
ANTHRACNOSE

Integrated Pest Management for Home Gardeners and Landscape Professionals

Anthracnose is a group of diseases found on many deciduous and evergreen trees and shrubs; some trees such as sycamore, ash, and evergreen elms can be noticeably blighted. Often called leaf, shoot, or twig blight, anthracnose results from infection by any of several different fungi, including *Apiognomonium errabunda*, *A. veneta*, *Discula fraxinea*, *Glomerella* sp., *Gnomonia* sp., and *Stegophora ulmea*, depending on the tree attacked. Infections on deciduous plants are more severe in areas where prolonged spring rains occur after new growth is produced. Anthracnose fungi need water to be disseminated and infect; they do not spread under dry conditions.

IDENTIFICATION AND DAMAGE

Anthracnose symptoms vary with the plant host, weather, and time of year infection occurs. The fungi affect developing shoots and expanding leaves. Small tan, brown, black, or tarlike spots appear on infected leaves of hosts such as elm or oak. Dead leaf areas may be more irregular on other hosts such as ash. Sycamore anthracnose lesions typically develop along the major leaf veins (Fig. 1). If leaves are very young when infected, they may become curled and distorted with only a portion of each leaf dying.

Generally, mature leaves are resistant to infection, but when conditions are favorable, they may become spotted with lesions. Heavily infected leaves fall prematurely throughout the growing season, and sometimes trees are completely defoliated. Early leaf drop is usually followed by production of more

leaves. Twigs and branches also may be attacked and killed, resulting in a tree with crooked branches.

On some trees, cankers (infected areas that may or may not be surrounded by callus tissue) are another symptom of anthracnose infection. Cankers develop on twigs, branches, and the trunk, occasionally resulting in girdling and dieback. If defoliation, branch dieback, or cankering does not occur every year, anthracnose will not seriously harm plants. In California, anthracnose rarely causes permanent damage to plants except for elm trees.

LIFE CYCLE

Anthracnose fungi occur primarily on leaves and twigs (Fig. 2). On deciduous trees these fungi overwinter in infected twigs. In spring many microscopic spores are produced and spread by splashing rain or sprinkler water to new growth where they germinate; the fungus enters the leaves and newly expanded twigs. If moist conditions prevail, a successive generation of spores is produced in the infected parts of new leaves. On evergreen species such as Chinese elm, the fungus can occur year-round on leaves and twigs, but on most deciduous trees the progress of the disease slows and becomes negligible during the hot dry summer.

MANAGEMENT

With careful management, some cultivars of susceptible landscape plants can be grown at a high level of aesthetic quality, despite the presence of anthracnose. For new plantings, choose varieties that are resistant to the anthracnose



Figure 1. Sycamore leaf infected with anthracnose.

fungi. Plant them widely apart to maximize air circulation and increase sunlight, both of which facilitate faster drying of leaf surfaces when trees are fully grown. Once symptoms develop or become severe, anthracnose cannot be effectively controlled during the current season. Rake and dispose of fallen leaves and twigs during the growing season and during the fall. Prune during winter to increase air circulation in the canopy and remove the previous season's infected twigs and branches. Available pesticides are effective in preventing anthracnose infections on Modesto ash only.

Environmental factors also play important roles in managing anthracnose. Pay close attention to past and current conditions such as rain and irrigation to determine if anthracnose development is favored. Dry spring weather could mean that disease management is not

necessary. A wet spring or an irrigation system that wets the foliage could result in disease outbreak that may warrant control.

Resistant Varieties

Avoid planting highly susceptible species, including Modesto ash (*Fraxinus velutina* var. *glabra*), American sycamore (*Platanus occidentalis*), and the London plane tree (*P. acerifolia*). California sycamore (*P. racemosa*) should be avoided in the north, but it is not affected in the southern part of the state. The ash varieties Moraine and Raywood and Evergreen (Shamel) ash are more resistant to anthracnose than other varieties. For

evergreen Chinese elm, plant the more resistant Drake cultivar instead of the True Green or Evergreen cultivars, which are susceptible to anthracnose.

When planting London plane (also called plane tree), decide whether anthracnose or powdery mildew resistance is more beneficial based on prevailing environmental conditions at that site and the planned pruning method (see Cultural Practices). For instance, the Bloodgood London plane tree cultivar is resistant to the fungus that causes anthracnose but not to the one that causes powdery mildew. On the other hand, the susceptible

Yarwood cultivar is resistant to powdery mildew. Table 1 shows relative susceptibility of some landscape trees to anthracnose.

