Rhizosphaera Needle Cast Disease of Blue Spruce

By Natalie P. Goldberg[1]

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***Figure* 1. Discolored needles on a blue spruce infected with Rhizosphaera needle cast** (photo by NMSU Plant Diagnostic Clinic)**.**

Rhizosphaera needle cast, a fungus disease caused by *Rhizosphaera kalkhoffii*, is primarily a disease of blue spruce (*Picea pungens*) trees in New Mexico, though it can affect other conifers, such as ponderosa pine, Japanese black pine, and Douglas fir. The disease occurs statewide, but is more common in the northern part of the state. The disease is problematic in landscape settings, particularly when trees are planted too close together. It can also occur in nurseries where trees are pruned to maintain their shape and are often subject to overhead irrigation.

SYMPTOMS

Symptoms of the disease are discoloration of the needles (Figure 1), needle drop, and eventual defoliation (Figure 2). Infected needles turn yellow in July and then reddish-purple in August. The needles eventually turn brown and fall off one or more branches. A severely affected tree will have many bare branches. Premature needle drop is

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***Figure* 2. Blue spruce tree infected with Rhizosphaera needle cast exhibiting defoliation and branch dieback** (photo by NMSU Bernalillo County Extension).

***Figure* 3. Pycnidia (black fruiting bodies) of *Rhizosphaera kalkhoffii* on an infected blue spruce needle** (photo by Paul Bachi, University of Kentucky Research and Education Center, Bugwood.org).

the primary damage, causing the tree to become unsightly. Branches that defoliate for four or five years may die. The disease usually attacks the oldest needles on branches in the lower portion of the tree canopy first and progresses upward, giving the appearance of death from the bottom up and inside out. If left uncontrolled, the disease can eventually kill the tree.

The disease affects trees of all ages. Infection takes place in the spring, but symptoms are not visible until the following spring and summer. The fungus can sometimes be seen with a hand lens (10X) as tiny brown to black spots called pycnidia, or fruiting bodies, emerging from stomata (pores) on the needles (Figure 3). Spores produced in these fruiting bodies (Figure 4) serve as inoculum to spread the disease within trees and to new trees. Many of the affected needles fall off in the late summer of their second growing season.

Some needles stay on the tree over winter and produce spores the following spring, which spread the disease. New growth may appear at the ends of some of the bare branches in the spring, so you may think the tree is recovering, but this new growth is often infected during the growing season.

RHIZOSPHAERA BIOLOGY AND DISEASE SPREAD

The disease is spread primarily by rain water splashing the spores from infected needles to newly emerging needles in the spring. Pycnidia emerge from these newly infected needles the following spring and continue the disease cycle.

DISEASE MANAGEMENT

The best control measures are to plant only healthy trees and avoid planting new trees next to established trees. Additional cultural controls that help prevent disease spread include promoting good air circulation in and around trees by proper plant spacing and pruning, and mowing grass and removing brush from around trees. When pruning trees, shears should be sterilized with alcohol (70% isopropyl alcohol), or another suitable disinfectant, between cuts and between trees.

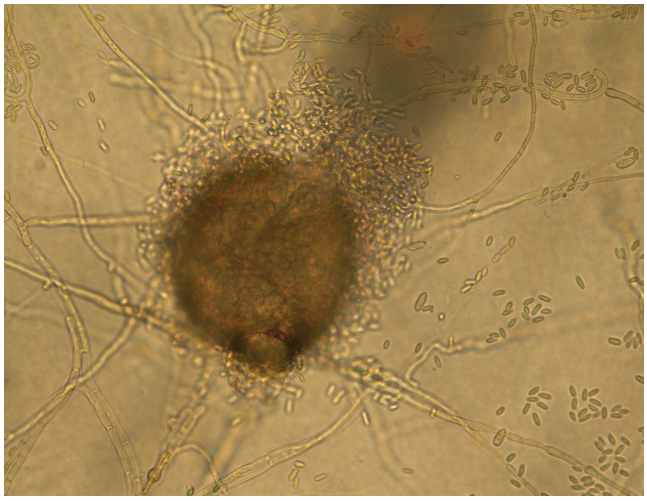

Figure* 4. Spores of *Rhizosphaera kalkhoffii
(photo by NMSU Plant Diagnostic Clinic).

If trees are infected, fallen needles should be cleaned up and put in a sealed plastic trash bag and sent to the dump. If a blue spruce tree is in such bad condition that you want to replace it, a tree species other than spruce should be considered so the new tree doesn't succumb to the same disease.

Fungicides can also be used as part of a management program. Infected trees can be sprayed with Bordeaux mixture 8-8-100 (8 lb hydrated lime, 8 lb copper sulfate, 100 gal water) or fungicides containing chlorothalonil or thiophanate methyl. Fungicides should be available at local nurseries, garden supply stores, or feed stores. Fungicides provide protection against infection and prevent the spread of the disease within the tree. The timing of fungicide applications is critical for them to be effective in managing the disease. They should be applied to the tree when the new needles are about half developed and again when they are full length (about 3 weeks later).

Two years of treatment usually restores moderately affected trees to full foliage. Severely affected trees may require more years of treatment. Homeowners who have blue spruce trees that are losing needles can contact their pest control person to inspect their trees and spray if appropriate. Tree owners can spray their own trees if they have the equipment to adequately cover the tree. Label directions for using pesticides should be followed precisely.

DIAGNOSIS AT A GLANCE	
Caused by	**The fungus *Rhizosphaera kalkhoffii***
Symptoms	Needle discoloration: yellow to reddish-purple to brown
	Symptoms develop first on the oldest needles on branches in the lower plant canopy
	Premature defoliation
	Premature death
Sign	Black pycnidia (fruiting bodies) develop on infected needles
Disease conditions	Warm temperatures (65–75°F), wet weather
Disease management	Plant only healthy trees
	Avoid planting new trees next to established trees
	Sterilize pruning shears between cuts
	Promote good air circulation around trees by open spacing, selective pruning, and removing brush and grass around trees
	Apply fungicide

PURCHASING NEW TREES

Nursery owners should closely inspect their trees to make sure they don't sell any infected trees. Use a hand lens to inspect trees for fruiting bodies of the fungus emerging from the stomata of the needles. Purchasers should also inspect trees closely when they are purchased.

REFERENCES

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The pesticide recommendations in this publication are provided only as a guide. The authors and New Mexico State University assume no liability resulting from their use. Please be aware that pesticide labels and registration can change at any time; by law, it is the applicator's responsibility to use pesticides ONLY according to the directions on the current label. Use pesticides selectively and carefully and follow recommended procedures for the safe storage and disposal of surplus pesticides and containers.

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Revised June 2017 **Las Cruces, NM**