

Rhizosphaera Needle Cast of Spruce

Rhizosphaera needle cast is caused by the fungus *Rhizosphaera kalkhoffii*. This disease causes defoliation (needle loss) and can pose a threat to tree health and tree appearance in nurseries, Christmas tree plantations, and landscape plantings. The fungus thrives in wet conditions, and therefore the disease is more of a problem in Eastern Kansas where rainfall is higher.

Infection is thought to occur in the springtime. By late summer or early fall the infected needles often show a yellow discoloration. The newly diseased needles do not drop right away. Rather, they remain attached to the tree throughout the winter.

The following spring, needles begin to turn purple and drop from the branch. Most defoliation occurs late in the summer the year after infection. Defoliation proceeds upward from branches nearest the ground towards those at the middle and top of the tree (Figure 1) and outward from the inner-most (oldest) needles on a branch towards the youngest (Figure 2). Affected branches will die after several years of repeated defoliation. An accumulation of dead branches damages the aesthetic appearance of the tree and can decrease tree health.

The disease is best diagnosed by examining needles with a hand lens or magnifying glass. Healthy spruce needles have rows of white dots, which are the stomata (pores for gas exchange). In contrast, the stomata on infected needles are darkened by growth of the *Rhizosphaera* fungus (Figure 3). The dark growths are the spore-producing structures of the fungus (called pycnidia).



Figure 1: Symptoms of *Rhizosphaera* needle cast. Notice how the needle-loss is most severe on the lowest parts of the tree.



Figure 2: *Rhizosphaera* needle cast symptoms. Notice how the defoliation and yellow-green discoloration are most prominent on the older (inner) needles while the newer (outer) needles look normal.

Spruce trees in Kansas are affected by several other problems including mites and abiotic stresses. Make sure to get a good diagnosis. Your county Extension office and/or the KSU diagnostic lab can assist you.



Figure 3: The healthy needle on the bottom has rows of normal, white stomata (gas exchange pores). The black on the stomata in the upper, infected needle is growth of the *Rhizosphaera* fungus.

DISEASE MANAGEMENT

Cultural practices:

This fungus grows best in wet conditions. Therefore, increase air movement to promote drying of the needles. This can be accomplished by removing or mowing down tall weeds that surround the trees. In addition, thin out shrubs or trees that are encroaching and blocking air movement. Raking up and disposing of fallen (infected) needles can help to reduce disease pressure. Avoid pruning and shearing when branches are wet.

Fungicides:

The above cultural practices should be the primary method of disease management, but fungicides are available for disease prevention. Correct timing is critical. To target the key time when the fungus is most active,

the first applications should be made in springtime when needles are halfway elongated. A second application when needles are fully elongated (several weeks later) will further protect the needles. Usually, at least two years of applications are required. Infections are most effectively managed if they are detected and treated early and not when several years of defoliation have occurred. Along with proper timing, it is also critical to cover the tree thoroughly. For commercial applicators the following materials are labeled currently for *Rhizosphaera* on spruce: copper (ex: Camelot), chlorothalonil (ex: Chlorostar, Daconil, Echo, Manicure), mancozeb (ex: Protect), chlorothalonil + thiophanate-methyl (ex: Spectro). For homeowners, several products with the active ingredient chlorothalonil are labeled for this disease. It is the legal responsibility of the user to read, understand, and follow the label. Labels change frequently. Listings here do not suggest endorsement, nor does lack of listing represent non-endorsement.

References:

Diseases of Trees and Shrubs, Second Edition. 2005. By Wayne A. Sinclair and Howard H. Lyon. Cornell University.

Rhizosphaera Needle Cast of Spruce. By Darroll D. Skilling and James A. Walla. Chapter 56 in: *Diseases of Trees in the Great Plains.* 1986. Jerry W. Riffle and Glenn W. Peterson, editors. Available online:

<http://www.unl.edu/nac/diseasetrees/chap56.pdf>

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