



Province of
British Columbia
Ministry of
Forests

PesTopics

ROOT ROTS - COPING WITH THE CREEPING CRUD

Although mushrooms in the forest are fun to pick and occasionally good to eat, some, like the honey mushroom, indicate a hidden, slowly progressing tree root disease.



Armillaria mushrooms indicate root disease
(Photo courtesy of CFS)

While tree diseases, death and decay are expected, forest production could be increased dramatically if some root diseases were prevented. In coastal, second-growth forests of Douglas-fir for example, control of laminated root rot (described in PesTopic # 3) could increase timber production by 20% or more.

Root rots are caused by fungi which either kill the tree roots or decay the interior of roots or stems to such an extent that the tree falls. Trees of any age, in nurseries, forest plantations, natural stands and recreation sites can be infected by a variety of fungi. Even in cities, trees with root rot are hazardous to life and buildings.

Forest trees are attacked by several root-disease fungi. In coastal forests, Douglas-fir trees of all ages are infected by laminated root rot, and young trees are vulnerable to Armillaria and blackstain root diseases. Coastal hemlock, spruce and true firs are subject to annosus root rot, but only trees 30 years or younger are killed.

In the interior of the province, Douglas-fir is damaged by laminated root rot, and Armillaria root disease. Blackstain root disease is occasionally damaging to older lodgepole pine. Spruce trees have tomentosus root rot, usually more important as a heartrot in older trees.

To protect new, young forests from root disease, sites are inspected prior to harvest to determine the location and extent of any damage. Diseased trees will show symptoms, such as a flow of resin from the lower trunk or discoloured foliage, and evidence of the disease fungi, such as mushrooms or conks. Knowing the fungus or fungi involved is essential.

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The usual approach to control root disease is to establish less susceptible trees, such as western red cedar, lodgepole pine, western white pine, ponderosa pine or western larch, depending on the site and the disease. However, these trees can be infected, some probably will die, and root disease fungi probably will persist.

Mechanical stump removal after harvest is a drastic but effective treatment. The site must be relatively flat and have deep, coarse soil to support heavy machinery. Operators must pull stumps carefully to avoid disturbing soil. The treatment, now costing \$500.00 to \$1000.00 per hectare, is suitable only for better quality sites. In research trials, less than 1% of planted trees have died from root rot in treated areas whereas 5% died in similar untreated areas.

One possible, but usually impractical treatment for root diseases, is to leave an infected site fallow (without trees) until the fungus dies. However, laminated root rot and Armillaria root disease fungi survive 50 years or more in stumps and in large buried roots. Growing only hardwoods such as alder on a site with

laminated root rot is possible, but not acceptable, for most commercially valuable forests.

In young stands, some measures can be taken to reduce the effects of root disease. During juvenile spacing, infected and susceptible trees can be cut and less susceptible trees left as crop trees. Annosus root rot can be prevented in young coastal hemlock stands by dusting the cut surfaces of stumps with borax which prevents airborne fungal spores from germinating.

The effectiveness of any root disease treatment is not evident for several years. Even on infested sites, it might take 10 to 15 years or more before roots contact old infected roots or stumps. Because root disease fungi grow along roots at 30 - 60 cm (1 to 2 feet) per year, patches of young infected trees develop slowly.

Thus, to maintain and improve productivity of future younger forests, we must keep a close watch for these underground fungi. Otherwise they will take an unacceptable toll.



Digging out diseased stumps and roots to protect future crops of trees
(Photo courtesy of CFS)