15. Phomopsis Canker of Douglas-fir

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Hosts

Phomopsis canker, caused by the fungus *Phomopsis lokoyae* (sexual state: *Diaporthe lokoyae*), affects both the Pacific Coast and Rocky Mountain varieties of Douglas-fir. Western hemlock and western redcedar are rare hosts.

Distribution

Phomopsis canker is found in California, Oregon, and Washington. Another species, *Phomopsis occulta*, has been reported to cause cankers on Douglas-fir and western hemlock seedlings in a northwest California nursery.

Damage

The fungus causes cankers on stems and branches; however, death occurs infrequently, and those seedlings that are killed are usually scattered throughout the nursery beds. The greatest impact of the disease is a reduction in seedling quality and an increase in the number of culls.

Diagnosis

Look for cankers on stems and branches of current-year growth (fig. 15-1). The foliage turns yellow and dies quickly once the canker encircles twigs or branches. When the canker occurs in succulent growing tissue, look for the stem to be bent into the shape of a shepherd's staff (fig. 15-2). These symptoms are typical of many other diseases, and the only positive identification of the disease is by the fruiting bodies of the causal organism.

Both P. lokoyae and P. occulta produce in the cankered areas pycnidia that are visible with a 10 x hand lens, and both form two types of spores. Alpha-spores of *P. lokoyae* are hyaline, ellipsoid, one-celled, and 6-10 x 2-4 microns; beta-spores are 10-12 x 1.5-2 microns. Alpha-spores of *P. occulta* are similar to those of *P. lokoyae*, but the beta-spores are 20-30 x 1 microns.

Perithecia of the sexual state of P. lokoyae are produced in a stroma immersed in the bark. Ascospores are ellipsoid, hyaline, two-celled with a hyaline appendage at each end, and 10-16 x 2.2-4.5 microns.

Figure 15-1—Seedling of Douglas-fir affected by Phomopsis canker. Note canker on stem below dead foliage.

Figure 15-2—Note shepherd's crook symptoms, or bending of stems, on infected Douglas-fir seedlings.

Biology

Alpha-spores produced in pycnidia are waterborne and are spread to new hosts by splashing drops of rain or sprinkler irrigation. Under favorable conditions of temperature and humidity, the spores germinate and infect the current-year needles on new hosts. The fungus grows into and kills the inner bark of the stem or twig. Ascospores of the sexual state of *P. lokoyae* are windborne and are responsible for the long-distance spread of the fungus.

Control

Spraying Douglas-fir seedlings with benomyl at 2- to 4-week intervals throughout the growing season has provided some control.

Selected References

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