves, twigs, shoots, buds
Walnut	<i>Gnomonia leptostyla</i>	Leaves, twigs, nuts



Figure 7-5. Leaf necrosis and twig dieback of sycamore caused by *Gnomonia platani*.

Disease Cycle

The life cycles of these anthracnose fungi are similar and may be typified by *G. platani*, which attacks sycamore (figs. 7-5, 7-6). The fungus survives the winter in infected twigs and branches on the tree and on fallen infected leaves and branches. In most situations there is abundant inoculum for infection if conditions are favorable. Asexual spores (conidia) are the most important stage for dissemination and infection by anthracnose fungi. In several species, the sexual spores (ascospores) may also be produced and serve as primary inoculum; however, their relative importance compared to the conidial stage is undetermined.

Spores are disseminated by wind and splashing rain to buds, shoots, and expanding leaves, where infection begins if conditions are favorable. In some species, infections develop during favorable periods in summer, giving rise to late-season spots or leaf blight.

Damage

Anthracnose fungi cause defoliation and branch dieback, which disfigures the tree. If anthracnose is severe for several seasons, the tree may be weakened and start to decline, or may become susceptible to other diseases or insect pests. Trees stressed by root restriction, drought, heavy scale infestation, etc., are much less tolerant to anthracnose, and may show decreased vigor after only a single season of severe anthracnose defoliation.



Figure 7-6. Leaf necrosis of sycamore caused by *Gnomonia platani*.

Control

Because individual trees vary in susceptibility to anthracnose, there is potential for selection of resistant clones or seed sources of highly resistant trees. The true London plane-tree (an inter-specific hybrid) is much less susceptible than the native American sycamore. Oaks in the white oak group are much more susceptible to anthracnose than those in the red oak group.

Fungicide sprays have long been used in attempts to control anthracnose on boulevard and residential plantings. Specific protectant fungicides are registered for certain tree species. Follow label instructions for times of application and dosage rates. Specific recommendations on type of spray and timing vary with locality. Consult your local Extension Plant Pathologist or Forester for current recommendations for your area. Recently, several systemic fungicides have been registered for tree injection to control anthracnose fungi.

Cultural measures, such as raking up leaves in fall and pruning out infected twigs and branches, reduce spring inoculum, but probably not enough to affect disease development except on isolated young trees.

Selected References

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