Cultural Practices

When feasible, prune infected twigs and branches during fall or winter. Severe pruning of larger diameter branches is not recommended for most types of trees because it triggers bushy growth of watersprouts, which are poorly attached to the trunk and become susceptible to diseases, such as powdery mildew. To stimulate vigorous growth of trees severely affected by anthracnose, fertilize after the leaves

Figure 2. Anthracnose disease cycle on Modesto ash.

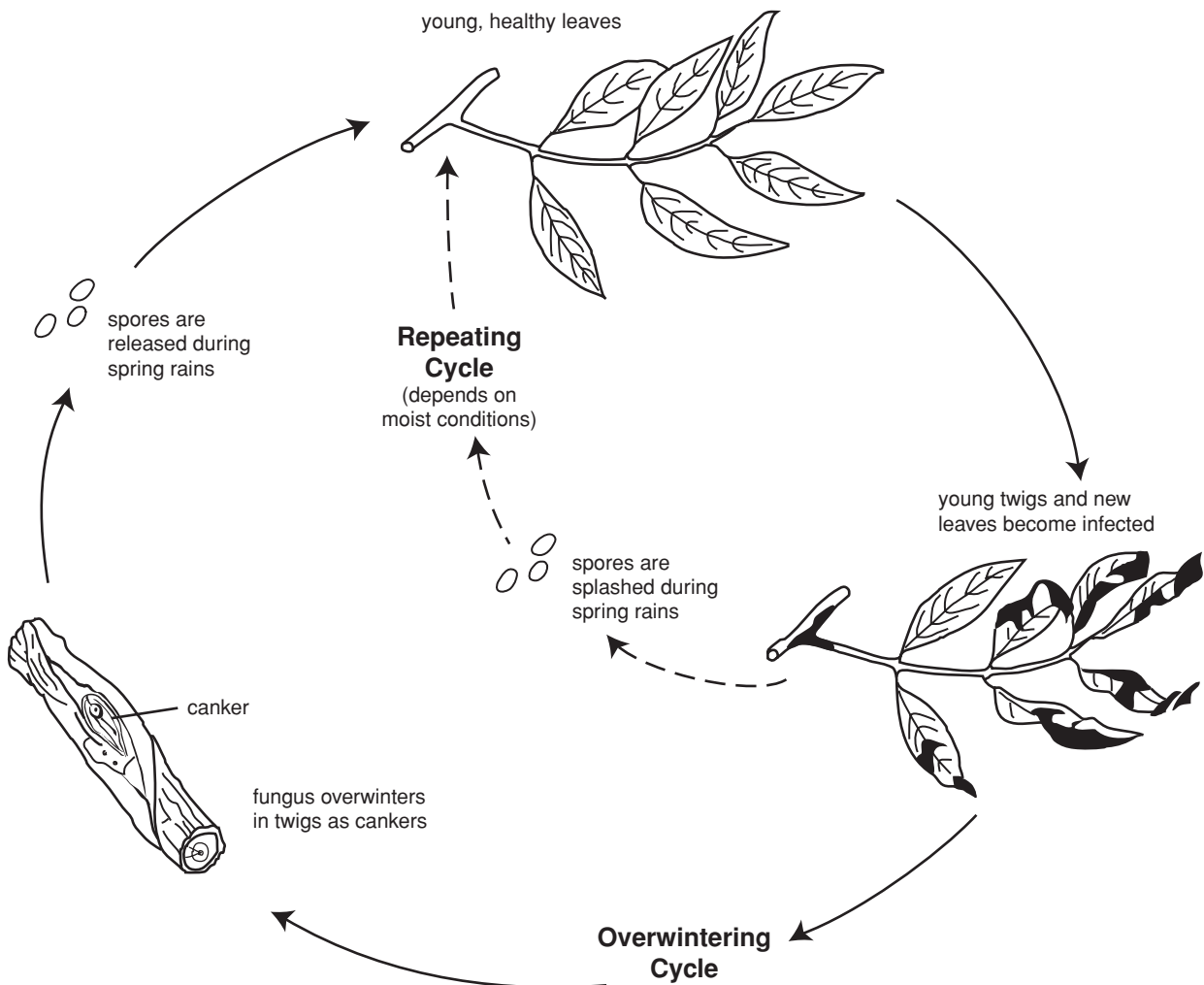


Table 1. Relative Susceptibility of Some Landscape Tree Cultivars to Anthracnose.

