BRANCHING OUT
IPM NEWSLETTER FOR TREES & SHRUBS

What is Making My Spruce Tree Drop its Needles?

Dawn Dailey O'Brien, Department of Plant Pathology and Plant-Microbe Biology, Cornell University

Spruce trees are popular landscape plants and also valuable Christmas trees. Unfortunately, they are susceptible to a variety of needle diseases that cause their needles to shed which can severely affect their aesthetic value and the health of the tree. Spruces can become more susceptible to diseases and pests when they become stressed. The stress can be caused by improper planting techniques or poor site conditions. In order to create the best opportunity for healthy trees, they should be planted in sites that are favorable to their growth. Preferable conditions include full-sun locations with acidic and well-drained soils.

There are several common diseases found in New York which can cause spruce needles to drop including Rhizosphaera needle cast, Weir's cushion rust, Stigmina needle blight, and Cytospora canker. In the Midwest there is another spruce disease that has been getting a lot of press lately. It is called sudden needle drop disease (SNEED) and is associated with *Setomelanomma holmii* but it hasn't been found in NY yet. Currently, *S. holmii* has not been proven to be a true pathogen; it may just be a fungus taking advantage of stressed trees. We include it here only for comparison's sake. The chart on the back of this page compares and contrasts each disease to help make the diagnosis easier.

Rhizosphaera Needlecast (27)

Two and three year old needles that turn purplish-brown. Inset: Fruiting bodies emerging from the stomates on infected needles. Photos © USDA Forest Service - North Central Research Station Archive, USDA Forest Service, Bugwood.org

Weir's Cushion Rust (143)

Early symptoms of Weir's cushion rust on infected needles Inset: Blister-like fruiting bodies sporulating on blue spruce needles. Photos © Sandra Jensen, Cornell University.

Stigmina Needle Blight

Fruiting bodies of Stigmina lautii *emerging from the stomates on infected needles © Joseph O'Brien, USDA Forest Service, Bugwood.org. Top inset: Close-up of fruiting bodies showing the tendrils. Fruiting bodies under high magnification. Inset photos © Sandra Jensen, Cornell University, Bugwood.org*

Cytospora Canker (83)

Cytospora infections usually start low in the tree, and progress upward through the crown.© Joseph O'Brien, USDA Forest Service, Bugwood.org. Inset: White or light blue patches of resin exuded from cankered branches is visible after infected needles are shed. © George Hudler, Cornell University.

Disease	Hosts	Symptoms and Signs
Rhizosphaera needle cast (*Rhizosphaera kalkhoffii*) (*27*)	Commonly Colorado blue spruce White spruce is intermediately resistant, Norway is highly resistant A number of other spruce species are reported hosts as well	• Minute, round, smooth, black fruiting bodies in rows on the undersides of needles. Can be found on both green and yellow needles. These fruiting bodies are often capped with a white wax substance. Seen only with a hand lens. To the unaided eye the fruiting bodies look like rows of dirt. • Two and three year old infected needles turn purplish-brown and eventually drop. • Current year's needles are green • Usually found in the lower branches of affected trees. • Microscopic evaluation necessary to differentiate this from Stigmina needle blight
Stigmina needle blight (*Stigmina lautii*)	Wide range of spruce species, including Colorado blue spruce	• Tiny, fuzzy black fruiting bodies that have small finger-like tendrils growing out of the sides. They emerge from the stomates (in perfectly aligned rows) of both brown and green needles. Stigmina makes the needles look "dirtier" than Rhizosphaera. • Two and three year old needles turn purple or brown, die and are shed • Current year needles not affected • Microscopic evaluation necessary to differentiate this from Rhizosphaera needle cast • The pathogenicity of the fungus is in question. Seems only to infect stressed trees.
Weir's cushion rust (syn. spruce needle rust) (*Chrysomyxa weirii*) (*143*)	Commonly Colorado blue spruce but also other spruces including white, red and black among others	• Previous year's infected needles begin to develop yellow spots or bands in late winter or early the following spring. • Current year needles are green and intact. • Bright orange-yellow blisters develop on these discolored areas of one-year old needles in the spring • Current season's needles are infected by windblown spores in early spring when new growth emerges. • Later in the growing season, infected previous year needles are shed from the tree.
Cytospora canker (syn. Leucostoma canker or spruce canker) (*Leucostoma kunzei*) (*83*)	Commonly Colorado blue spruce (also Norway, Englemann, white, black, Oriental and red spruces)	• Entire branches turn purple/brown. • Branches will ooze a bluish-white resin • Affects all needles from the tip of the branch to the base. • Often lower branches are affected first. As the disease progresses over a number of years the higher branches show damage. • Usually on trees 10 years old or older
Sudden needle drop of spruce (SNEED) (*Setomelanomma holmii*)	Norway, white and Colorado blue spruce trees	• **Note:** Not known to occur in NY but has been found in several states in the Midwest. *Setomelanomma holmii* has been found associated with the symptoms of sudden needle drop of spruce (SNEED), but it has not been proven that this fungus is the pathogen responsible for SNEED. • Yellowing and eventual browning of older needles. • Needles do NOT turn purplish • No fruiting structures (little black dots) on the needles, only on the stems and twigs. • Frequently, by end of the summer, all of the needles on the affected branches fall off except the newest needles on the tips of the branches. Eventually the canopy of the tree thins, sometimes leaving bare branches. • Only current year needles remain • Affected branches may be scattered through the canopy.