

## **The Mystery of Browning Pine Needles: Part 1**

What's not to love about pine trees? Many are drought resistant, cold hardy, and adaptable to poor soils. And, especially now in the midst of winter, pines present bold statements. Defiantly green, they shrug off bitter cold, icy rains, thick snows.



Loblolly Pine (*Pinus taeda*)

We may be most familiar with our native pines: loblolly (*Pinus taeda*), white (*P. strobes*), ponderosa (*P. ponderosa*) and a few others. But some of the non-natives are especially attractive. Austrian pines (*P.nigra*), Scotch pines (*P.sylvestris*) and Mugo pines (*P.mugo*), all present such different profiles, such different statements. They are often used in landscapes for those very reasons.

As with any plant in our landscape, it's good to check the health of pines from time to time. While they are sturdy additions to our landscapes, pine trees can be affected by certain diseases that can certainly weaken and likely cause disfigurement . . . and some that will cause the tree to actually die prematurely.

Viewing the needles is one way of checking on pines. However, browning needles or needles dropped beneath the canopy don't necessarily indicate a problem. Though called evergreens, all pines drop needles as part of their natural life cycle. Austrian and ponderosa pines, for example, retain needles for 3 to 4 years, scotch pines for 3-5 years. In natural needle drop the older, inner needles throughout the tree turn brown and shed in the fall. Needle browning or dropping at other times of the year could indicate problems.



Natural browning of older needles

Unfortunately, non-native pines are susceptible to one of the most devastating pine tree diseases, called ***Pine Wilt***. To the dismay of homeowners, the disease occurs most often in well-established trees that are more than ten years old. And, once infected, a tree will die within a few weeks to a few months. There is no cure.

This disease is caused by a microscopic roundworm, the pinewood or pine wilt nematode, which is unwittingly carried by a species of a long horned beetle, the Pine Sawyer Beetle. Pine Sawyer Beetles feed on the bark of pine trees. Females lay their eggs in distressed or dying pines. Emerging from the eggs, the growing beetle larvae bore into the tree feeding on the inner bark and cambium. When fully grown, the larvae enter the pupa stage, generally remaining in their tunnels through the winter months.



Adult Pine Sawyer Beetle emerging

In spring, adults emerge, chewing out from their tunnels. However, if pinewood nematodes had colonized the tree, large numbers would have already moved into the beetles' respiratory openings. When the emerging adult beetles fly to healthy trees to feed on the bark, the nematodes will be introduced to the healthy trees through the feeding wounds.

Once introduced into a pine, the nematode population explodes rapidly, feeding on plant cells surrounding resin canals and water-conduction (xylem) cells. As the population multiplies and moves throughout the tree, the nematodes interfere with the flow of water and nutrients.

Initially, the needles on a few branches will fade to greenish gray, then to yellow and brown and the needles will remain attached. Quickly, though, the disease spreads throughout the tree. With no cure, the tree declines rapidly.

Dead and infected trees should be removed, leaving no stump, and burned as soon as possible. Burning will destroy beetle larvae before the next generation emerges to spread the pinewood nematodes to other pine trees in the area. The cut wood should not be kept for firewood but should be destroyed immediately.



Early symptom of wilt, brown needles remain attached to tree



Mature pine killed by pine wilt

The Pine Sawyer Beetle is most active from May through September with Pine Wilt symptoms appearing from July through December. Austrian and Scotch pines are highly susceptible to pine wilt. Mugo pines are moderately susceptible. Native pines are seldom affected unless suffering from environmental stress or other pest or disease problems.

For more information, here are some links for further reading opportunities:

[Pine Wilt Disease--OSU Extension fact sheet EPP-7674](#)

[Pine Sawyer Beetles--OSU Entomology & Plant Pathology](#)

[Pine Wilt--a Fatal Disease of Exotic Pines--KSU publication MF2425](#)

[Fall Needle Drop--Michigan State University Extension](#)