

2. Marssonina Leaf Spot of Cottonwood and Aspen

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Marssonina leaf spot, a widespread and serious disease of native and hybrid poplars, can severely defoliate susceptible trees well before normal fall leaf drop. The disease is caused by fungi in the genus *Marssonina*.

Hosts and Distribution

Marssonina spp. are distributed widely on poplar in Europe and are native to North America. All species of poplar are hosts for these pathogens. *M. populi* damages quaking aspen in the Rocky Mountains and has been found on narrowleaf cottonwood, although the latter is not considered a highly susceptible host. Severe defoliation of eastern cottonwood by *M. brunnea* has been observed along the Mississippi River Valley from Mis-

sissippi to Iowa and as far west as Nebraska. Although *M. brunnea* defoliates most native poplars, it is most damaging to susceptible clones grown under a short rotation intensive-management culture, and is considered a significant threat to eastern cottonwood in central United States.

Symptoms and Signs

Dark brown flecks, often with yellow margins, appear on leaves within a few weeks after leaves emerge in spring. On eastern cottonwood, reddish-brown to purple lesions develop on both leaf surfaces. These spots darken with age and gradually enlarge to 1–2 mm in diameter (fig. 2-1). Individual spots on severely infected leaves may coalesce to form angular, necrotic blotches. The leaf spots on quaking aspen vary in size, and are circular or lens-shaped. A yellow to golden margin often borders each spot.

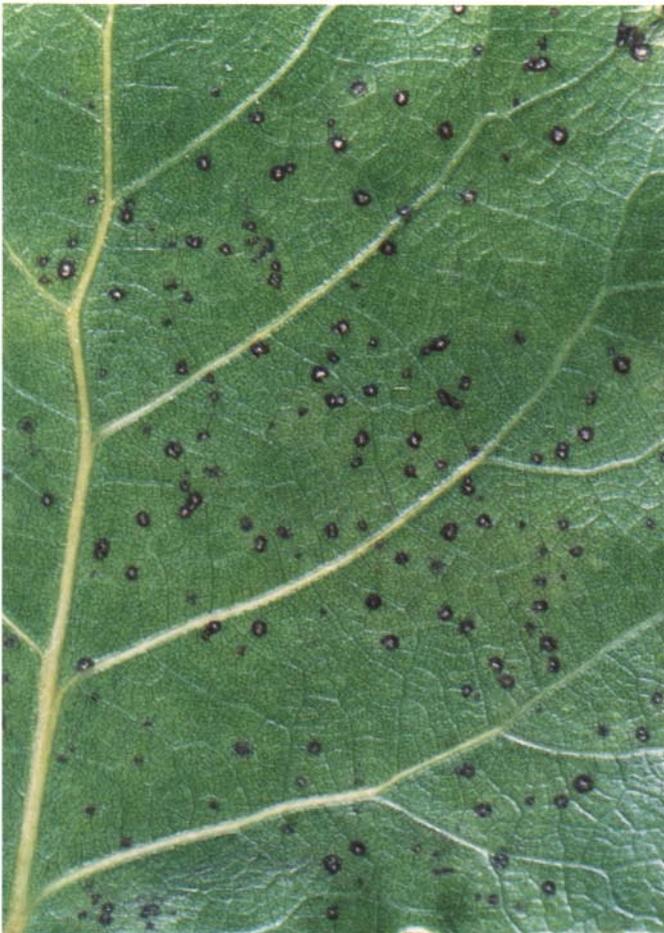


Figure 2-1. Marssonina leaf spots on a poplar leaf.



Figure 2-2. Elliptical lesions on petioles of poplar leaves caused by *Marssonina* sp.

Subcuticular lens-shaped fruiting bodies (acervuli), containing a white gelatinous mass of conidia, form within leaf lesions. As macroconidia are released, the epidermis ruptures forming a small, ring-like blister (fig. 2-1).

Diseased leaves on affected trees appear smaller than normal, turn yellow to bronze, and are shed prematurely. The fungus moves progressively upward into the crown. If viewed from a distance, the diseased leaves appear bronzed.

Elongate black lesions develop on veins, leaf petioles, and terminal sections of new shoot growth (fig. 2-2). Characteristic fruiting bodies also form on these structures and release masses of conidia.

Macroconidia of *Marssonina* are hyaline, unequally 2-celled, ovate or pear-shaped, and are 11 to 16 μm by 3.5 to 7 μm (fig. 2-3). Microconidia are hyaline, 1-celled, elliptical, and range from 3.3 to 5.5 μm by 1.2 to 1.8 μm . *Marssonina* grows slowly in culture; it produces spores in a yellow matrix, with portions of the colony turning dark as it matures (fig. 2-4).

Disease Cycle

Primary infection is by conidia and ascospores produced in overwintering fruiting bodies on fallen leaves or on infected shoots on the tree. In spring and early summer, conidia are released and splashed by rain or carried by wind to newly emerged leaves and succulent young shoots. Throughout summer and early fall, conidia produced on leaf and shoot lesions are spread to other leaves and shoots, initiating secondary infections. Epidemics coincide with the length and frequency of wet weather.

Damage

In nurseries and plantations, the *Marssonina* leaf spot pathogen causes only slight damage to cuttings and young seedlings until sufficient inoculum develops on infected shoots and on fallen leaf debris. On more established plantings and in native stands, repeated outbreaks result in branch and twig dieback and predispose trees to other pathogens or pests and to injury from low temperatures. Severe defoliation of eastern cottonwood by *M. brunnea* has been reported throughout much of the central and southern Mississippi River Valley.

Control

No fungicides are presently registered for control of *Marssonina* leaf spot on poplar.

The most successful control is to plant poplars resistant or tolerant to *Marssonina* leaf spot. Current research, however, indicates specialization in *Marssonina* spp. infecting poplar. This must be taken into account in developing resistant cultivars.

The disease can be minimized on established susceptible poplars through sanitation. Removing dead and infected twigs from diseased trees and raking up and

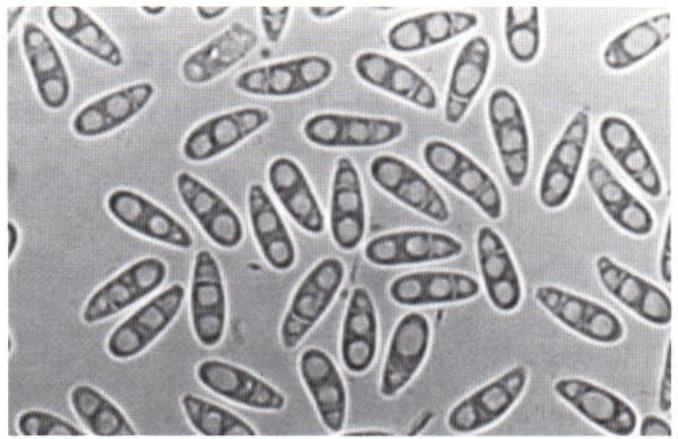


Figure 2-3. Macroconidia of *Marssonina* sp.

Figure 2-4. Colony of *Marssonina* sp. in pure culture.



destroying fallen leaves during the growing season reduces primary and secondary infections. To restrict spread within the nursery and into home landscapes, nurserymen should take propagative cuttings only from disease-free shoots.

Selected References

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