Susceptible	Resistant or less susceptible
ASH (<i>Fraxinus</i> spp.) Modesto (<i>F. velutina</i> 'Modesto')	Moraine (<i>F. holotricha</i> 'Moraine') Raywood (<i>F. oxycarpa</i> 'Raywood') Evergreen/Shamel (<i>F. Uhdei</i> 'Shamel')
DOGWOOD (<i>Cornus</i> spp.) Flowering (<i>Cornus florida</i>): many cultivars Chinese Kousa (<i>C. kousa</i> 'Chinensis') Pacific (<i>C. nuttallii</i>)	flowering: Spring Grove, Sunset Kousa (<i>C. kousa</i>): many cultivars Bunchberry (<i>C. canadensis</i>) Carnelian cherry (<i>C. mas</i>) Japanese cornel (<i>C. officinalis</i>)
CHINESE ELM (<i>Ulmus parvifolia</i>)¹ Evergreen, True Green	Drake
PRIVET (<i>Ligustrum</i> spp.)² Common privet (<i>L. vulgare</i>)	Amur (<i>L. amurense</i>) Ibota (<i>L. obtusifolium</i>) Regal (<i>L. obtusifolium</i> 'Regelianum')
SYCAMORE (<i>Platanus</i> spp.) London plane (<i>P. acerifolia</i>): Yarwood ³ American sycamore (<i>P. occidentalis</i>) California sycamore (<i>P. racemosa</i>)	London plane: Bloodgood, Columbia, Liberty

1 All cultivars appear resistant in warm interior areas of California where Chinese elm anthracnose is uncommon.
2 *Glomerella cingulata* severely blights and cankers common privet in the eastern United States. It infects other hosts in California but is not common or does not occur on privet.
3 Yarwood is largely undamaged by anthracnose if pollarded regularly.

open and spring rains have stopped. Avoid irrigation systems that wet the leaves.

Pollarding (i.e., pruning to establish a stable tree frame branching with knobs) London plane trees controls anthracnose because pathogen-infected shoots are removed. However, pollarding increases susceptibility of London plane trees to powdery mildew because it stimulates growth of new shoots and foliage. If London plane trees are regularly pollarded, Yarwood is a good

choice because it is highly resistant to powdery mildew and its susceptibility to anthracnose will be controlled by pruning.

Fungicide Applications

Some fungicides provide a degree of control on Modesto ash if thoroughly sprayed on all new growth as buds begin to open in spring. The spray must be applied before rainy periods because fungicides can only protect healthy tissue and do not eradicate existing infections. If no rains are pre-

dicted, this application can be delayed. If moist weather prevails, additional applications may be needed at intervals of about 2 weeks to protect newly exposed growth.

The most effective fungicides for control on Modesto ash are chlorothalonil (e.g., Ortho Garden Disease Control), a protective fungicide, and thiophanate-methyl (e.g., Cleary's 3336—professional use only), a systemic fungicide. Only chlorothalonil is readily available to home gardeners. Proper application timing is critical for both fungicides.

Complete coverage of very large, tall trees is difficult to achieve; spraying is not very efficient and may not be justified or feasible. Fungicide applications for anthracnose control generally are not recommended for hosts other than ash.

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REFERENCES

McCain, A. H. 1983. *Sycamore Anthracnose*. Oakland: Univ. Calif. Agric. Nat. Res. Leaflet 2618.

Sabaloni, J., K. Hesketh, and A. H. McCain. 1982. *Chinese Elm Anthracnose*. Oakland: Univ. Calif. Agric. Nat. Res. Leaflet 21322.

Sinclair, W. A., H. H. Lyon, and W. T. Johnson. 1987. *Diseases of Trees and Shrubs*. Ithaca: Cornell University Press.

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Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Confine chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits or vegetables ready to be picked.

Do not place containers containing pesticide in the trash nor pour pesticides down sink or toilet. Either use the pesticide according to the label or take unwanted pesticides to a Household Hazardous Waste Collection site. Contact your county agricultural commissioner for additional information on safe container disposal and for the location of the Household Hazardous Waste Collection site nearest you. Dispose of empty containers by following label directions. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.

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