Rhizosphaera needle cast

Quick facts

- Rhizosphaera needle cast is a fungal disease of spruce trees that causes needles to turn brown and fall off.
- Trees stressed from drought, poor planting practices or other factors are more likely to suffer from Rhizosphaera needle cast.
- Trees can be protected from Rhizosphaera needle cast with properly timed fungicide applications.
- Several other fungi cause symptoms very similar to Rhizosphaera and correct identification is important.

How to identify Rhizosphaera needle cast

- In spring or early summer, new needles at the branch tips are green, and the older needles turn brown to purple.
- Use a magnifying glass to look closely at both green and discolored needles. Tiny black bumps can be seen arranged in neat rows on infected needles. These are the spore producing structures of the Rhizosphaera fungi.
- Discolored needles fall off in late summer to fall.
- Infected trees have few needles near the trunk and look thin, or see-through.
- Damage typically starts on the lower branches and moves up the tree.
- If the majority of needles are infected for 3 to 4 years in a row, the branch will die.

Young tree with a thin canopy due to Rhizosphaera needle cast

Lab analysis is necessary to distinguish Rhizosphaera needle cast from other diseases of spruce trees. Submit a sample to the UMN **Plant Disease Clinic** <https://pdc.umn.edu/> for testing.

Trees affected by Rhizosphaera needle cast

- Colorado blue spruce (*Picea pungens*) is highly susceptible and is commonly affected.
- White spruce (*P. glauca*, including Black Hills spruce) is somewhat resistant but can become infected when grown under stressful conditions.
- Norway spruce (*P. abies*) is relatively resistant but can become infected when grown under stressful conditions.

How does Rhizosphaera survive and spread?

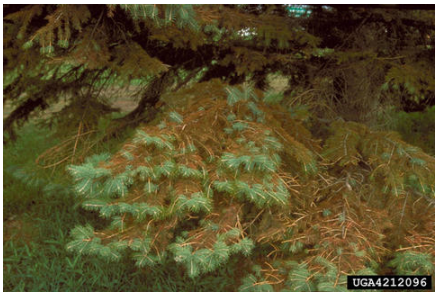
- Rhizosphaera needle cast is caused by the fungus *Rhizosphaera kalkhoffii*.
- The fungus survives winter on living and recently killed needles.
- In spring through early autumn, spores spread to new needles within the tree or in neighboring trees via splashing water.
- Needles are most commonly infected when they are young and still growing.
- Older needles can become infected if environmental conditions are highly favorable for disease.
- Needle infection occurs best during warm (77 F) wet weather.

Tiny raised black dots in lines on needles are the spore producing structures of the Rhizosphaera fungus

How to manage Rhizosphaera needle cast

Plant disease tolerant trees

- Do not plant Colorado blue spruce (*Picea pungens*) or other spruce that are not well adapted to the environmental conditions in your area.
- Plant Norway (*P. abies*) or white spruce (*P. glauca*) as they are more resistant to Rhizosphaera needle cast.
- Plant spruce trees on sites with acidic, moist, well drained soils and full sun. Trees planted on poor sites are more likely to be infected with Rhizosphaera needle cast due to stressful conditions.
- Whenever possible plant spruce trees grown from local seed sources. These plants are likely to be best adapted to the local conditions.



New needles remain green, while old needles turn brown on a spruce infected with Rhizosphaera needlecast

Maintain good air circulation around trees

- Do not overcrowd plants. Use the mature size of the tree as a spacing guide when planting.
- Remove the bottom most branches from the trunk to help increase circulation around the tree canopy.
- Do not shear spruce as shearing creates a dense, compact growth that stays wet longer.

Mulch under trees

- Remove all weeds under the trees.
- Maintain a 3 to 4 inch deep, even layer of wood chip mulch around your tree to prevent weed growth.
    - Leave at least a 2 inch space between the mulch and the trunk to allow for air movement.
    - Do not mound the mulch around the trunk of the tree
    - Inspect the depth of the mulch layer each year. Add additional mulch only to maintain a 3 to 4 inch depth.

Do not allow sprinklers to spray needles

- If the tree is in a landscape with a sprinkler irrigation system, make sure that water is not spraying the needles.
- When setting out sprinklers, direct the water away from needles.

Fungicides

- Several other fungi result in symptoms very similar to Rhizosphaera. Before spraying fungicide, send a lab sample to the UMN plant disease clinic to confirm that Rhizosphaera is responsible for the damage.
- Fungicides with the active ingredient chlorothalonil, copper hydroxide or mancozeb will protect new spruce needles from infection by Rhizosphaera.
    - Make one application in spring or early summer when the new needles have grown to half their mature length.
    - Make a second application 3 to 4 weeks later.
    - Chlorothalonil based fungicides may discolor spruce needles. As a result some chlorothalonil-based fungicides are listed as phytotoxic to spruce trees.

> **CAUTION:** Mention of a pesticide or use of a pesticide label is for educational purposes only. Always follow the pesticide label directions attached to the pesticide container you are using. Remember, the label is the law.

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