



# PINE WILT

## A FATAL DISEASE OF SCOTCH PINE

Scotch pine, a popular tree for ornamental plantings, windbreaks and Christmas trees, is rapidly disappearing from Nebraska's landscape. The tree is susceptible to pine wilt, a disease that has killed thousands of Scotch pines in the southeastern part of the state since the mid-1990s. This publication discusses pine wilt and how to control the disease.

### Symptoms

Trees affected by pine wilt initially develop faded, grey-green needles, which quickly turn brown.

Symptoms develop rapidly in late summer or fall.

Some trees die branch by branch, especially from late fall to late spring.

Dead needles may remain on the tree for a year or more.



Rapid browning of trees occurs in late summer to late fall.

### Susceptible Trees

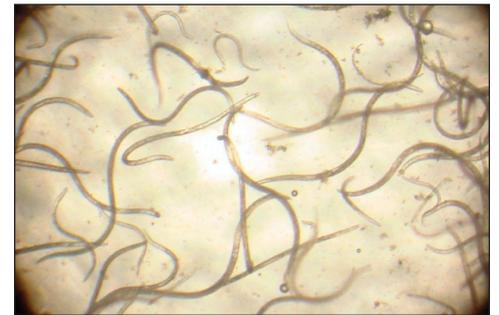
Scotch pine is highly susceptible to pine wilt. Austrian pine is moderately susceptible.

Native pines such as ponderosa and eastern white pine rarely die of the disease, while spruces, firs, junipers and redcedar are not susceptible.

### What Causes Pine Wilt?

Pine wilt is caused by a microscopic worm-like organism called the pinewood nematode. The nematode attacks tissues in the wood, causing decreased

water flow and death of susceptible trees. Bacteria associated with the pinewood nematode may play a significant role in disease development.



Nematodes extracted from a pine wilt killed tree (highly magnified).

## Identifying Scotch Pine

### Needles

- Grouped in pairs
- Slightly twisted
- 1.5" to 3.5" long



### Bark

- Branches and trunk have flaky orange bark, especially in the upper-crown



### Cones

- Mature open cones are round to egg-shaped
- 1.5" to 2.5" long
- Immature cones point backward on the stem



## How Does Pine Wilt Spread?

Pinewood nematodes are carried from tree to tree by pine sawyer beetles. Immature pine sawyer beetles tunnel in the wood of dying pines, such as those dying from pine wilt. When the beetles mature and emerge from the wood, they may carry thousands of nematodes on their bodies.

Adult beetles fly to healthy trees to feed, carrying the nematodes with them. The beetles chew on twigs, creating wounds through which the nematodes infect the trees.

Susceptible trees die within a few months following infection.



Immature pine sawyer larvae (top) and adult pine sawyer beetle (bottom).



## Diagnosis

If a Scotch Pine in the eastern half of the state rapidly turns brown and dies in late summer or fall, pine wilt is likely the cause. Laboratory testing can help confirm pine wilt but is usually not necessary.

In other pine species, and in the west, other causes for browning are more likely and should be considered before pine wilt is suspected.

## Control

- Trees with pine wilt cannot be saved
- Diseased trees must be destroyed to prevent the beetles from spreading the nematodes to nearby healthy trees
- Trees should be chipped, burned or buried before the beetles emerge from the wood
- Do not save diseased wood for firewood
- Woodchips from diseased trees are safe to use as mulch, even around pines
- Healthy, high-value trees can be protected from pine wilt with a trunk injection



## Trunk Injection

Healthy trees can be protected from pine wilt with a trunk injection of abamectin or emamectin benzoate. The treatment should be applied by a certified arborist who is well trained in the procedure.

The treatment greatly reduces the chance that a tree will die of pine wilt, but it is not 100% effective.

Trees must be re-treated every 2-3 years, and the cost may run a few hundred dollars per treatment for a large tree. Because of the expense, usually only high-value trees in excellent health are treated.

### Removal Guidelines

*If a tree dies May 1 - Oct. 1:*

Remove and destroy immediately

*If a tree dies after Oct. 1:*

Remove and destroy by April 30

*For more information about pine wilt and how to hire an arborist, visit the Nebraska Forest Service:*

[www.nfs.unl.edu](http://www.nfs.unl.edu)