3. Septoria Leaf Spots of Cottonwood, Caragana, and Maple

Joseph M. Krupinsky and David W. Johnson

Septoria leaf spots of cottonwood, maple, and caragana (Siberian peashrub) are caused by the fungi *Septoria musiva*, *S. aceris*, and *S. caraganae*, respectively. Because the life cycles of these fungi are similar and information on *S. aceris* and *S. caraganae* is limited, information on *S. musiva* on cottonwood will be presented as a general example of this type of disease.

Hosts and Distribution

S. musiva causes leaf spot and cankers on native and hybrid poplars commonly grown in windbreaks (fig. 3–1). The disease is widely distributed in Canada and the United States. *S. aceris* on maple is distributed throughout the United States, while *S. caraganae* has been reported on caragana in windbreaks in the Great Plains.

Symptoms and Signs

Symptoms reported for Septoria leaf spot on cottonwood vary according to time of infection, hosts, and texture and age of leaves. Four types of leaf spot symptoms have been described (figs. 3–2, 3–3):

1) Brown, mostly circular leaf spots that may have a brown or yellow margin, with pycnidia clustered within. These spots often are 1 cm in diameter.
2) Small flecks, commonly with very angular margins. Flecks may coalesce to form spots 2 to 10 mm across.
3) White or silvery spots, mostly 1 to 3 mm in diameter.
4) Irregularly shaped large spots that are light tan in the center, with a dark brown margin. Black pycnidia are commonly clustered in the center of spots (fig. 3–4). These spots may be several cm across; some look like targets because of rings or zones within the spot.

When leaves bearing pycnidia are under high humidity, conidia are discharged from the top of the pycnidia in pink or white curled spore horns. Because fungi other than *Septoria* can cause similar leaf spots, the type and size of the conidia must be examined for positive fungal identification. Conidia of *S. musiva* are hyaline, cylindric, straight or slightly curved, usually 2–4 septate, and 17–56 by 3–4 μm (fig. 3–5). *Septoria* leaf spots on maple species usually are small and reddish-tan to brown. The same fungus can also infect immature fruits of maple and cause browning. The conidia of *S. aceris* are cylindric, straight or slightly curved, usually 3 septate, and 20–43 by 2–3 μm. Conidia of *S. caraganae* are hyaline, usually 1–3 septate, and 30–50 by 2.5–3.5 μm.

Disease Cycle

S. musiva overwinters in dead leaves and twigs in-

Figure 3-1. Defoliation of Northwest poplar by *Septoria musiva*.

fected the previous growing season. Initial infections in spring are from ascospores (sexually produced spores) released from fungal fruiting structures on fallen infected leaves. The perfect stage of *S. musiva* is *Mycosphaerella populorum*. Ascospores are 1 septate, hyaline, and 16–28 by 4.5–6 μm. Primary infections are mostly confined to leaves on lower branches. During summer rains, conidia produced on leaf spots may be washed from infected leaves and twigs, causing secondary infections. With favorable conditions of moisture and high humidity, numerous infections result in yellowing of leaves and premature defoliation. In new nurseries or plantings, infections can develop from spores lodged on cuttings from infected stool beds, from windborne spores from nearby infected cottonwood trees, and from spores produced on young cankers on the planting stock.

Damage

Numerous infections can result in premature defolia-

Figure 3-2. Circular leaf spots on leaf of Northwest poplar infected by *S. musiva*.

tion of highly susceptible trees. Multiple cankers can girdle stems. Individual cankers are possible infection courts for other pathogens such as *Cytospora*, *Phomopsis*, and *Fusarium* that can girdle stems. When conditions are favorable, *S. caraganae* can become epidemic and cause premature defoliation.

Control

These pathogens are best controlled by planting only resistant or tolerant clones. Spraying stool beds with a fungicide and spacing trees to provide good aeration and reduce high humidity may reduce infection of leaves and stems. Sanitation is also important in stool beds. All infected overwintering leaves and stems should be removed to prevent new shoots from becoming infected by ascospores. Sanitation in the field—burial or removal of leaves and stems—can reduce primary infections in the spring.

Selected References

Filer, T. H., Jr. Septoria leaf spot and canker on cottonwood. In: Forest Nursery Diseases in the United States. Agric. Handb. 470. Washington, DC: U.S. Department of Agriculture; 1975: 101–103.

Kennedy, Patrick C. Insects and diseases of Siberian pea shrub (Caragana) in North Dakota, and their control. Research Note RM–104. Fort Collins, CO: U. S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station; 1968. 4 p.

Palmer, Marguerita A.; Schipper, Arthur L. Jr.; Ostry, Michael E. How to identify and control Septoria leaf spot and canker of poplar. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station; 1980. 6 p.

Thompson, G. E. Leaf-spot diseases of poplars caused by *Septoria musiva* and *S. populicola*. Phytopathology. 31: 241–254; 1941.

Waterman, Alma M. Septoria canker of poplars in the United States. Circular 947. Washington, DC: U.S. Department of Agriculture; 1954. 24 p.

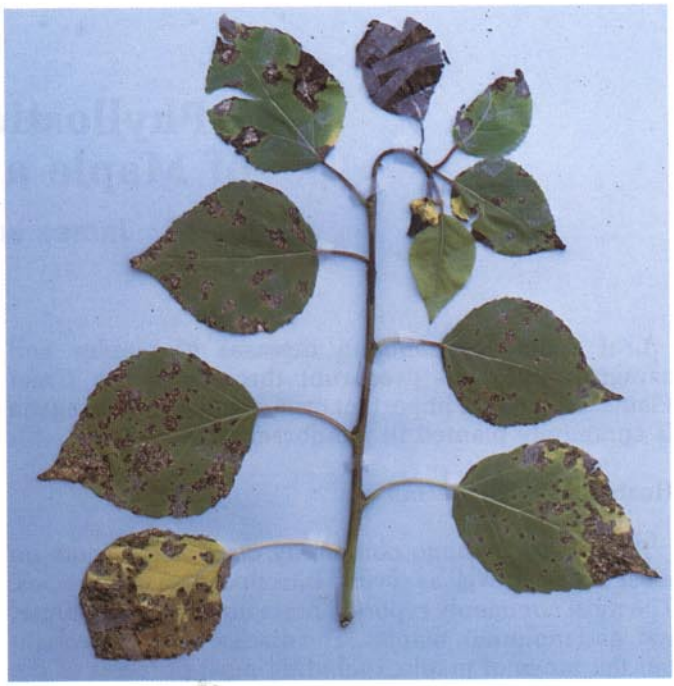

Figure 3-3. Range of leaf spot symptoms on Northwest poplar inoculated with *S. musiva*.

Figure 3-4. Pycnidia of *S. musiva* within leaf spot lesions.

Figure 3-5. Conidia of *S. musiva*.