

23. Phomopsis Canker on Cottonwood

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Cottonwood occurs naturally along streams and rivers throughout the Great Plains. In most of its range, cottonwood grows on moist, well drained soils; but in the western semi-arid one-third of its range, it is found only along streams.

Hosts and Distribution

Phomopsis macrospora causes dieback and cankers on many tree species in the United States, as well as in

Europe and Japan. The species was first described in Japan in 1961 and in the United States in 1967. The perfect stage of the fungus was first described on willow in 1891. This stage is distinctly different from the perfect stages—*Diaporthe eres* and *D. medusaea* (the predominant species on *Populus*) because of its larger ascospore with appendage and because the alpha spores are larger than the beta spores.

Symptoms and Signs

Phomopsis cankers develop on cottonwood twigs, limbs, and boles; they are inconspicuous during early development. Small pustules on cankers appear as small black dots, protruding through bark epidermis (fig. 23-1). Spores are pushed out of the pore of pustules under moist conditions, and often form sticky orange or reddish sporehorns (fig. 23-2). As the canker develops and enlarges, the phloem tissues die, forming a sunken area (fig. 23-3). When the stem is girdled, the distal portion dies; the resulting dead leaves cling to the branches for several weeks (fig. 23-4). Similar symptoms are caused by *Fusarium*, *Cytospora*, and other canker-causing fungi.

P. macrospora fruits profusely on dead wood. The small black fruiting bodies are less than a millimeter in size. They look like miniature mountains protruding through the bark (fig. 23-5).



Figure 23-1. Small black pustules of *Phomopsis macrospora* on surface of canker.

Figure 23-2. White curled sporehorns composed of millions of spores that can cause new infections.



Figure 23-3. (a) Sunken area inside canker. (b) Canker 23-3a with outer bark removed to show necrotic tissues.



Disease Cycle

The asexual spores are the primary inoculum. Conidia are primarily wind- and insect-dispersed, but rain can spread the spores to wounds on lower parts of the tree. The fungus is considered a wound parasite, and needs some natural or wound opening before it can penetrate and colonize tissues. The size of canker that develops depends on tree vigor. On fast-growing cottonwoods, canker development is usually limited and the callus tissue formed restricts fungal growth. On slow-growing trees (trees growing under moisture stress or in poorly aerated soils), cankers can girdle the stem and cause mortality.

Damage

Phomopsis is one of the most important pathogens that cause mortality of planted cuttings. In most cases the fungus is on the cuttings when they are taken from the nursery, and girdles the stem within a few weeks after planting.

Control

Good cultural practices can reduce the possibility of mortality of shade trees. Fertilize trees at the rate of 6 pounds of N-P-K per 1,000 square feet, water at the rate of 2 inches per week during droughty periods, and control insect defoliators and leaf diseases to reduce tree stress and promote tree vigor.

To prevent losses when planting poplars, select healthy, canker-free cuttings or seedlings. Prevent cuttings from drying in storage; soak them at least 24 hours prior to planting. Cultivation is needed during the first year to keep trees growing vigorously. Plant poplars that are resistant to *Septoria* leaf disease.

Selected References

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Figure 23-4. Crown of cottonwood showing dead leaves on branches girdled by cankers.

Figure 23-5. Small black fruiting bodies of *P. macrospora* protruding through bark.

