Wilt diseases

Titles

- **Oak wilt disease.**
- **Verticillium wilt.**
- **Pine wilt disease.**
- **Dutch Elm disease.**

Oak Wilt Disease

Pathogen: ***Ceratocystis fagacearum***

Hosts: red Oak, white Oak and live Oak but red Oaks are more susceptible.

Economic Impact:

The fungus clogs sapwood vessels in the oak trees, which inhibits water transport. This results in wilting and eventually kills the tree.

The Oak fungus is spread in one of two ways:

Fungal spores are transported to healthy trees by insects(beetles),
or the fungus travels from a diseased tree to a healthy one via root grafts.

SYMPTOMS

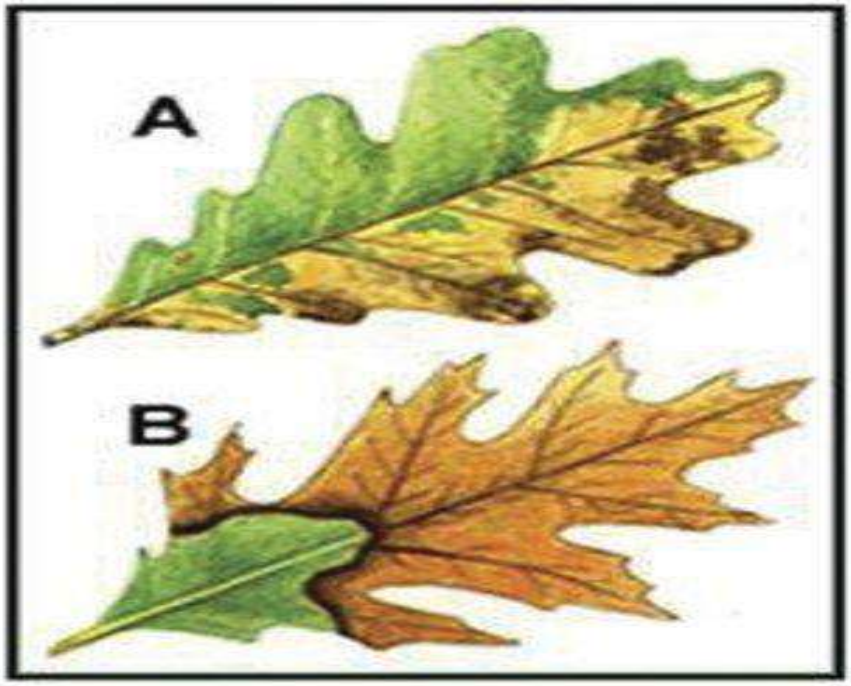
Leaves of red oaks turn dull green or bronze and then turn yellow or brown.

Browning often begins at the leaf base with a sharp line between brown and green.

the leaves begin to wilt from the top of the crown downward.

In white oaks symptoms are generally identical to those in red oaks but white oaks die much more slowly.

Some white oaks appear more resistant and seem to recover from the disease.



Symptoms of oak wilt in A. white oak and B. red oak.

symptoms

Leaf symptoms appear as wilting and defoliation throughout the tree crown.

Most trees die within 12-months.

