

# FOCUS ON FOREST HEALTH

## DISEASE: ANNOSUM ROOT ROT

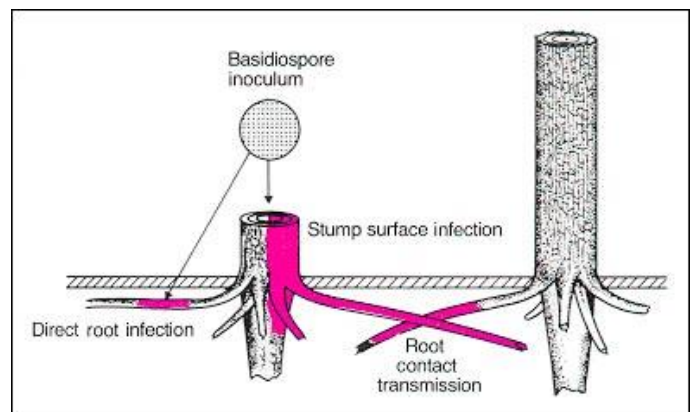
### Background

Annosum root rot is caused by the fungus *Heterobasidion irregulare*. Annosum was first found in Wisconsin in 1993. It is considered one of the most destructive diseases of conifers in the northern parts of the world. Prevention of this disease is key, as it is difficult to treat and control. Many tree species can be hosts, but in Wisconsin annosum is most common in red and white pine plantations. In Wisconsin annosum root rot has also been found infecting jack pine, balsam fir, white spruce, eastern red cedar, oaks (both red and white), black cherry and buckthorn. It seems infected deciduous trees are able to survive the disease.

Infection most often happens when spores, produced by the fungus, land and grow on the surface of a freshly cut stump. This infection process is why annosum can be so damaging in an area where trees are cut down like in pine plantations.

Annosum spreads both above- and below-ground. Above-ground spread occurs by spores blowing in the wind. Spores are most common when the temperature is between 41 and 90 degrees F. Spores can be carried by the wind over hundreds of miles but most land within 300 feet.

Once the fungus infects a tree then it spreads below-ground through the connected roots. Annosum may grow 3-7 feet along roots per year. Although infection through root and lower stem wounds can also occur, the major point of entry for the disease is through freshly cut stumps.



### Description

Three to eight years after a tree becomes infected nearby trees start to decline and die. Pockets of dead and dying trees become noticeable as the infection spreads below-ground from tree to tree. Infected trees and stumps produce fruit bodies (mushrooms) at the base, often where the tree goes into the soil. You may need to brush away fallen needles or soil to find the fruit bodies. Young fruit bodies look like popcorn. Older fruit bodies grow to be bracket-shaped, reddish brown on the top and white on the underside. Annosum weakens and breaks down wood causing a stringy, yellow decay in the roots and lower stem.

### Signs and Symptoms

- Trees start to thin (have fewer needles) and die.
- Expanding pockets of dead and dying trees.
- Annosum fruiting bodies (mushrooms).
  - Young fruit bodies look like popcorn
  - Older fruit bodies are bracket-shaped, reddish-brown on top and white on the bottom
- Stringy, yellow decay at the base of trees.



Photo: Pine trees declining and dying from Annosum.



Photos from left to right: Young, popcorn like fruit bodies; older fruit bodies; decayed wood.

### Habitat and Current Distribution

Annosum is a non-native disease that was officially discovered in Wisconsin in 1993 when the disease was first identified and is currently found in many counties all over the state. For a current distribution map visit [www.dnr.wi.gov](http://www.dnr.wi.gov) and search “annosum”.

### Impact and Management

- Ecological – Conifers, mainly red, white and jack pines and spruce-fir, represent about 22% of Wisconsin’s 16.6 million forested acres. Conifers provide shelter and food for many species of mammals including deer as well as many songbirds. Fire is an important component of many conifer habitats.
- Economic – Pines are very important economically. The wood of many species is used as timber for construction, telephone poles, furniture and fuel. Pines are also used for the manufacture of turpentine, pulp, and paper. Pines are a good renewable resource because the mature more quickly than many deciduous tree species.
- Social/recreational –Conifer forests provide a wide variety of recreation opportunities for Wisconsin’s residents and the many tourists that visit including hiking and camping. Red pine is used in recreational areas because of its colorful bark. Conifers also help protect watersheds.

Once annosum is in a stand, it is very difficult to control. Prevention is the best approach. Two fungicides (chemicals that protect trees from fungi), Sporax and Cellu-Treat can be used to protect stumps from infection. These chemicals must be applied the day the tree is cut to be effective.

If annosum is found in a forest management may include:

- Harvesting dead and dying trees.
- Harvesting healthy trees near dead and dying trees.
- Leave infected parts of trees on site.
- Cleaning equipment before leaving the site.
- Treating stumps with fungicide to stop new infections from occurring.



Photo: Applying fungicide to a pine stump

### For more information

- [http://dnr.wi.gov/](http://dnr.wi.gov) Search “annosum”