



FOREST PEST FACT SHEET

ROOT DISEASE

Root disease causes more growth loss and mortality than any other disease in Idaho. It is caused by fungi that live under ground and attack the root systems of living trees. The disease kills the roots and continues to live in the dead root systems for decades. Trees with root systems weakened by root disease are predisposed to windthrow, breakage, and bark beetle attacks. Because the disease is active underground, it can go unnoticed resulting in weakened trees that are often attacked and killed by bark beetles. Root disease is caused by several different fungi that can attack all conifer species in Idaho, especially when they are young. Grand fir and Douglas-fir are most susceptible to the disease.

Life Cycle



Roots of healthy trees most often become infected with root disease when they grow into contact with the diseased roots or stumps of adjacent trees. The fungus then begins to spread along newly infected roots, killing them as it goes. When the disease reaches the base of the tree, it rapidly girdles and kills it. Often by this time, bark beetles have also attacked the weakened tree. Once the roots are dead, the fungus can remain alive for decades by decaying the wood in the roots and stumps. Although the disease spreads most commonly by root contact, it can also spread by spores produced in mushrooms or conks growing on or near infected trees. A key diagnostic symptom of the disease is the presence of trees that have been dying slowly over time, as indicated by dying trees, old snags, and both standing and down dead trees. Severely infected live trees may have abnormal pitch flows at their base.

Management



The most common root diseases in Idaho include *Armillaria*, *fir annosum*, laminated, and *Schweinitzii* (brown cubical root and butt rot). Once a site becomes infected with one or more of these diseases, it remains infected for decades. There is no practical way to remove the disease from the site. It doesn't go away! The best treatment is to silviculturally change the tree species on the site from species that are highly susceptible to the disease to ones that are more tolerant of the disease. Tolerant species are those that may be less frequently infected or if infected, are not rapidly killed. None of the conifer species native to Idaho are immune to root disease and all appear to be more susceptible below about age 20.

For more information:

IDL Forest Health website: <http://www.idl.idaho.gov/forestry/insects-and-disease>

U.S. Forest Service Management Guide: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5186684.pdf



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ROOT DISEASE	TOLERANT HOSTS	SUSCEPTIBLE HOSTS	SIGNS & SYMPTOMS	SIGNS & SYMPTOMS	MANAGEMENT STRATEGY
<u>Armillaria</u> 	Western larch Ponderosa pine White pine Lodgepole pine	Highly: Douglas-fir Grand fir Moderately: Redcedar, Spruce, Hemlock	White fungal fans under the bark, basal pitch flows, fading crowns, de- cay in roots, bark beetle attacks	Fungal fans under bark 	Establish & maintain a high component of tolerant species (pines & larch), reduce the amount of susceptible species
<u>Laminated</u> 	Ponderosa pine Lodgepole pine White pine Redcedar	Highly: Douglas-fir Grand fir Moderately: Larch, Spruce, Hemlock, Subal- pine fir	Basal pitch flows, beige fungal growth outside bark of roots, de- cay in roots sepa- rates at growth rings, fading	Laminated decay 	Establish & maintain a high component of tolerant species (pines & red cedar), reduce the amount of susceptible species
<u>Fir annosum</u> 	Western larch Ponderosa pine Lodgepole pine	Highly: Douglas-fir Grand fir Moderately: Spruce, Hemlock, Redcedar, White pine	Fading crowns, conks in hollow stumps or under- neath exposed roots, decay in center of recently cut stumps	Conks in hollow stumps 	Establish & maintain a high component of tolerant species (ponderosa & lodgepole pines & larch), reduce the amount of susceptible species
<u>Schweinitzii root & butt rot</u> 	Redcedar Hemlock Grand fir Subalpine fir	Highly: Douglas-fir Ponderosa pine Engelmann spruce Moderately: Lodgepole pine, White pine	Trees uprooted or broken off, brown cubical decay in roots or stumps, conks on ground near trees & stumps	Fresh & old conks 	Damage is most se- vere in older trees. Maintain rotation length less than 80 years, favor the more tolerant species