



PLANT DISEASE IN KANSAS

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WATCH FOR SPRUCE NEEDLE CASTS IN SPRING

Spruce trees are commonly planted in urban and rural Kansas landscapes, and nearly as common is needle loss on these trees. Generally, even healthy spruce trees experience needle loss of older needles, but premature needle loss may also occur. This needle loss can be attributed to many factors, including environmental stress, poor planting, insect pests, and diseases. Some of the most common diseases of spruce trees in the Great Plains area include two types of needle cast, *Stigmina* needle cast (caused by *Stigmina lautii*) and *Rhizosphaera* needle cast (caused by *Rhizosphaera kalkhoffii*), both of which cause premature needle loss.

Both diseases produce similar symptoms and may require a hand lens or even professional diagnosis to differentiate them. They require extended wet conditions to develop, making spring an ideal time for infection. They typically cause yellow bands on the needles which frequently turn darker yellow, purple, tan, or brown and may discolor the entire needle. With *Rhizosphaera* needle cast, the needles may be shed soon after the onset of disease in the spring or may remain attached up to two years. In the case of *Stigmina* needle cast, needles are not usually shed until the following year after onset of symptoms. Both diseases usually colonize the lower 1/4-2/3 of the tree (Fig. 1). Both diseases produce black fruiting structures on the needles which are the best method of differentiating the two diseases. *Rhizosphaera* needle cast produces smooth black spherical fruiting bodies (pycnidia, Fig. 2) whereas *Stigmina* needle cast produces round, black fuzzy-looking fruiting bodies and spores (sporodochia, Fig. 3). These fruiting bodies typically form in spring to summer. In the absence of the fruiting bodies, these diseases are sometimes mistaken for drought stress. The diseases are not typically deadly but decrease the aesthetic value of the tree.

Blue spruce is among the most susceptible hosts to these diseases, while Norway spruce is among the most resistant. White spruce is also susceptible, but not as much as blue spruce. One way to manage these diseases is to plant resistant species. Cultural practices such as promoting good air circulation, reducing humidity around the tree by mowing grass and spacing out trees, and pruning to remove dead and diseased branches also will decrease risk of disease. Avoid pruning trees during wet weather, as wounding the trees may contribute to easier infection. Water trees during drought conditions to prevent drought stress. Lastly, fungicides are also available to protect against them, if sprayed proactively and at the proper intervals.



Figure 1: A tree suffering from Rhizosphaera needle cast, although a tree suffering from Stigmina needle cast will also present similarly. Photo by USDA Forest Service - North Central Research Station, USDA Forest Service, Bugwood.org.



Figures 2 and 3: Rhizosphaera needle cast fruiting bodies are round and smooth (Fig. 2, left), while Stigmina needle cast fruiting bodies are fuzzy (Fig. 3, right). Photos by Paul Bachi, University of Kentucky Research and Education Center, Bugwood.org.

PINE WILT DISEASE SURVEY OF WESTERN KANSAS CONTINUES

The Kansas Department of Agriculture and Kansas Forest Service continue to survey in Western Kansas for pine wilt annually, to protect the valuable windbreaks planted there. Due to complications from COVID-19 restrictions, KDA was unable to complete survey in winter 2020-2021. Plans are currently in place for winter 2021-2022 survey of the town of Hays (Ellis County), as well as Cheyenne, Rawlins, Kiowa, Comanche, Thomas, Gray, Haskell, Meade, and Clark Counties.

Pine wilt is a disease caused by the pinewood nematode, *Bursaphelenchus xylophilus*. This nematode is spread by the pine sawyer beetle. By itself, the beetle does little damage to a tree beyond some minor stress, but it is the primary vector of this nematode, which enters the trachea of the insect at larval stage and is spread during feeding after the insect spreads to other trees as an adult. This disease is established in Eastern Kansas but has yet to establish in most of Western Kansas at this point.

Although not a pest of regulatory significance, we consider this pest to be significant to monitor and control in Western Kansas due to the importance of pine trees as windbreaks. Windbreak trees are more valuable in this region, which is more susceptible to heavy winds.

Pine wilt disease usually kills pine trees relatively quickly, within a few weeks to a few months. Mature pine trees (10+ years old) are more susceptible than young ones. Because of this, it is not a serious threat to Christmas tree farms. Symptoms include color change in needles from green to grayish green, then to brown (Fig. 4). If you remove a limb, it is usually characterized by a lack of resin, as the nematodes multiply and clog up the xylem which stops resin flow. Needles do not drop immediately but may stay on a dead tree's branches up to a year. Another common sign of pine wilt disease is presence of a blue stain fungus in the wood (Fig. 5), which is spread to pine trees by bark beetles and serves as an alternative food source for the nematodes once the pine tree dies.

To prevent the spread of pine wilt, it is imperative to remove dead pines promptly. They must be burned, buried, or chipped, as they may harbor insects and promote spread of the nematode. Do not use the wood for firewood, as the insects may still emerge from firewood logs. When planting evergreens, select resistant trees, such as white pine, spruces, firs, and junipers. Susceptible pines include Scots pine, Austrian pine, Mugo pine, jack pine, and red pine. No effective nematicides exist at this time.

If you suspect a pine tree of having pine wilt, a sample of wood is necessary. Take a disk of wood or branch at least 1 inch thick and 3 to 4 inches wide and submit it to the Kansas State University Plant Disease Diagnostic Lab in Manhattan, Kansas. If a pine tree dies it is important to know whether pine wilt was the cause, as it is important to dispose of the tree properly to avoid spread of the nematode.



Figure 4: A pine tree in Goodland, KS with partial dieback due to pine wilt.



Figure 5: Blue stain fungus spreads via bark beetle and serves as an alternative food source for the nematodes.

Plant Protection and Weed Control staff work to ensure the health of the state's native and cultivated plants by excluding or controlling destructive pests, diseases, and weeds. Staff examine and analyze pest conditions in crop fields, rangelands, greenhouses, and nurseries. Action taken to control potential infestations of new pests, whether they are insects, plant diseases, or weeds, is beneficial to the economy and the environment.

Our mission is to:

- Exclude or control harmful insects, plant diseases, and weeds;
- Ensure Kansas plants and plant products entering commerce are free from quarantined pests;
- Provide customers with inspection and certification services.

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