6. Eastern White Pine Foliage Blight

Charles E. Affeltranger and Charles E. Cordell

Hosts

This foliage blight, associated with a species of Pestalotio, affects 2-0 and 3-0 seedlings of eastern white pine. It has not been observed on 1-0 white pine seedlings.

Distribution

This disease has been found in forest tree nurseries in North and South Carolina, Tennessee, Kentucky, and Virginia. A similar foliage disease is also reported from an Ohio nursery.

Damage

Mortality seldom occurs in the nursery, even on severely damaged seedlings.

However, outplanting diseased seedlings results in significantly more seedling mortality and reduced growth than outplanting healthy seedlings.

Diagnosis

The first symptoms appear from late August to October. On 2-0 and 3-0 seedlings, look for small, yellowish spots on the needles. These spots eventually coalesce and turn brown. The needle browning proceeds rapidly toward the needle tips. Where infection is severe, the seedlings in the entire nursery bed may look brown and scorched (fig. 6-1). Extensive defoliation can occur within a few weeks. By the time seedlings are harvested (December-March), defoliation can be so intense that only a few green needles remain near the terminal bud (fig. 6-2).

Figure 6-1—Bed of 2-0 seedlings severely affected by eastern white pine foliage blight.

On affected needles, small, shiny, black, fruiting bodies can be seen with the naked eye or with a 10 x hand lens. Under moist conditions, long, black ribbons of spores are exuded from the fruiting bodies. Individual spores are mostly five-celled (fig. 6-3) and are 22-32 x 7-13 microns. The middle cells are dark, and the end cells, colorless. The spores are ornamented with two to three slender appendages on one end and a single appendage on the other.

The root system of infected seedlings may show various degrees of lateral and feeder root blackening and necrosis.

Figure 6-2—Seedlings partially defoliated by eastern white pine foliage blight. Only terminal green needles remain on some seedlings.

Figure 6-3—Conidia of *Pestalotia* sp. associated with eastern white pine foliage blight.

Biology

A species of *Pestalotia,* morphologically similar to *P. funerea,* has been the only fungus consistently isolated in pure culture from early and late symptomatic eastern white pine foliage. However, root disease fungi, including species in the genera *Fusarium, Phytophthora,* and *Pythium,* have been found in the soil and roots of white pines showing symptoms of foliage blight. These findings suggest that the foliage blight may be caused by a combination of factors: *Pestalotia,* the root disease fungi, and adverse environmental or soil conditions.

No information is available to establish when infection occurs, but it appears to be correlated with extended periods of above average rainfall during the growing season. Little or no disease occurs during growing seasons with below average rainfall. The incidence of disease is highest and damage most severe in densely stocked seedbeds.

Control

Prevention—Use seedbed mulches that are free of fungus pathogens. Favor mulch materials such as hydromulch, sawdust, pine bark, and grain straw. Avoid planting white pine for windbreaks because white pines may provide a source of inoculum. Never ship diseased white pine seedlings between nurseries.

Cultural—Plant at densities of fewer than 25 seedlings per square foot; high seedling densities increase moisture retention of the foliage and decrease air movement-conditions that favor the spread of the fungus. Irrigate during the early morning hours, when seedlings dry most quickly. This practice reduces the time that the seedling could be infected.

Remove and destroy seedlings that have 50 percent or more of their foliage discolored or that are 25 percent or more defoliated, or both. More-intensive practices may be needed when culling white pine Christmas tree stock. As an alternative to culling, grow these seedlings another year as 3-0 seedlings and protect the new foliage with a fungicide.

Store seedlings for as short a time as possible. Maintain storage temperatures at 40 to 45 °F.

Chemical—Chlorothalonil, maneb, and Bordeaux mixture have been effective in controlling the disease. Apply foliar sprays to 2-0 and 3-0 seedlings every 2 weeks from May 1 to October 1. Use additional fungicide during periods of excessive rainfall. A spreader-sticker is needed with maneb.

Before planting, fumigate the soil in nurseries where foliage blight or root disease fungi are potential problems. The most effective fumigant for controlling soil-borne fungi is a mixture of methyl bromide and chloropicrin. Pine needle mulch should also be fumigated before use with methyl bromide-chloropicrin.

Selected References

Graham, J.E.; Nichols, C.R.; Affeltranger, C.E. 1974. An evaluation of five fungicides for control of a white pine foliage disease at the Piedmont Forest Tree Nursery in South Carolina. Asheville, NC: U.S. Department of Agriculture, State and Private Forestry, Forest Pest Management. 7 p.

Vermillion, M.T. 1950. A needle blight of pine. Lloydia. 13: 196-197.