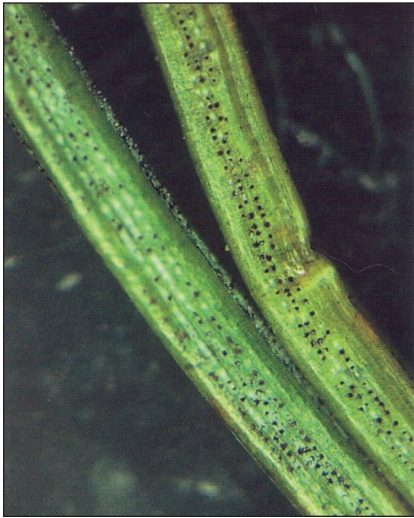


Colorado blue spruce and other conifers disorder: *Rhizosphaera* needle cast

M. F. HEIMANN and G. R. STANOSZ



Black spore-bearing structures protrude through the pores on these spruce needles.

Rhizosphaera needle cast occurs throughout Wisconsin but infects only certain conifer species. Colorado blue spruce is the most common host in Wisconsin. Other spruce species susceptible to the disease are Engelmann, black, Serbian and Sitka. Reported hosts include Austrian, mugo and eastern white pine, as well as Douglas fir and western hemlock. The disease has also been identified on balsam fir in this state. Fraser fir, a popular Christmas tree grown in Wisconsin, may also be susceptible, although this has not been reported.

Symptoms and effects

Rhizosphaera needle cast starts from the bottom of the host tree and progresses upward. Second-year needles on the lowest branches are infected first. These needles take on a yellow mottled appearance, then turn brown and drop from the stem. After several years of continued infection, only current-season needles may remain attached to lower branches.

Even these younger needles eventually become infected, and the branch ultimately dies.



The disease spreads outward from the infected, inner needles to the younger needles.

While the disease does not usually kill the tree, the tree's appearance deteriorates. The top of the tree remains green while the lower branches become bare. Sometimes these dead branches will be interspersed with living, green branches.

You can usually diagnose *Rhizosphaera* needle cast with a 10x hand lens. Each needle has parallel rows of stomata (pores), which appear white when healthy. When infected with the fungus, small black pycnidia (spore-bearing structures) protrude through many, if not all, of the stomata. They look like little columns of pepper grains along the needle. These are sometimes capped by a white, waxy discharge that is pushed from the pore as the pycnidia form.

Do not confuse *Rhizosphaera* needle cast with mite injury, which is very common and can cause considerable damage. You may also find saprophytic (non-disease) fungal growth on spruce needles. While such growth does not cause injury to the tree, it can confuse the diagnosis. If you are in doubt about the diagnosis, you may need to have the diseased tree tested. Collect representative twigs and needles, and take them to the county Extension office for submission to a laboratory.

Cause

The source of this infection is a fungus, *Rhizosphaera kalkhoffi*. Soon after needles have elongated in the spring, the pycnidia on the infected needles open and release spores. Winds and splashing rain carry the spores from one branch to another and from tree to tree. If favorable weather conditions prevail, this process will continue throughout the summer and into fall. The temperatures most favorable for spore germination are around 77°F (25°C). Germination takes place over about 48 hours, in humid or rainy conditions that allow a film of water to remain on the susceptible area.

Control

Cultural

Before planting a blue spruce, make certain that other blue spruce in the area are not already infected. If you find an infected tree, remove and destroy any diseased branches immediately. Be sure to cut off the entire branch, back to the main trunk. Do not allow spruce trees to undergo drought stress. Water when necessary, but not with a sprinkling can or container. Instead, set a hose-end sprinkler that will run for one-half to one hour. To guard against *Rhizosphaera* needle cast in a Christmas tree planta-

tion, it may help to space the trees a bit farther apart than usual when planting. Sanitation and fertility programs do not significantly control the disease.

Chemical

Two chemical treatments will help control *Rhizosphaera* needle cast: fungicides that contain copper, and chlorothalonil.

You can use commercially prepared Bordeaux, a common copper spray, but for large numbers of trees it is better to prepare fresh Bordeaux of the 8-8-100 formulation. To prepare a fresh mixture for multiple trees, dissolve 8 pounds of copper sulfate (blue vitrol) in 50 gallons of water. Dissolve 8 pounds of slack lime (spray lime) in a separate 50 gallons of water. Pour the two solutions together under continuous agitation. Just before spraying the mixture, strain it to remove insoluble particles.

If you need only enough material for a single tree, dissolve 2 ounces of copper sulfate in 1 gallon of water and 2 ounces of spray lime in a separate 2 gallons of water. Then pour them together, stir, strain and spray.

Be certain to take proper precautions when mixing these materials. Protect yourself by wearing rubber gloves, long sleeves, a dust mask, and a rubber apron.

Trade names for chlorothalonil include Bravo, Daconil, and Echo. Read the label carefully for instructions on mixing and applying this material and for precautions to be taken. You may need to obtain supplemental labeling information from the dealer, because directions for this use are not found on all containers.

Apply either copper sprays or chlorothalonil first in spring at bud break, before new growth exceeds 2 inches in length. Make additional applications every 3–4 weeks as long as the proper conditions for germination prevail.

If you have a small amount of leftover fungicide, do not discard it. Spray it onto the affected tree.

References to products in this publication are for your convenience and are not an endorsement or criticism of one product over other similar products. You are responsible for using chemicals according to the manufacturer's current label directions. Follow directions exactly to protect the environment and people from chemical exposure.

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