Needle Cast in Spruce Trees

Spruce tree suffering from Rhizosphaera Needle Cast.
UMN Plant Disease Clinic

Many spruce trees across Minnesota have brown or missing needles along with dead branches. This damage can be caused by a variety of problems including needle cast diseases, branch cankers, insect pests, mites, or environmental conditions. In many cases, the problem is needle cast disease.

Although management options are available for many of these problems, each problem has its own unique solution. The first step in correcting a spruce problem is getting a correct diagnosis.

TWO NEEDLE CAST DISEASES

There are two common fungal diseases of spruce trees in Minnesota:

- Rhizosphaera Needle Cast (*Rhizospaera kalkhoffii*): commonly affects Colorado blue spruce; will also affect other spruces
- Stigmina Needle Cast (*Stigmina lautii*): commonly encountered on blue spruce and Black Hills spruce; will affect other spruces

Before you treat these diseases you **MUST** know which problem your tree has! Unfortunately it is not possible to diagnose either of these disease problems without a laboratory analysis. Both fungal pathogens cause needles to discolor or fall off. Both fungal pathogens make tiny black spore producing structures along the needle (in stomata).

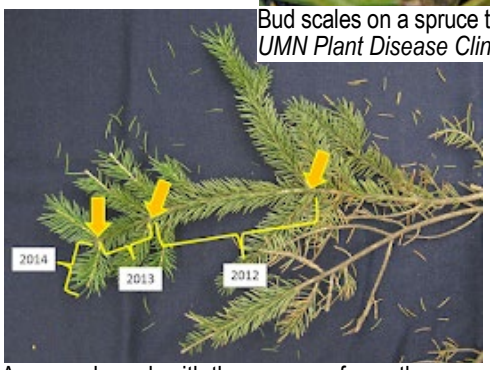
IDENTIFY DISEASE/INSECT PROBLEMS THROUGH THE UM PLANT DISEASE CLINIC

You can send a plant sample to University of Minnesota Plant Disease Clinic on the St. Paul campus. Samples can be dropped off in person or sent in the mail. There is a fee for diagnosis. Check the web page for sampling procedures, mailing information and current prices: pdc.umn.edu

Bud scales on a spruce twig.
UMN Plant Disease Clinic

WHAT TO SEND

Send a branch that has live but discolored needles. Ideally, the branch needs to be long enough to include needles from the past 3 to 4 years of growth. A branch that is 1 to 2 feet long is usually sufficient. This year's needles will be at the very tip of the branch. Previous years needles will be further down the branch behind a ring of rough brown bud scales on the twig separating each year of growth. Keep the sample in a cool dry location until it can be sent.



A spruce branch with three years of growth.
UMN Plant Disease Clinic

Fill out the online sample submission form and include it with the plant sample.

HOW TO SEND A SAMPLE

Wrap the branch in dry newspaper and then plastic before placing it in a box for mailing. It is best to mail the sample early in the week to avoid having the plant sample sit in a storage facility over the weekend. Samples brought directly to the clinic do not need to be packaged.

WHAT HAPPENS TO PLANT SAMPLES AT THE CLINIC?

The plant pathologists at the UMN Plant Disease Clinic carefully inspect every plant sample submitted. Diagnosticians use a variety of techniques to identify the pest or pathogen causing the problem including microscopy, culturing and DNA analysis.

Needle discoloration and loss caused by Stigmina Needle Cast.
M. Grabowski, UMN Extension

HOW DO I GET THE RESULTS?

The results will be sent to you via email, mail, or fax. You choose by marking a box on the submission form. The results will include the name of any pests and pathogens found on the plant sample and information about research based management options available to you. More information about how to treat common spruce diseases can be found at the UMN Extension website.

OPTIONS TO MINIMIZE SPRUCE NEEDLE CAST DISEASES

- Plant spruce in full sunlight as individual trees and not as parts of rows.
- If you desire a privacy or windbreak of trees, do not plant spruce next to each other. Alternate spruce with a different tree, such as an arborvitae, pine, fir, or a deciduous tree. Understand that these trees will eventually need much more space to grow, so make sure that spruce branches will not encroach on other spruce branches.
- Improved plant spacing (farther apart, i.e.: 25 – 30') is critical to allow air movement between trees.
- If you currently have a row of younger spruce trees, remove every other spruce once their branches contact other spruce trees' branches.
- Do not allow irrigation water to contact spruce needles or spray up through the canopy.
- Pruning away lower canopy branches may delay progress of needle cast in the tree's canopy.
- Consider planting disease resistant varieties of conifers if available.

Remember, diversifying any tree row or forest, regardless of species, can avoid many disease problems.

LABELED FUNGICIDES FOR NEEDLE CAST DISEASES

Fungicidal treatments are used to protect new growth, preventing disease infection and spread rather than curative of already infected needles. In most cases, they are most effective on smaller spruce that do not have any disease or very low disease levels. Diseased spruce branches will not recover and benefit from spraying. Sprays often are ineffective, likely because they are made after infection has already occurred or because they are applied to a spruce that is already heavily infected. Cultural controls described above may be more effective than fungicide spraying. The fungicide chlorothalonil is labeled for both needle cast diseases. Chlorothalonil can be applied for 2 months after bud break. Follow label directions. Apply at bud break and repeat in one month. Repeat every year for 4 to 5 years for high value trees.

If you do not want to treat your trees yourself you can hire an arborist. Arborists are tree care professionals that can work with you to provide the best care for trees on your property. To find a certified arborist who works in your area, go to treesaregood.org and use the "Find an Arborist" tool from the International Society of Arboriculture.

Resources

UM Extension Blog: (Michelle Grabowski) http://z.umn.edu/umneedlecast
Two Needle Diseases of Spruce in North Dakota: (NDSU) http://z.umn.edu/needlecast
Diagnosing Disorders of Spruce: (NDSU) http://z.umn.edu/sprucendsu
Recommended Trees for Minnesota: http://z.umn.edu/rectrees

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