

Forest Disease Management Notes

United States
Department of
Agriculture

Forest Service
Pacific Northwest
Region



Armillaria Root Rot

Armillaria root rot, also called shoestring root rot, is caused by the fungus *Armillaria mellea*. This is the most common conifer root rot in the Pacific Northwest. Infection results in growth loss, root and butt rot, uprooting, and tree killing.

Hosts: Virtually all trees and other woody species.

Recognition: Decline in growth increment, foliage yellowing, distress cone crop, heavy resin flow at tree base, tree death; early decay appears as a watersoaked area with tiny pockets; advanced decay is a yellow stringy rot; butt rot sometimes develops in non-resinous hosts, especially hardwoods. Disease centers contain numerous stubs, snags, and dying trees.

White mycelial sheets often shaped like fans developed under bark of roots and lower bole; rhizomorphs (black or brown shoestring-like structures) form in the same areas; mushrooms are golden-yellow with a ring on the stem and grow from infected material in the fall.

Disease Spread: The fungus survives and grows in old stumps or dead trees; rhizomorphs are formed and grow through the soil to infect the roots of new hosts; spread also occurs across root contacts and grafts; spread by spores is negligible. On the West Side Douglas-fir develops resistance to the disease at age 20- Disease centers usually occur around infected stumps of the former overstory. Secondary attack by bark beetles is common. Frequently occurs on trees affected by other root diseases.

Management: West Side - Maintain vigorous growing stock. In severely diseased areas, plant or favor species that appear only lightly or not affected; remove stumps of infected trees to sanitize severely infected sites. Do not thin severely infected areas. **East Side** - Precommercial thinning or harvesting and stump removal may be necessary to sanitize severely infected sites. Normal tree harvesting does not reduce or prevent infection and may aggravate the problem. Infected trees should be treated in recreation areas.

May be Confused With: No other disease or insect if mycelial fans are present.



Diagnostic mycelial fan
under bark of *Armillaria
mellea*-infected tree

Basal resin flow
associated with
Armillaria mellea infection



Armillaria mellea mushrooms