



# 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 website: <http://www.idl.idaho.gov/forestry/forester-forums/index.html>

U.S. Forest Service Management Guide: [https://fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5186684.pdf](https://fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5186684.pdf)



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