11. Phoma Blight

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Revised from chapter by Michael D. Srago, Robert L. James, and John T. Kliejunas, 1989.

Hosts

Phoma blight is associated primarily with *Phoma eupyrena*, although a few other *Phoma* species are sometimes isolated from diseased plant tissues. The disease primarily affects Douglas-fir; red and white fir; mugo, lodgepole, and ponderosa pines; and Engelmann spruce.

Distribution

Phoma blight probably occurs at low levels within bareroot nurseries in most Western States.

Damage

Phoma blight causes chlorotic and necrotic foliage, tip dieback, defoliation, and mortality of 1-0 bareroot seedlings. Stem cankers of 2-0 stock may also occur. Losses vary, but can be significant during certain years at some nurseries.

Diagnosis

On young 1-0 bareroot seedlings, chlorotic needles become evident near the groundline. Foliage covered with soil becomes necrotic. As the disease progresses, the entire seedling becomes chlorotic and finally dies. On Douglas-fir seedlings, infected needles often turn a golden brown and frequently drop prematurely. Terminal and lateral branch dieback or blight occurs on both Douglas-fir and true firs but is more common on the latter. Dieback starts at or near the buds, progresses down the stem, and, if continued, results in seedling death (figs. 11.1 and 11.2). Stem cankers associated with colonization by *P. eupyrena* may occur on older (2-0) Douglas-fir seedlings, but mortality is rare on older seedlings. *Phoma* produces black fruiting bodies (pycnidia) on dead needles, stems, and canker margins. Other fungi (*Sphaeropsis, Sirococcus*), however, may form similar looking fruiting bodies on diseased conifer seedlings. Microscopic examination of spores from fruiting bodies is necessary to verify which pathogen is involved. *Phoma* spores are hyaline and one-celled (fig. 11.3). Size varies according to species; spores of *P. eupyrena* are 3 to 6 by 1.5 to 3 microns.

Figure 11.1—*Blight in terminal bud of a true fir seedling. Small black fruiting bodies of the fungus are visible on dead needles.* Photo by Robert L. James, USDA Forest Service.

Figure 11.2—*Dieback progressing down the stem of a true fir seedling. Note discoloration on stem and at base of needles.* Photo by Robert L. James, USDA Forest Service.

Biology

Phoma species are common soil inhabitants. Overhead irrigation or rain splash may result in excessive soil collar buildup around young seedling stems. *Phoma* can invade seedlings from soil collars, usually through the lower needles. *Phoma* then spreads up the seedling crown, killing needles until the seedling is defoliated. *Phoma* also frequently kills new buds. On older seedlings, soilborne *Phoma* spores can infect needles;

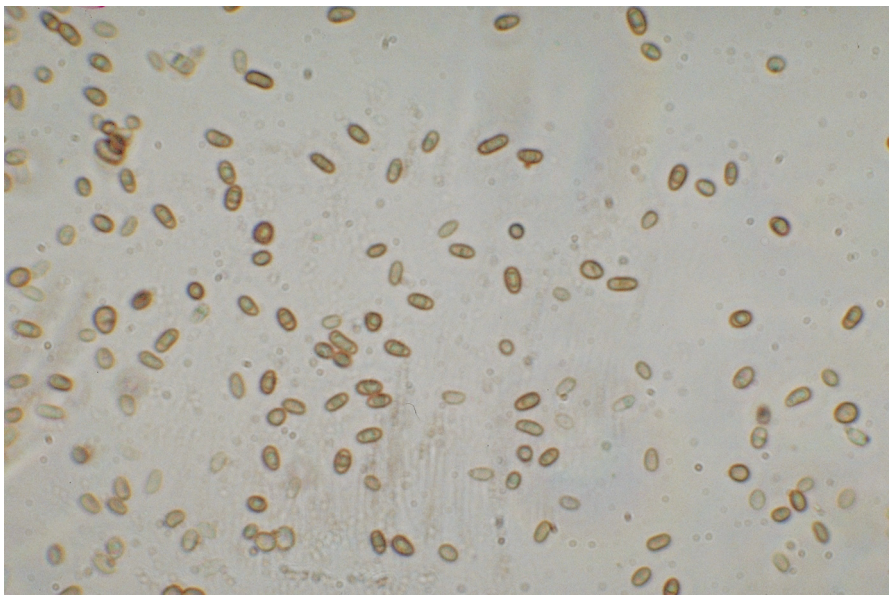

Figure 11.3—*Clear, oval, one-celled spores of* Phoma *species.* Photo by Robert L. James, USDA Forest Service.

colonization then progresses to stems, eliciting cankers. Seedlings weakened by nutrient imbalances, such as excess calcium and iron, are especially susceptible to attack.

Control

Cultural

Sowing bareroot beds early to increase seedling height during the first year may be helpful in reducing damage and mortality. Foliage above soil cones formed during the winter following the first growing season seldom becomes infected. Mulches that reduce soil cone formation help limit Phoma blight incidence.

Chemical

Fumigating soil before planting reduces or eliminates potentially pathogenic fungi in nurseries, including *Phoma*. Most *Phoma* species are good saprophytes, and high soil populations may build up on incorporated cover crops and organic amendments. When disease symptoms become noticeable, fungicide applications at 2- to 4-week intervals during the dormant season (October to April) reduces losses.

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