

Heterobasidion Root Disease

Biology, Symptoms And Management

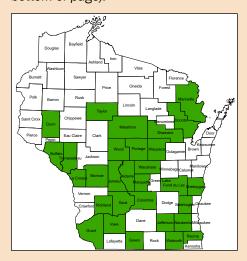
FOREST HEALTH FACT SHEET

Wisconsin Department of Natural Resources, Division of Forestry, Forest Health Program, May 2023

Locations

Heterobasidion root disease (HRD), formerly known as annosum root rot, was first observed in Wisconsin in 1993. It is now known to occur in 30 of Wisconsin's 72 counties.

Note: The Wisconsin Department of Natural Resources maintains the locations of all stands confirmed with HRD. If you suspect HRD in your stand, please contact Forest Health staff for confirmation and consultation (link at bottom of page).



County distribution of Heterobasidion root disease in Wisconsin.

Impact

Many woody species have been reported as HRD hosts in the world. In Wisconsin, HRD is known to infect and kill red, white and jack pines, white and Norway spruces, balsam fir and red cedar.

Infection in Wisconsin has been discovered on some hardwood species, but its impact there appears to be minimal.



A red pine, white pine and balsam fir killed by root spread of HRD.

HRD-infected trees exhibit reduced height, shoot and diameter growth and thinner foliage. Symptoms progress over several years and result in mortality. Symptoms typically appear 3-8 years after a thinning. The number of infection centers in a stand can vary widely. Infection centers create gaps in the forest canopy.

Biology

Infection by the HRD fungus (Heterobasidion irregulare; formerly H. annosum) most often occurs when spores, produced by the fruit body, land and germinate on the surface of a freshly cut stump. This infection process proves a strong relationship between HRD and thinned stands.



A pocket of red pine impacted by HRD.

Spores are most often produced when the temperature is between 41 and 90 degrees Fahrenheit. Though most spores are deposited within 300 feet of the source, spores can be carried in the wind over many miles.

The HRD fungus colonizes the stump, moves into the root tissue and progresses from tree to tree via root contact at the rate of approximately 3.2 to 6.5 feet per year. Infection through root and lower stem wounds also can occur. The fungus degrades both the lignin and the cellulose and causes a stringy yellow decay in the tree's roots and lower stem.

Identification

Fruit bodies (called conks) of HRD can be found at the base of fading

and dead trees, as well as on stumps. These fruit bodies may be buried in the soil and duff layer. Fruit bodies are most commonly observed in the fall, but can be found any time of the year.

Young fruit bodies look like popcorn and, under favorable environmental conditions, become bracket-shaped or



Young HRD fruit bodies resemble popcorn.



Older, conk stage HRD fruit body.

shelf-like. Fruit bodies vary in color but are usually light to dark brown above and white to tan below.

Prevention

Once HRD exists in a stand, it is very difficult to control. Prevention is the best approach.

If you are planning a thinning, consider treating freshly cut stumps with fungicide. Stumps should be treated as soon as possible after cutting and no later than one day after cutting.

Many factors influence the risk of infection and impact by HRD. A risk-based fungicide treatment guide is



A pine stump treated with fungicide. Blue dye is added to ensure coverage.

available for landowners and property managers to determine whether fungicide treatment is warranted in a stand.

Currently there are two pesticides to prevent HRD registered with the Wisconsin Department of Agriculture, Trade and Consumer Protection. "Cellu-Treat®" (disodium octaborate tetrahydrate) is a borate-based chemical; "Rotstop®C" is a biological fungicide that contains spores of the naturally occurring wood decay fungus, *Phlebiopsis gigantea*. Both products can be mixed in water and applied using a backpack sprayer or an attachment to a harvester.

Purchasing Fungicides

Cellu-Treat® can be purchased online in a 25-pound bucket. As of May 2023, the cost for a 25-lb. bucket is \$138.94 plus shipping. The product also might be available from area suppliers.

The company states on its website that one pound of **Cellu-Treat®** makes two gallons of solution, enough to cover 2,000 6-inch stumps or 500 12-inch stumps.

Cellu-Treat® national distributor: Nisus Corporation, 100 Nisus Drive, Rockford, Tennessee; 1-800-264-0870. Website: https://nisuscorp.com

Cellu-Treat® in-state distributors:

- Crop Production Services, Plainfield, WI; 715-335-4900
- Insight FS, Antigo, WI; 715-627-4844

Rotstop®C is available in two package sizes — 0.13 oz. package (which makes one gallon) and 0.67 oz. package (which makes five gallons).

As of May 2023, the cost for a 0.13ounce package is \$1.89 and a 0.67ounce package costs \$9.45. One gallon can cover 210 6-inch stumps or 50 12-inch stumps.

Rotstop®C distributor: Lallemand Plant Care, Sault Ste. Marie, Ontario, Canada; 1-888-236-7378; NAOrders@ lallemandplantcare.com. Website: https://bioforest.ca/en/unitedstates

Note: References to pesticide products and distributors in this publication are for your convenience and are not

an endorsement or criticism of one product over similar products or one distributor over other distributors. DNR makes no endorsement or guarantee regarding any product or distributor.



Pockets in a red pine stand after management practices were implemented.

Management

Recommended best management practices for harvesting a stand with HRD:

- 1. Start harvesting in healthy areas of the stand, moving to infected areas last.
- 2. Utilize dead trees and the bottom eight feet of dying trees with HRD fruit bodies as soon as possible to reduce fruiting body production and subsequent spore production.
- 3. Healthy trees within 35-65 feet of infected trees may be harvested to capture value before the next harvest.
- 4. Clear-cut areas where pockets are coalescing or the entire stand if pockets exist throughout.
- 5. Clean logging equipment between sites.



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