



## ANNOSUM ROOT ROT TREATMENT

*Forest Management: pathologies*

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[www.forestresources.org/members/serpub/10-R-18.html](http://www.forestresources.org/members/serpub/10-R-18.html)

**INTRODUCTION:** Less than five years ago, most loggers in Wisconsin had no idea what Annosum root rot was. Today, both loggers and landowners are taking active steps to prevent this disease.

**GENERAL FEATURES:** Annosum Root Rot (*Heterobasidion irregulare*, formerly *H. annosum*) is a fungus that is destructive to conifers, occurring throughout Europe and the Eastern U.S. In the U.S., it is most common and severe in the Southeastern region, but to a lesser degree, it has been confirmed over the years in Iowa, Illinois, Lower Michigan, and Ohio. In 1993, Annosum was finally confirmed in Wisconsin. It has continued to spread in the state and is now found in 21 counties. It has become a problem with a growing economic impact.

Although identified in many species, in general, conifers are most susceptible. Specifically, thinned pine plantations are at a very high risk. Annosum spores infect freshly cut pine stumps via air movement or, possibly, insects. Once established, it often kills the tree and, spreading through root contact, progresses through the soil at up to 6 feet per year. This progress puts entire groups at risk, and an infected tree may die within two years. As long as temperatures remain above freezing, there is a chance for infection, and since Annosum can survive in dead material, once infection has taken place, it may persist for a very long time.

There are a few signs that indicate infection. From a distance, thinning crowns are noticeable, in which only the current year's needles are present and those needles shorter than normal. Fungal conks will typically be found on the infected tree, usually in the root collar zone. However, many times this sign is missed because the duff layer may be deep enough to hide the area from view.

Especially in a pine plantation, mortality in a group will commonly get blamed on bark beetles, or red pine pocket mortality. Although these pathologies may be present, the underlying problem is often Annosum.

**CONTROL AND APPLICATION:** Once infection has been verified in a stand, there is no way to eliminate it. It is best to focus efforts on prevention. Once a tree has been harvested, the entire stump should be chemically treated by the end of the work day.

There are two fungicidal treatments labeled for Annosum, both of which provide good control:

**Sporax** (*Sodium Tetraborate Decahydrate*) is a dry, granular fungicide that is normally applied with a salt-shaker-style dispensing unit. The advantage is that it can be applied at any time of the year. The disadvantage is that it is labor-intensive, adding more cost.

**Cellu-Treat** (*Disodium Octaborate Tetrahydrate*) is water-soluble. As a solution, it can be applied by a backpack/hand-held sprayer, or mechanical harvester. One advantage is that it is easy to apply, and application is especially efficient with a harvester. Studies demonstrate that the cost per acre to apply is much less than the cost of a Sporax treatment. A big disadvantage is that the solution can freeze, thereby preventing winter application. To answer this problem, European users have been using an anti-freeze additive for many years. In the US, however,

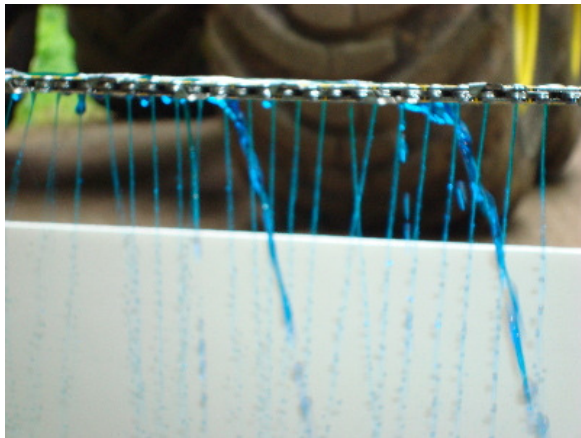


*Fig. 1: Applying a liquid fungicide at the stump at the time of harvest is the most cost-effective means of inoculating a pine plantation against Annosum root rot outbreaks.*

there is no additive currently labeled for legal use. Research is underway to find an anti-freeze agent that would enable year-round use of Cellu-Treat.

There are no effective non-chemical deterrents. Harvesting healthy trees around an infected stump or tree may appear to make economic sense in the short-term, since it might be presumed that roots of adjacent trees will die and stop the spread. But leaving more stumps vulnerable to infection in this way increases the rate of spread by spores and root contact, although leaving healthy trees in a group around the infection site may retard the actual spread. Leaving a pile of slash on a fresh-cut stump is ineffective, since the spores are small enough to filter their way through very small apertures. Likewise, trenching around the infected tree will only open up more fresh wounds for infection. Spores have even been identified even on charred wood.

**OPERATION:** Aaron Burmeister, of Burmeister Logging, became convinced that landowners would increasingly require preventive treatment for this disease, so he got his Wisconsin pesticide applicator's license and purchased a liquid application system to apply Cellu-Treat, which was then attached to his 2009 John Deere 1270D Harvester. He purchased and installed the unit for \$10,000. The line from the pump on the reservoir attaches to a special applicator saw bar on his 480H processor head. The saw bar is specifically designed with a series of holes that can



*Fig. 2: A unit feeding through the harvester's saw bar applies the fungicide directly to the stump. The blue dye enables the operator to verify coverage.*

be configured to whatever the maximum expected stump diameter may be. As the saw bar passes through to make the cut, the computer turns on the pump and applies the fungicide. A blue dye is typically added to the solution for visibility, making it easy to check proper coverage of the stump surface area from the operator's seat. The official prescription for 100% control is 100% coverage.

According to Burmeister, the application works well and does not slow him down, except when he needs to mix a new batch and refill the reservoir. However, his application rate is much higher than what the figure on the label estimates. He says that it simply takes more volume to get the required coverage.

More loggers are equipping processors with these types of sprayers. Burmeister feels that landowners will universally require this treatment in pine harvesting.

**THE FUTURE:** A couple of concerns need to be addressed. If an anti-freeze additive does not become available, the only option for harvest of pine in sub-freezing weather will be the application of Sporax. Because of the cost and labor involved, many loggers that currently harvest winter pine will simply postpone those operations. If their business is highly dependent on winter pine harvesting, the challenge is to find a way to harvest a much larger volume during the non-frozen periods, storing the wood until needed, and still meet the consuming mill's freshness specifications. There are also liability concerns: will a harvester who has applied the treatment according to guidelines still be liable if the landowner subsequently identifies an infection?

Annosum is permanently in Wisconsin and will continue to spread. A prevention program through the use of fungicides on uninfected stands has been proven effective. Logging contractors working in pine (and in all likelihood in all softwood) need practical and cost-effective ways to apply the fungicide and adapt their business plan accordingly.

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