19. Rhizoctonia Blight of Longleaf Pine

James T. English and Edward L. Barnard

Hosts

Rhizoctonia blight affects almost all conifers, but longleaf pines are particularly susceptible because the seedlings grow as grass does, close to the soil. The blight is caused by species of *Rhizoctonia* (*R. solani* or binculeate forms of *Rhizoctonia* with sexual states belonging to the genera *Thanatephorus* or *Ceratobasidium*, respectively).

Few hardwoods are susceptible.

Distribution

Rhizoctonia blight has been reported on bareroot stock in North Carolina, South Carolina, Mississippi, and Florida. It is a potential problem wherever nurseries grow bareroot longleaf pine.

Damage

Rhizoctonia blight can cause significant mortality of longleaf pine it nursery beds. Its effect on field performance of outplanted stock is unknown.

Diagnosis

Look for chlorotic lesions, often with a water-soaked appearance, at the base of needles (fig. 19-1). The ends of the needles initially appear healthy but gradually turn yellow and then brown. In time, the needles' base, as well as the terminal bud and upper taproot, darken and decay (fig. 19-2).

In nurseries, infected seedlings usually occur in groups of various sizes. These infection centers typically consist of several dead seedlings surrounded by seedlings with different degrees of discoloration (fig. 19-3).

Figure 19-1—Chlorotic lesions at base of longleaf pine needles associated with Rhizoctonia blight.

Figure 19-3—Typical infection center of Rhizoctonia blight in longleaf pine bed.

Rhizoctonia spp. can be cultured easily on most common laboratory media. Cultures vary in color from pale yellow to dark brown. These fungi do not commonly produce spores in culture. However, they do readily develop gray to dark brown sclerotia (fig. 19-4). Microscopically, these fungi may be recognized by the characteristic

Figure 19-2—Death of terminal bud and needle bases of longleaf pine caused by *Rhizoctonia* sp. Healthy seedling shown at right.

Figure 19-4—Typical culture of *Rhizoctonia* sp. showing characteristic brown sclerotia.

right-angle branching of the hyphae, which have constrictions at the points where they connect with parent hyphae (fig. 19-5). In older cultures, cross walls usually develop just beyond the hyphal constrictions.

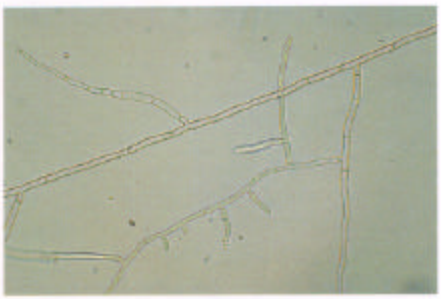

Figure 19-5—Hyphae of *Rhizoctonia* sp. in culture showing characteristic right-angle branching and constrictions near the septa.

Biology

How *Rhizoctonia spp.* infest a nursery is uncertain: sources of inoculum may include contaminated seed, airborne basidiospores, infested soil carried on machinery, or natural mulching material, such as pine straw.

Seedlings are infected through the terminal bud and needle base at or just below the soil surface. Irrigation and rain water, which splash soil onto the low-growing longleaf pine seedlings, create conditions favorable to infection. This situation is often intensified in sandy soils. Once a nursery bed becomes infested, these pathogens spread within soil by mycelial growth. Basidiospores may also be involved.

Rhizoctonia spp. probably overwinter as sclerotia, either within plant debris or in the soil.

Control

Prevention—Use only recently collected, clean seed for sowing. When feasible, sow longleaf pine seed in the fall. Losses in fall-sown longleaf pine have been appreciably less than when seedlings are sown in the spring.

Cultural—Avoid the movement of infested soils within nurseries on machinery or hand tools.

Recent field trials have shown that the incidence of Rhizoctonia blight may be reduced by using hardwood chips rather than pine straw as mulch.

Maintain soil pH below 6.0 to minimize activity of the pathogens. Rhizoctonia blight appears to develop more rapidly in neutral to alkaline soils.

Chemical—Fumigate nursery beds with methyl bromide, preferably mixed with chloropicrin.

Fumigate with methyl bromide all natural mulching material, such as pine straw, because *Rhizoctonia* spp. may exist saprophytically in this material.

Selected References

Davis, W.C. 1941. Damping-off of longleaf pine. Phytopathology. 31: 1011-1016.

English, J.T.; Ploetz, R.C.; Barnard, E.L. 1986. Seedling blight of longleaf pine caused by a binucleate *Rhizoctonia* solani-like fungus. Plant Disease. 70: 148-150.

Gilly, S.P.; Barnard, E.L.; Schroeder, R.A. 1985. Field trials for the control of Rhizoctonia blight of longleaf pine seedlings: effects of seedbed planting densities, fungicides, and mulches. In: South, D.B., ed. Proceedings of the international symposium on nursery management practices for the southern pines; 1985 August 4-5; Montgomery, AL. Montgomery, AL: Alabama Agriculture Experiment Station, Auburn University, and the International Union of Forest Research Organizations: 476-485.

Parmeter, J.R., Jr., ed. 1970. *Rhizoctonia* solani, biology and pathology. Berkeley: University of California Press. 255 p.