

15. Rhizoctonia Blight of Southern Pines

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Revised from chapter by James T. English and Edward L. Barnard, 1989.

Hosts

Rhizoctonia blight, caused by species of *Rhizoctonia* (sexual states in the genera *Thanatephorus* or *Ceratobasidium*) occurs on many southern pine species. In forest seedling nurseries, longleaf pine is highly susceptible to Rhizoctonia blight due to the close proximity of the needles to the soil, while loblolly pine is more affected by aerial web blight. Slash pine has been observed to be resistant to the aerial form of the disease.

Distribution

Rhizoctonia blight occurs throughout the Southern United States wherever susceptible hosts are grown.

Damage

Rhizoctonia blight can cause significant seedling mortality in both bareroot and container nurseries growing longleaf and loblolly pine. Seedling damage by *Rhizoctonia* includes damping-off and rot of roots, stems, needles, and terminal buds. The early grass stage of longleaf pine is particularly vulnerable to damping-off, needle loss, rot, and eventual mortality. On loblolly pine, aerial web blight is the most common form of damage. The disease does not generally cause widespread mortality across nursery beds, but rather occurs in isolated disease foci within a nursery bed that may coalesce over time (fig. 15.1). Coastal loblolly pine families are more susceptible to the aerial web blight form although the disease severity varies among pine families. The effects of infection in the nursery (without mortality) on field performance of outplanted stock are unknown.

Diagnosis

On longleaf pine, water-soaked, chlorotic lesions appear at the base of needles (fig. 15.2). The basal ends of the needles initially appear healthy but gradually

turn yellow and then brown. In time, the needle base, terminal bud, and upper taproot, darken and decay (fig. 15.3). Foliar aerial web blight on loblolly pine can become severe among the lower, interior needles within a nursery bed weeks before symptoms even become visible on the seedling's upper foliage. Often, the disease is discovered only when upper needles are top-clipped, revealing brown patches, dead needles, and bare stems within the canopy (fig. 15.4). Infected foliage turns gray and is covered with fine aerial mycelial webbing. The affected foliage abscises, leaving a bare seedling stem. Unlike longleaf pine, loblolly pine stems and buds do not appear to be infected by the fungus. Frequently, Rhizoctonia blight appears in circular to irregular patterns scattered within the seedling bed. These infection centers typically consist of several dead seedlings surrounded by seedlings with different degrees of discoloration and stages of infection (fig. 15.5). *Rhizoctonia* species

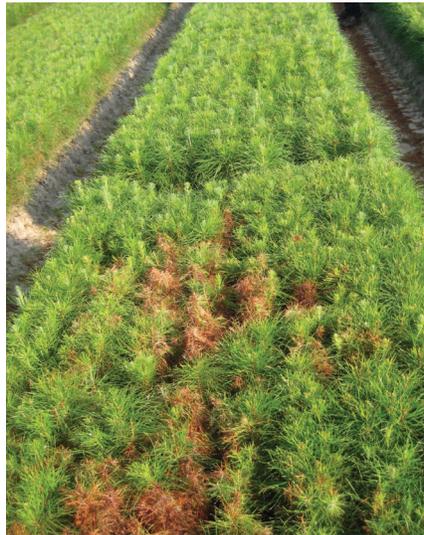


Figure 15.1—*Rhizoctonia foliar blight* disease foci in loblolly pine (foreground). Photo by Tom Starkey, Auburn University.



Figure 15.2—Necrotic and chlorotic lesion at the base of longleaf pine associated with *Rhizoctonia* species. Photo by Edward L. Barnard, Florida Division of Forestry.

Conifer Diseases

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Figure 15.3—Death of terminal bud (left) and needle bases of longleaf pine caused by *Rhizoctonia* species. Healthy seedling is shown on the right. Photo by Edward L. Barnard, Florida Division of Forestry.



Figure 15.4—Necrotic lower needles associated with *Rhizoctonia* foliar blight in loblolly pine. Photo by Tom Starkey, Auburn University.

machinery, or mulch material added to the nursery soils. Longleaf pine 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. After a nursery bed becomes infested, the fungus spreads within soil by mycelial growth. The exact mode of infection for the aerial blight in loblolly pine is unknown, but infection is initiated on the weakened foliage within the interior seedling canopy during warm weather and free moisture after seedling canopy closure within a nursery bed. Basidiospores may also be involved with infection as well. *Rhizoctonia* overwinters as sclerotia, either within plant debris or in the soil. The disease tends to be more severe in soils that are in their second and third crop since soil fumigation.

can be cultured easily on most common laboratory media. Cultures vary in color from pale yellow to dark brown. These fungi generally do not produce spores in culture. However, cultures develop gray to dark brown sclerotia (fig. 15.6). Microscopically, these fungi may be recognized by the characteristic right-angle branching of the hyphae, which have constrictions at the points where they connect with parent hyphae (fig. 15.7). In older cultures, cross walls usually develop just beyond the hyphal constrictions.

Biology

How *Rhizoctonia* species infest a nursery is uncertain, but inoculum sources may include contaminated seed, airborne basidiospores, infested soil carried on



Figure 15.5—Typical nursery bed damping-off of longleaf pine caused by *Rhizoctonia* species. Photo by Edward L. Barnard, Florida Division of Forestry.



Figure 15.6—Typical culture of *Rhizoctonia* spp. showing characteristic brown sclerotia. Photo by Edward L. Barnard, Florida Division of Forestry.



Figure 15.7—Hyphae of *Rhizoctonia* species showing characteristic right-angle branching and constrictions near septa. Photo by Gerald Holmes, at <http://www.bugwood.org>.

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. Variation exists among loblolly pine families and susceptibility to infection, piedmont sources tend to tolerate the fungus over coastal sources. In addition, *Rhizoctonia* blight appears to

develop more rapidly in neutral to alkaline soils, so lower soil pH may mitigate the disease.

Cultural

Avoid the movement of infested soils within nurseries on machinery or hand tools. Irrigate early in the day to prevent long periods of wet foliage. Maintain soil pH below 6.0 to minimize activity of the fungus. High nitrogen fertilization favors *Rhizoctonia* development. Longleaf seed beds can be mulched to reduce soil splash.

Chemical

Fumigate nursery beds to reduce soilborne inoculum. Early detection of damping-off is critical to minimize seedling loss. After symptoms are observed, applications of a registered fungicide should begin as soon as possible. For the aerial blight, regular fungicidal sprays after canopy closure occurs can provide effective control to this disease. Efficacy of chemical control varies with chemicals.

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