

# Forest Disease Management Notes

United States  
Department of  
Agriculture

Forest Service  
Pacific Northwest  
Region



## Black Stain Root Disease

Black stain root disease is caused by the fungus *Ceratocystis (Verticicladiella) wagneri*. Incidence of this disease is increasing in the Pacific Northwest, particularly in Douglas-fir plantations. Infection results in growth loss and tree killing.

**Hosts:** Major hosts are Douglas-fir and ponderosa pine; mountain hemlock, western hemlock, lodgepole pine, sugar pine, and western white pine are infected occasionally.

**Recognition:** Dark-brown to purple-black stain in the sapwood of roots, root crowns, and lower stems are especially diagnostic. Growth reduction, foliage yellowing, distress cone crops, basal resinosis, rapid decline, death; symptoms may begin on one side of the tree.

**Disease Spread:** Occurs in stands with a large component of host species; in the Pacific Northwest, most common in 10-30 year-old Douglas-fir plantations; sometimes found killing ponderosa pine on moist East Side sites; usually found causing discrete infection centers which contain old dead trees and trees in all stages of disease development; spreads from tree to tree across root contacts and grafts at a rate of 6-12 feet per year; long distance spread probably involves bark beetle and weevil vectors; the fungus dies soon after death of the host tree.

**Management:** Remove host trees in infection center and 50-foot buffer strip; replant with non-hosts. Host trees may be planted 1 year after infected trees are removed.

**May be Confused With:** Laminated root rot, Armillaria root rot, mountain pine beetle damage or animal feeding on roots.



Douglas-fir being killed by  
black stain root disease



Diagnostic stain caused by  
*Ceratocystis wagneri*  
in Douglas-fir