



Protect Conifers on Your Courses by Preventing Heterobasidion Root Disease

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Editors Note, Dr. Stanosz joins us this month from the Forest and Wildlife Ecology area of the Department of Plant Pathology at the University of Wisconsin Madison. His work with conifers should be of interest to many golf course superintendents to ensure a healthy tree population. For more information Dr. Stanosz can be reached at 608-265-2863 or my e-mail at grs@plantpath.wisc.edu

Occurrence and spread

Heterobasidion root disease is among the greatest causes of damage to conifer forests throughout the world. Several closely related fungal species in the genus *Heterobasidion* cause this disease. One of these pathogens was found in Wisconsin for the first time in 1993, but by 2010 was known to be killing trees in at least 21 counties in central, southern, and western Wisconsin. More infestations are likely to be discovered each year. Trees most at risk in Wisconsin are pines, spruces, firs, Douglas-firs, and larches. Experience in other states indicates that trees in recreational areas (such as wooded portions of golf courses) can be affected, as well as those in forests. Infection centers often begin when wind-blown spores of the fungus land in recent wounds, such as freshly cut stump surfaces. Following stump colonization, the fungus spreads through interconnected root systems to attack other trees. Growth is reduced and trees eventually die. The pathogen persists for years in stumps and roots of killed trees, and can infect young trees planted in previously affected areas.

Disease symptoms and signs

Look for:

- groups of affected trees with dead trees in the center and dying trees around the margin;
- thin tree crowns with yellowish needles; reduced twig growth with tufting of needles branch tips;
- dried resin at bases of tree trunks and on roots;
- rotted stumps and roots with white to yellow, stringy decayed wood;
- fungus fruiting bodies low on stumps and trees; these vary in appearance from irregular, small, white bodies (that might resemble popcorn) to shelf-like brackets; fruiting bodies have brown upper surfaces, and white edges and lower surfaces with tiny pores; they may include twigs, needles, and leaves.

Identification of *Heterobasidion* pathogens requires recognition of fungal fruiting bodies or culture and microscopic examination. A qualified plant pathologist should be consulted. Because this serious disease is so new to Wisconsin, suspected cases should be reported.

Prevention

Control measures are directed toward **preventing** establishment of this root rot pathogen in new locations. The chemical borax has been used to prevent infection of conifer stumps that are not already colonized. Borax may be purchased and used for this purpose in the form of the EPA registered pesticides **SPORAX** (sodium tetraborate decahydrate) and **CELLU-TREAT** (disodium tetraborate decahydrate).

SPORAX is a powder can be applied from a can or jug with a perforated lid, resembling a large salt shaker.



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The label indicates that **SPORAX** should be applied within 1 day of cutting. **CELLU-TREAT** is a powder to be mixed in water and then brushed or sprayed onto stumps. The label indicates that **CELLU-TREAT** in water should be applied within 3 days of cutting. Enough powder or liquid is applied to lightly but completely cover the cut surface, exposed wood on sides of stumps, and protruding slivers. Level, rather than sloping, stump surfaces are desired. At rates of application specified on the product labels current as of the date of this publication, one pound of **SPORAX** will cover 50 square feet of stump surfaces, and one-half pound of **CELLU-TREAT** in one gallon of water will cover approximately 400 square feet of stump surfaces. Fifty square feet of stump surface is equivalent to approximately 260 6-inch diameter or 60 12-inch diameter stumps.

Care should be taken to minimize application to areas other than the stump. When spilled or applied to cropland or growing plants, borax may kill or seriously retard plant growth. Do not contaminate water when cleaning equipment or disposing wastes. Applicators and other handlers must take care to protect themselves when using borax. They should wear a long-sleeved shirt and long pants, shoes, socks, and waterproof gloves. Always wash thoroughly after using pesticides.

Stump and root removal

If *Heterobasidion* root disease already has become established, thorough removal of stumps and roots should be considered. Colonized material that is uprooted must be burned or deeply buried to prevent development of fruiting bodies and production of spores. This practice will reduce further spread of the aggressive pathogen, and may allow continued use of the site for growth of conifers.

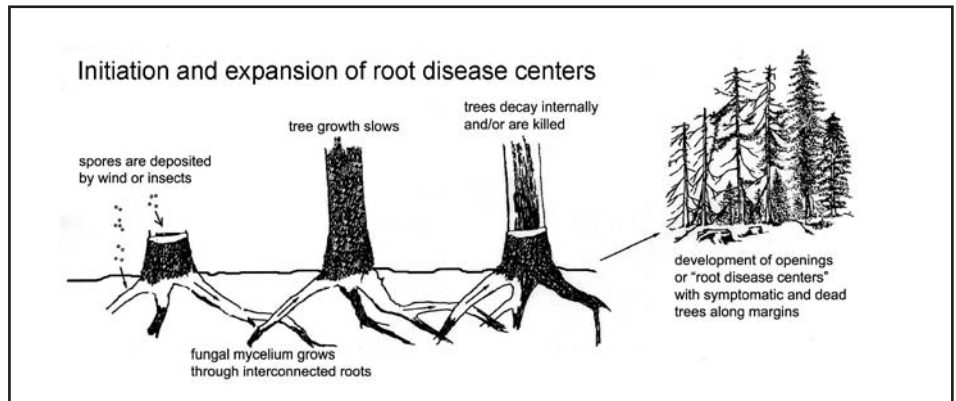


Figure 1. Thin, dying and dead crowns of pines affected by *Heterobasidion* root disease.



Figure 2. *Heterobasidion* fruiting bodies on a pine stump.