Oak tree killed by oak wilt

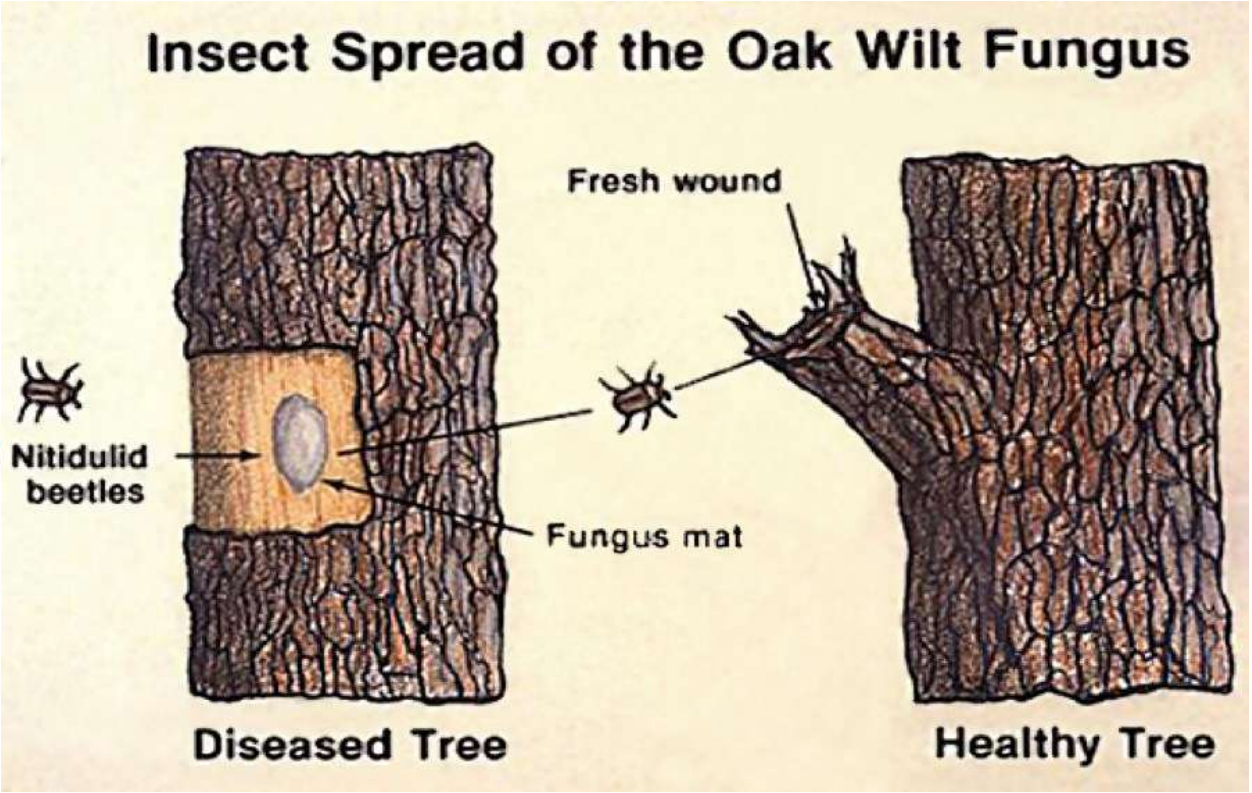
Oak wilt produces a distinctive fruiting body, called a spore mat, on the trunk or branches of infected trees.

Also they will produce a thumb-pad sized blister called a pressure pad underneath of bark.

Pressure pad

Fungal mat

Insect vectors can help this pathogen spread and become established in new areas.



control

1- Quarantine

2- To prevent vector transmission, avoid pruning or wounding healthy oaks in the spring when the insect vectors are most active.

3- painting wounds

4- Removing and properly disposing of symptomatic trees can reduce overland spread .

5- reducing construction near oak trees.

Verticillium Wilt

Verticillium wilt is caused by two closely related soilborne fungi, *Verticillium dahliae* and *V. albo-atrum*.

Hosts: ash, catalpa, maple, lilac, rose.

Conifers do not appear to be susceptible

Verticilium dahliae can persist in the soil for many years without a host as resting structures called microsclerotia.

Microsclerotia are stimulated to germinate by exudates from nearby growing roots.

The hyphae from germinating microsclerotia are penetrate roots of a susceptible host.

Symptoms :

the initial symptoms are characterized by sudden foliage wilting and dieback on one or few branches because the pathogen blocks water movement from the roots to the foliage. wilting and yellowing of individual branches and branch mortality may occur. Foliage may curl up and turn yellow, red or brown.

Discoloration occur on the trunk and main branches as distinct bands, streaks, or flecks in the sapwood

fleck

streak

control

1. Avoid planting susceptible tree species.
2. Avoid root injuries.
3. Apply fertilizer in appropriate amounts and watering.
4. Avoid planting susceptible tree species in the same site were the pathogen was present.
5. Pruning the infected branches.

Pine wilt nematode

The pathogen: ***Bursaphelenchus xylophilus***

Host:

Pine wilt is a fatal disease of pine (*Pinus* spp.) such as Scotch pine, Austrian pine, Japanese black pine, Japanese red pine, jack pine, mugo pine, and long-leaf pine.

Sawyer beetle (Monochamus spp.)

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.

