

## Rhizosphaera Needle Cast of Spruce

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Spruces are one of the most majestic landscape trees in temperate regions of the world. However a few diseases, especially *Rhizosphaera* needle cast, which is caused by the fungus *Rhizosphaera kalkhoffii*, can seriously affect the aesthetic value and health of most of the spruce species. Although white and Norway spruce can also be infected, Colorado blue spruce is most susceptible to *Rhizosphaera* needle cast. Like other evergreens, spruce will not replace fallen needles; therefore infected trees often have holes of bare branches in their canopies. Repeated needle loss can result in branch death after 3 to 4 years and, in rare cases, eventually cause tree death. Replacing these trees is costly, and requires a significant lapse in time before they can be grown to an attractive size and shape. Preventative maintenance and stress alleviation are the best approaches for maintaining spruce health and the long-term aesthetics of the landscape.

### How to identify *Rhizosphaera* needle cast

Needles with a *Rhizosphaera* infection will turn purplish-brown and drop off. A healthy spruce will usually hold its needles for five years or more, but an infected one will drop all but the current year's growth. In most cases, disease starts at the base of the tree, with diseased trees showing barren branches progressing upward and affected needles dropping (Fig. 1).



*Figure 1. Spruce tree infected with Rhizosphaera; note the lower barren branches. All photos by permission on M.M. Rahman.*

Infection usually occurs in late spring, but symptoms will not appear until the late fall or following spring. When infected needles are moist, the fungal pathogen will form pinhead-sized fruiting structures (pycnidia) in rows on the needles protruding through the stomates (the tiny slits in the plant tissue through which gas is exchanged). These fruiting bodies release spores during wet conditions in late spring, which spread the fungus to healthy needles and trees. In severe infections, rows of white stomates will be replaced by black pinhead-like pycnidia. If suspected needles are placed in a plastic zip-top bag with a moist paper towel and then observed using a hand lens after 24 hours, the diagnostic fungal structures will be visible (Fig. 2).



Figure 2. Infected needles with rows of fruiting bodies (pycnidia) protruding through the stomates.

## How to treat or prevent *Rhizosphaera* needle cast

*Rhizosphaera* needle cast is best managed using a combination of methods:

1. Plant only disease-free plants. Before planting, check suspect needles for fruiting bodies by following the method outlined above.
2. Plants from susceptible species should not be planted next to infected trees.
3. Provide adequate spacing when planting new trees to promote good air circulation.
4. Stressed plants are more susceptible to diseases. Reduce tree stress by fertilizing, mulching and watering as needed.
5. Do not prune tree branches during wet conditions that may spread fungus and cause new infections.
6. Chemical options for managing the disease are also available. Prune severely infected limbs before initiating a two-consecutive-year spray program that includes three timely applications of fungicides. The first application should be made at bud break in the early spring when the needles are half grown. Make the second application within 4 to 6 weeks of the first, and then make the third application in late spring. Several chlorothalonil-based treatments are approved to control *Rhizosphaera*, including Daconil® 2787, Bravo®, and Terranil® 90. Bordeaux mix and other copper fungicides may also be effective.

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