

SOS – Save Our Spruces!

Feb 12, 2025 WCGC “Gardening Musical Chairs” table

Summary of what to know about needlecast fungus disease in our community:

It is here and can be diagnosed by inspecting the needles as drought injury may look similar.

It is contagious and needs control measures to prevent spread and save the tree.

A repeated spray of an approved specific antifungal chemical may be needed.

Scientific references are provided here, with the first one the likely culprit here.



Colorado spruce with *Rhizosphaera kalkhoffii*.
Photo: Joe Zeleznik, Kasia Kinzer, N Dakota State U



Close up of infected needles (top) and healthy needle (bottom).
Photo: Michael Kangas, NDSU – N Dakota Forest Service

1. *Rhizosphaera* needlecast (*Rhizosphaera kalkhoffii*)

Hosts

Spruce, especially Colorado Blue Spruce

Distribution and Disease Cycle

Rhizosphaera needlecast is a fungal disease affecting mainly Colorado spruce, and occasionally other spruce. The disease begins in the lower portion of the tree with infected needles being shed, causing branches to look sparse. Spore dispersal from infected needles occurs during wet weather in spring, spreading by rain from needles infected the previous season to newly emerging needles. Under suitable conditions, the disease gradually progresses up the tree continuing to cause loss of needles, leading to eventual decline of trees.

Symptoms and Signs

Symptoms of *Rhizosphaera* needlecast appear in the spring following infection, with infected inner (2nd year) needles turning yellow, then purplish brown by end of summer, with black fruiting bodies appearing in lines as they emerge from needles' stomatal pores. Most infected needles will be shed by fall, although some may remain attached, acting as an infection source the following spring. Repeated infections will cause trees to begin having a sparse looking interior and after 3-4 years of severe infection, branches may begin to die.

Control

Management of *Rhizosphaera* needlecast can be difficult. To reduce the spread of *Rhizosphaera* needlecast, avoid pruning or shearing trees during wet weather and sterilize pruning tools frequently by dipping in 70% alcohol for 3 minutes. Remove any severely infected branches and rake fallen needles from the base of trees where practical. Promote good air circulation and encourage rapid drying of foliage by mowing weeds or other vegetation near trees. Chemical controls registered for *Rhizosphaera* needlecast control include fungicides containing chlorothalonil. Apply as per label instructions beginning in spring when new shoot growth is 1 to 5 centimetres in length, and again several times at 3- or 4-week intervals until conditions no longer favour disease development.

<https://agriculture.canada.ca/en/agricultural-production/crop-protection/diseases-and-pests-agroforestry/rhizosphaera-needlecast> Updated 2020

2. Spruce needle cast (*Lophodermium piceae*)

- **French disease name:** Rouge
- **Kingdom:** Fungi
- **Phylum:** Ascomycota
- **Class:** Leotiomycetes
- **Order:** Rhytismatales
- **Family:** Rhytismataceae

Main host(s)

- Fir (Balsam and white alpine) and spruce (Colorado, white, Sitka, and black)

Distribution

This disease is widely distributed in North America throughout the range of its hosts.

Damage, symptoms and biology

Needle cast is caused by a related group of fungi (Ascomycetes), which cause more damage to coniferous foliage in North America than any other group of fungi. Severe infection can result in significant growth reduction in seedlings.

Typically, only a few of the many needle cast diseases are known to cause serious damage which is limited to growth loss; tree mortality is not known. Seedlings may be severely damaged if a high percentage of the foliage is infected. Heavily infected trees have an unsightly appearance caused by needle discolouration.

The degree of damage can be influenced by the age of the host tree; older trees are more resistant to damage and infection of older needles is eventually harmless.

Lophodermium piceae causes damages on 2-year-old and older infected needles, which makes damage minimal. Sokolski et al. 2007 consider it an endemic endophyte in black spruce.

Climatic conditions influence spore dissemination and germination, and thus the frequency and severity of infection. Needle cast diseases are more common following wet springs. Lower branches and understory trees are frequently the most seriously affected as the more humid conditions favour infections.

Generally, two types of fruiting bodies develop during the life cycle of fungi responsible for needle cast:

- "asexual" fruiting bodies, which occur as small dots (pycnidia) on the upper surface of the needles; and
- "sexual" fruiting bodies (producing the ascospores that transmit the disease), which are generally larger and occur along the mid-ribs of the lower needle surface.

Each fungus responsible for needle cast has a different life cycle and many are incompletely known; that of *Isthmiella faullii* is presented as an example.

The current year's needles are infected first, but they do not show any damage. The following spring, brown spots appear, eventually covering the entire surface of the needles by mid-summer. The first fruiting bodies form on the upper surface of the needles and discharge spores in late summer or early fall. It is unclear exactly what role these spores play, but they may give rise to the second type of spores. Ascospores form in mid-summer on the needles infected two years earlier. The "sexual" fruiting bodies called hysterothecia (because the ascocarp has a slit-like opening), create a black line on the lower needle surface. During rainy periods, they will release ascospores that are able to infect new shoots the following spring. The ascospores are dispersed by the wind. Prolonged wet periods contribute to infection.

Other information

No control measures are planned in the forest sector. However, Christmas tree growers might consider preventing infection on lower branches by clearing the base of trees and cleaning out grasses growing between rows to reduce moisture levels, thus minimizing conditions conducive to new infections. Keeping fir and spruce trees in windbreaks should also be avoided to reduce potential sources of inoculum. Lastly, chemical control using copper oxychloride-based fungicides (the only fungicide registered in Canada for controlling needle cast and rusts) applied every 10 days after bud break until wet spring conditions subside could be considered. This spraying should be done by trained personnel who have received the required training.

Canadian Forest Service Publications

<https://tidcf.nrcan.gc.ca/en/diseases-caused-by-pathogens/factsheet/1000122> Updated 2024

Town of White City information (Gary Schmidt)

The trees along 48 have been assessed and determined to be not needle cast. Drought impact, overcrowding and glyphosate drift were implicated in the causes for tree stress.

The Town is developing website information for urban forest maintenance. They have an online request form that they encourage residents to use to identify trees on Town property for attention. It is a reliable way to report a specific issue that allows tracking of responses so be sure to leave contact information.

There are many certified arborists who can help residents with their tree problems and sending samples to U of R or U of S for diagnosis is also an option.

RM of Edenwold information (Clark Gates)

We used the Tree Medics Ltd - Patrick Griffin. He came out, inspected and treated several diseased trees in Emerald Park but I'm unsure what he used. If you want, please feel free to reach out to him to see what he used and what he recommends. His number is 306-781-2668.