



Leucostoma canker

Introduction

Leucostoma niveum, a fungus, causes a canker and dieback disease on aspen (*Populus* spp.) and willow (*Salix* spp.) as well as several other hardwood trees and shrub species. Susceptible hosts of this pathogen often are previously stressed by competition with neighboring vegetation, drought, nutritional deficiency, winter injury, and/or wounding. Therefore, *L. niveum* (hereafter referred to as *Leucostoma*) is considered an opportunistic pathogen, capable of colonizing stems or twigs either injured or weakened by other causes.

Host(s) and Distribution

Leucostoma canker occurs throughout North America, Europe, and Asia. The pathogen, *L. niveum*, causes disease on a broad range of hosts including alder (*Alnus* spp.), birch (*Betula* spp.), ironwood (*Carpinus* spp.), mountain ash (*Sorbus* spp.), aspen, and willow. Although the disease has been reported to affect 10 *Salix* species, descriptions depicting the disease cycle or damage of *Leucostoma* on susceptible willows in North America are limited to weeping (*S. babylonica*), black (*S. nigra*), and pussy (*S. discolor*) willows. However, in a 2009 survey of three coppice plantations in NY State, fantail (*S. sachalinensis*) and goat (*S. caprea*) willows, two Eurasian species, were the only shrubs affected by this pathogen. Fantail willow also was found to be susceptible to at least one related species, *Valsa sordida*.



Numerous white, disc-like stromata of *Leucostoma niveum* on *Salix sachalinensis* (Tully, NY).

Symptoms and Signs

Leucostoma cankers are sunken, yellow-brown or black, and elongate (ellipsoid) or irregular in outline on branches, stems, or twigs. The margin of each stem canker is well defined by a small ridge (i.e., lip or roll) of callus tissue that surrounds the darkened bark of the canker. Small, white pustules (diameter: 1-2 mm) bearing asexual (pycnidia) and/or sexual (perithecia) fruiting bodies develop in necrotic bark tissue, and the white context of either type of fruiting body is readily visible when sliced with a sharp blade. Several generations of pycnidia as well as perithecia can be found in a single canker. However, pycnidia are the first fruiting bodies to develop following infection and generally appear in the first spring or summer after infection. Perithecia often accompany pycnidia within individual pustules later in the growing season and mature in the fall and winter.

Following wet weather, tendrils of asexual spores (conidial horns; cirrhi) are exuded through minute pores in the pycnidia and can “grow” to several millimeters above the canker surface before collapsing into a slimy mass with the next rain event. Conidia are colorless, one-celled, somewhat curved (sausage-shaped), and approximately 4-6 x 0.8 µm. Perithecia are black, flask-shaped, measure 0.3 to 0.5 mm (typically 0.5 mm) in diameter at maturity, and are arranged in a circular-fashion (ring) within the sexual stroma (pustule; 6-18 perithecia/ring). Sexual spores borne in perithecia (ascospores) are contained within club-shaped “sacs” (asci; 8 ascospores/ascus). Ascospores are hyaline, sausage-shaped like the conidia but about twice as large, typically measuring 8.0 x 1.3 µm.

Disease Cycle

Leucostoma overwinters as mycelium in infected twigs, buds, or stems. Conidia are produced throughout the growing season in pycnidia embedded within infected plant parts. During and shortly after rain, conidia are dispersed by wind, rain splash, or insects, and cause the majority of infections. Natural openings (e.g., buds and lenticels) and wounds created by man, abiotic injury, or insect damage seem to be the most frequent sites for infection, presumably because this pathogen cannot penetrate intact willow bark. Conidial infections can occur throughout the growing season, particularly in the spring and late fall, and especially if the shrubs are stressed by adverse environmental or cultural conditions. *Leucostoma* cankers enlarge when the host is dormant but when temperatures are high enough to permit fungal growth. However during the growing season, willows react to injury of any kind – including that caused by pathogen invasion - via the production of woundwood or callus. Ascospore-initiated cankers likely occur; but the role of ascospores in the epidemiology of *Leucostoma* disease remains unclear.

Damage

Although canker pathogens cause some of the most destructive diseases of forest trees (e.g. chestnut blight, beech bark disease, Scleroderris canker), no evidence currently exists to indicate that *Leucostoma* canker is a threat to willows grown in short-rotation plantations in NY State. *Leucostoma* on planted willows now likely is indicative of nutrient or water stress, insect damage, or freeze-thaw and frost injury.

Selected References

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