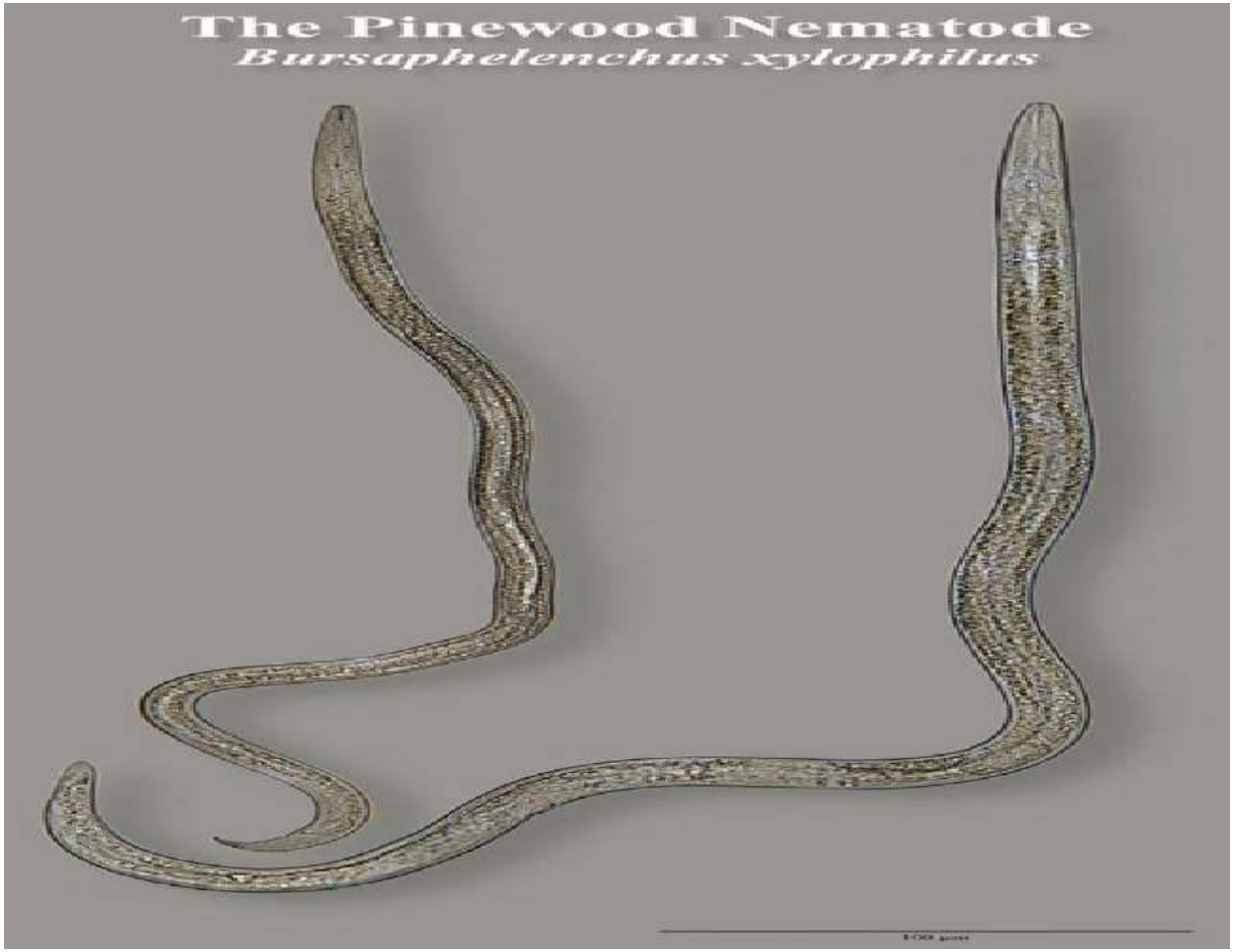
symptoms

Early symptoms may be reduced vigor, fading green color, yellowing and reddish brown throughout the entire tree.

Symptoms often begin from the top of the tree and progress downward.

Trees begin to die in midsummer within a few weeks of the initial infection leaving brown, dead needles still attached to the branches.

Bursaphelenchus xylophilus



control

1- Quarantine

2- Dead trees and stumps should be removed and buried as soon as possible?

3- Select resistant varieties Such as eastern white pine.

4- Maintaining the vigor of pines through periodic fertilization and irrigation during dry periods may help prevent beetle attack and disease development.

5- insecticide and nematicide.

Dutch Elm disease

Dutch elm disease (DED) is caused by two species of fungi *(Ophiostoma ulmi* and *Ophiostoma novo-ulmi)*.

It is transmitted from infected trees to healthy trees by at least three species of elm bark beetles.

Also the fungus can also spread from infected to healthy trees by root grafts.

Infection results in a blocking of the vascular tissues preventing water movement to the crown of the tree.

