

"Sneed" Ailing Wisconsin Spruces

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One characteristic symptom of "sneed" is the progressive loss of older needles on living spruce branches.

Spruce trees in Wisconsin are exhibiting numerous symptoms indicating poor health. Affected trees occur in a variety of production and landscape situations, and have even been seen in forests. While the newest needles may appear normal, older needles are spotted, banded and discolored olive-green to yellow to brown. Symptoms progress and intensify over time. Needles eventually drop, so that fewer years' needles are held on the tree and crowns appear thin. Tree growth slows, with shorter and shorter shoots produced each year. Entire branches can become bare, and in landscape situations the appearance of some trees has become so poor that they have been removed. Without knowledge of the cause, this collection of symptoms has been referred to as spruce needle drop or "sneed" for short.

While sneed is an indication of poor spruce tree health, it has not been proven that any particular living pathogen (such as fungus or bacterium) or nonliving factor (such as air pollution or soil mineral deficiency) is responsible for sneed. To date, other spruce diseases such as *Cytospora* canker and *Rhizosphaera* needlecast cannot explain all the symptoms occurring in all situations. Thus, pathologists still cannot indicate that sneed is a disease or make management recommendations such as fungicide application for trees exhibiting sneed symptoms.

Several years ago, tiny, black, spore-producing structures (fruiting bodies) of a fungus were noticed on spruces in Wisconsin. After some difficulty, US Department of Agriculture mycologists finally learned that the fungus is called *Setomelanomma holmii*. This fungus was originally discovered in Europe, and previously was almost unknown in North America. However, it now has been found on Colorado blue, white and Norway spruces throughout Wisconsin, on nursery seedlings, retail stock, residential landscape trees, and also in forests. *Setomelanomma holmii* fruiting bodies are sometimes present on very healthy vigorous trees, but seem to be more and more abundant on trees with deteriorating health, especially those that exhibit severe symptoms of sneed. So the questions have been asked, "Is *Setomelanomma holmii* a pathogen that is causing a disease?" and "Will spraying fungicides inhibit *Setomelanomma holmii* and prevent spruce needle drop?"

Efforts are underway in the UW-Madison Department of Plant Pathology to answer these questions, using federal block grant funds generously provided by the Wisconsin Christmas Tree Producers Association and Wisconsin Nursery Association. *Setomelanomma holmii* has been cultured and now can be grown in the laboratory. An inoculation trial was attempted using small Colorado blue spruce and white spruce seedlings in 2002, but no symptoms developed that could be attributed to this fungus. A longer-term experiment is now underway. In spring 2003, potted trees were sprayed with the fungus and are being maintained on campus. As the trees grow, their condition and amount of *Setomelanomma holmii* present will be compared to another group of control trees that were not inoculated.

Other experiments are evaluating the response of *Setomelanomma holmii* to fungicides. The fungus was grown in the laboratory on culture media containing various concentrations of three different fungicides. The fungicide chlorothalonil was the most inhibitory to growth of *Setomelanomma holmii*, even at relatively low concentration. With this knowledge, a field trial was established in 2003 with the help of Evergreen Nursery. Some trees are being sprayed periodically with chlorothalonil, others remain unsprayed. Symptom development and numbers of *Setomelanomma holmii* fruiting bodies produced on these trees will be monitored for at least two growing seasons. Inhibition of *Setomelanomma holmii* and suppression of symptoms will support involvement of fungi in sneed and point to a possible means of prevention. Current work will continue during 2004 at UW-Madison and Evergreen Nursery. Hopefully the information gained will contribute to understanding the cause of sneed and maintenance of spruce health. Additional questions regarding the role of soil and weather influences on spruce health and variation in the incidence and severity of sneed symptoms could be examined in the future.

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