Shepherd's Crook

Leaf and shoot blight of young aspen

Pathogen—Shepherd's crook, also known as aspen shoot blight, is caused by the fungus *Venturia tremulae* var. *grandidentatae* (= *V. moreletii*). The asexual stage (anamorph) of the fungus is *Fusicladium radiosum* var. *lethiferum* (= *Pollacia radiosa*). A similar disease is caused by *Venturia populina* but usually on other *Populus* species. Several other less common *Venturia* species cause similar diseases in other parts of North America.

Hosts—*Venturia tremulae* infects *Populus tremuloides, P. alba, P. grandidentata*, and hybrids. It has also been reported on *P. angustifolia* and occasionally infects other *Populus* species. The pathogen occurs across North America and in Europe.

Signs and Symptoms—Dark brown to black lesions first appear in the spring on leaf blades, petioles, or current-season shoots. Affected leaves and shoots often droop and curl, leading to the name of the disease (figs. 1-2). Early symptoms can look similar to frost damage, but patterns in the landscape differentiate the two. Infections can progress from leaves to petioles to shoots. Dead tissues eventually become dry and brittle and break off. During wet weather, lesions develop a fine, olive-colored fuzz due to production of asexual spores on the surface.

Figure 1. Shepherd's crook on young aspen, showing the typical "crook" (drooping) of the young, dead apical shoots and lesions on lower, living foliage. *Photo: Jim Worrall, USDA Forest Service.*

Disease Cycle—The pathogen can survive the winter as mycelium in the stubs of blighted shoots. It also overwinters in blighted foliage on the ground, where pseudothecia (sexual fruiting bodies) develop during the dormant season. In the spring, sexual spores are released into the air and can cause initial infections. The mycelium in stubs of blighted shoots may also produce infective asexual spores that are dispersed by rain splash. If the weather remains wet, subsequent cycles of infection are caused by asexual spores produced on diseased tissues. Lateral shoots cease growth early in the season and become resistant, so most infections later in the season are on terminals that continue to grow and remain succulent.

Figure 2. A group of aspen suckers, all with blighted terminals. *Photos: Jim Worrall, USDA Forest Service.*

Impact—During very wet years, particularly early in the growing season when tissues are succulent, the disease can kill nearly all terminal shoots of suckers and small saplings. Growth rate is reduced and the stem may become crooked as lateral shoots assume dominance. If infection is repeated for years, growth may take on a shrubby form as the terminals are repeatedly killed back. Smaller plants may be killed when disease is severe. The disease is most severe on moist sites.

A quantitative study using wounding to simulate the disease concluded that it significantly reduces height growth. However, the effect was temporary; differences between treated and control plants diminished over several years.

There is a high degree of genetic variation in resistance to shepherd's crook. Resistant genotypes have higher concentrations of condensed tannins in their tissues.

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Management—No practical management approaches are available for this disease in a forest environment. Because the effects are usually temporary and aspen populations recover, the disease is usually not a major management concern.

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