Early symptoms typically include yellowing leaves (chlorotic) on the tip of a branch and then turning brown and curling up.
Most of the leaves drop but some remain attached to the twigs for a long time.
These symptoms called flags

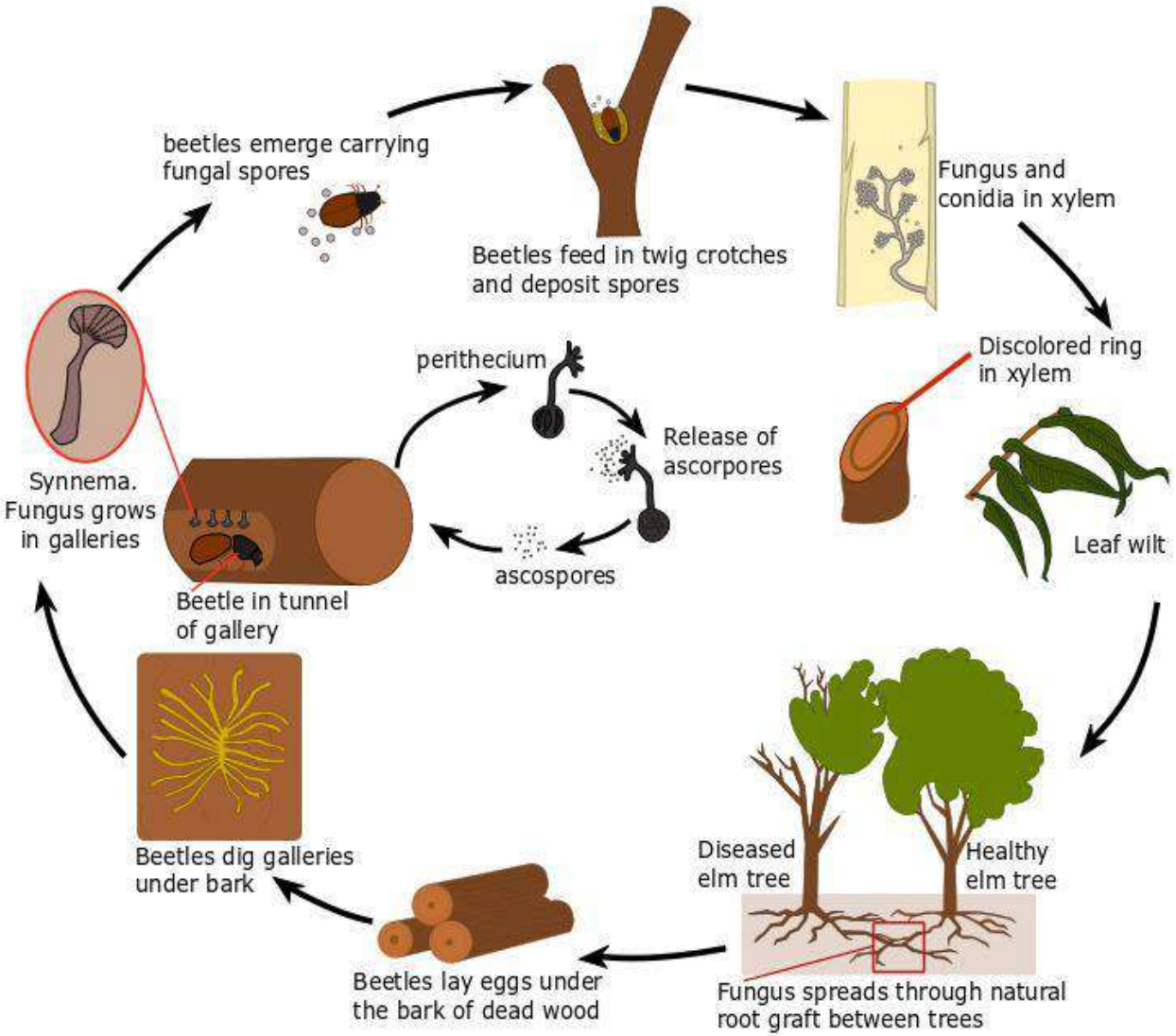
A brown to black streaking or discoloration under the bark of infected branches is a diagnostic symptom of DED.

Vector of the disease and their signs

Elm bark beetle

Streaking on the wood surface

Disease development



control

Sanitation involves removal and destruction by burning of DED infected trees, which act as an inoculum source for the disease, and a home for the vectoring beetles.

Using insecticide to control insect vectors.

Maintain healthy conditions for elms, such as avoiding construction activities that might weaken the root system.

Planting resistance trees.

Fungicide to control the fungus that cause the disease.