



## Understand and Manage

# Pine Wilt Nematode

### Overview

**Pine wilt** is a fatal disease of pine (*Pinus spp.*) caused by the nematode *Bursaphelenchus xylophilus*. Nematodes are microscopic, worm-like organisms that grow inside the tree's water conducting tissue causing a rapid death of infected trees. As a native to North America the pine wilt nematode is primarily a pathogen of non-native, 2-3 needle pines. The disease is transferred from infected trees to healthy trees by pine sawyer beetles (*Monochamus spp.*) as they feed on the bark and foliage of susceptible pines.

Pine wilt disease was first described in Japan in 1905, where it remains a very serious forest disease to this day. Here in the US, the disease does not affect our native pine species but can be devastating to popular landscape introductions such as Scots pine (*P. sylvestris*), Austrian pine (*P. nigra*), and others. This disease is a major concern for arborists as well as Christmas tree growers in the Midwest.

### Diagnosis

Field diagnosis can be difficult due to the rapid death of infected trees. Early symptoms may be reduced vigor, fading green color, and yellowing throughout the entire tree. Symptoms often begin from the top of the tree and progress downward. Trees begin to die in midsummer and can die within weeks of the initial infection leaving brown, dead needles still attached to the branches. It is helpful to scout for infection centers the previous year or during the off-season.



**Susceptible tree species** (listed most to least susceptible): Scots, Austrian/Black, Aleppo, Japanese black, Japanese red, Mugo, Pitch, Swiss stone, Shortleaf, Virginia, Lodgepole, Jack, Red, Loblolly, Monterey

**Distribution:** Midwest USA including IA, IL, MO, KS, NE, KY

**Pathogen:** *Bursaphelenchus xylophilus*

**Symptoms:** Rapid death, yellow needles turning brown in a few weeks, random distribution in the landscape. The disease affects healthy and stressed trees equally regardless of tree size

**Signs:** None visible

**Distinguish from look-alikes:** Rapid death – herbicides or mechanical injury are other agents that kill as quickly.

Salt damage will cause needles to die from the tip back, pine wilt nematode kills whole needle quickly.

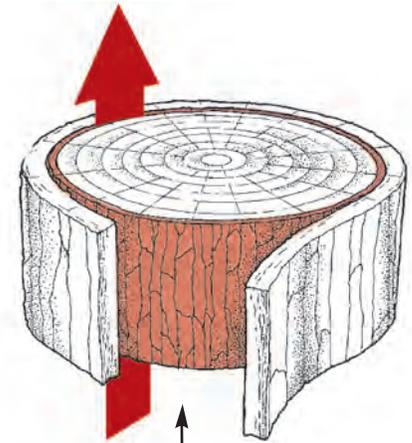
Needlecast diseases display symptoms either on newly formed needles or on older needles and will cause needle loss and decline over several years. PWN usually kills pines in one season

# Treatment: Pine Wilt Nematode

## Management Strategy

Pinetect™ is a tree injection product that is used to preventively treat pines that are susceptible to pine wilt nematode. Optimal results occur when Pinetect is applied in the spring of the year prior to adult flight of the pine sawyer beetle, which vectors the nematode. Pinetect is delivered directly into the pine's vascular issue using the Pine Infuser System. Pinetect is the only labeled product that follows the application procedures and dosage rates developed by Kansas State University.

# Pinetect™



*Pinetect is injected into the tree's vascular tissue where it protects against the nematode infections for two years*

## Expectations:

Pinetect will provide two years of protection from pine wilt nematode. Pines will need to be treated after two years to maintain protection.

## Other Treatment Practices:

- Preventive trunk and limb sprays with Onyx or Covert to control the pine sawyer beetle and other pine bark beetles
- Preventive applications of Xytect for control of sawfly and other insects
- Promptly remove and burn infected trees
- DO NOT transport woodchips from infected trees
- Cover firewood from infected trees for at least a year to prevent emergence of beetles
- Plant resistant native pines and 5-needle pines



*Injection of Pinetect is done with the Pine Infuser System*