

# Cytospora Canker of Conifers

## Branch flagging in stressed conifers

**Pathogen**—Cytospora canker of conifers is caused by *Valsa kunzei* (= *Leucostoma kunzei*) (asexual stage is *Cytospora kunzei*, = *Leucocytospora kunzei*). The disease is commonly referred to as Cytospora, Valsa, or Leucostoma canker.

**Hosts**—Many coniferous species are hosts, primarily spruce species. Common hosts in the Rocky Mountain Region include Colorado blue spruce, white spruce, Engelmann spruce, and Douglas-fir. The disease is particularly prevalent in windbreaks and ornamental plantings.

**Signs and Symptoms**—From a distance, the most obvious symptom is dead or dying branches, particularly older branches (fig. 1). Cankers are diamond-shaped and are usually very resinous—clear amber resin exudes from canker margins and eventually hardens to a conspicuous white crust (this symptom is less prominent on Douglas-fir). Cankers on trunks become sunken in the middle with expanding, flared edges (fig. 2). Branch cankers are common on all conifer hosts, and Engelmann spruce and Douglas-fir are also susceptible to trunk cankers. When a branch is girdled, foliage becomes discolored, dies in spring and summer, and brown needles are shed the following winter (fig. 3). The disease often progresses upward in tree crowns. Small (1/25-1/13 inch [1-2 mm]), black fruiting bodies are sometimes visible around the edges of cankers. During moist weather, yellow tendrils of spores ooze from pycnidia (fig. 4).

**Disease Cycle**—Cytospora canker is a disease of stressed conifers. The pathogen overwinters in cankered bark. Ascospores and conidia are dispersed during wet weather in the spring, summer, and fall by splashing rain, wind, and insects. Infection occurs through wounds; tiny openings in the bark created by environmental stresses such as ice or snow may also serve as infection courts. Symptoms develop shortly after infection but latent infections are not uncommon. The fungus can remain dormant on the outer bark until an infection court becomes available. Pycnidial and later perithecial stromata form around the edges of old cankers, and the fungus colonizes adjacent healthy tissue.

**Impact**—Cytospora canker causes branch and stem cankers, which can deform stems. It is one of the most common and damaging diseases of planted spruce. Colorado blue spruce sustains the most damage east of its natural range. The pathogen is opportunistic and invades trees weakened by other factors such as drought, hail, or insects. Older branches are more susceptible, so infections generally start in the lower crown and progress upward. Mortality is rare.



Figure 1. Typical symptomatic branch flagging caused by Cytospora. Photo: Joseph O'Brien, USDA Forest Service, Bugwood.org.



Figure 2. Sunken stem canker with flared edges on Engelmann spruce. Photo: Kelly Burns, USDA Forest Service.



Figure 3. Branch canker, showing white, resinous pitch. Photo: Michael Kangas, North Dakota State Forest Service, Bugwood.org.

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**Management**—The incidence and severity of Cytospora canker may be reduced by maintaining tree vigor (fertilize, water, control insects), reducing injuries to the stem and bark, and pruning and destroying infected branches.



Figure 4. Cytospora spore tendrils exuding from pycnidia. Photo: Michael Kangas, North Dakota State Forest Service, Bugwood.org.

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1. Sinclair, W.A.; Lyon, H.H. 2005. Diseases of trees and shrubs. 2nd ed. Ithaca, NY: Cornell University Press. 659 p.