

Spruce Diseases in North Dakota

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Two common diseases of spruce in North Dakota are *Cytospora* canker and *Rhizosphaera* needle cast. These diseases can reduce a tree's aesthetic value, decrease its utility for wind protection and predispose the tree to other pests. Correct identification of these two diseases is important, because management for each is different.

Cytospora Canker

Cytospora canker is a fungal pathogen (*Cytospora kunzii*) that is most severe on blue spruce (Colorado blue), but also infects white spruce (Black Hills) in North Dakota. The fungus can attack spruce of all ages, however it is more common on older, larger trees. The fungus enters branches through wounds, and eventually kills the branch. It can be spread to nearby branches (or trees) by rain splash, small animals or pruning shears.

Symptoms

Branch dieback from *Cytospora* canker generally begins on the lower branches of the tree and eventually spreads upward through the crown (Figure 2). Needles on the ends of infected branches turn brown and eventually fall. Cankers covered with white/blue-gray pitch (sap) can be found on the infected branches (Figure 1).

Management

Disease problems are more effectively prevented than treated once established and as a rule, healthy trees are less susceptible to disease problems. To keep spruce healthy, plant healthy nursery stock, irrigate during periods of drought, avoid wounding and plant to promote good air circulation around trees. This will reduce the factors that predispose trees to *Cytospora* canker infection.

Diligent removal of infected branches for at least two years can greatly reduce the progress of the disease. Prune branches to the branch collar at the trunk. Make sure to properly clean pruning equipment between cuts with rubbing alcohol to prevent infecting other branches or trees. If the disease has progressed so much that the trees no longer provide the intended function, removal should be considered.



Figure 1. Typical white/blue pitch covering *Cytospora* canker.



Figure 2. Branch mortality on spruce caused by *Cytospora*.



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Rhizosphaera Needle Cast

Rhizosphaera needle cast is caused by another fungus, *Rhizosphaera kalkhoffii*. Colorado blue and white (Black Hills) spruce are susceptible to this pathogen, however white spruce is far less susceptible except when adjacent to severely infected Colorado blue spruce. Like Cytospora canker, this fungus typically becomes evident in lower branches, and will progress throughout the tree unless management strategies are implemented. The fungus is spread by rain splash.

Symptoms

Severely infested trees often exhibit reduced needle retention. Older needles (those closer to the main trunk) typically show symptoms and signs of infection whereas newer needles (those found near the branch ends) tend to remain green (Figure 3). Needles become infected in late spring during wet weather but do not begin to turn brown until fall of the following year, at which time fruiting bodies of the fungus are abundant as rows of small black spots on the needles (Figure 4). Environmental stress may also cause reduced needle retention, so it is important to look for the black fruiting bodies on the older needles.

Management

Preventative approaches are the best way to reduce the likelihood of needle cast infection. Planting healthy stock, promoting good air circulation around trees through open spacing and not planting next to established trees are the best ways to reduce the chance of infection. If trees are infected, the use of fungicides may be considered. Two registered fungicides that can be found at local nurseries or garden supply stores are Bordeaux mixture 8-8-100 (8 lb. hydrated lime, 8 lb. copper sulfate, 100 gal. water) and

chlorothalonil (Bravo). Fungicides should be applied in early June (or when new needles have reached half their normal length) and again three weeks later (or when new needles have reached their full length). Two consecutive years of fungicide application may sufficiently disrupt the disease cycle.

For additional information, contact your local extension agent.



Figure 3. Pattern of *Rhizosphaera* infection. Note the reduced needle retention, the dead, older needles, and the healthy, new needles at the branch ends.



Figure 4. Infected needle (top) with black spots of *Rhizosphaera* fruiting bodies compared to uninfected needle (bottom).

For more information on this and other topics, see: www.ag.ndsu.nodak.edu

