

Oak Wilt

Cause

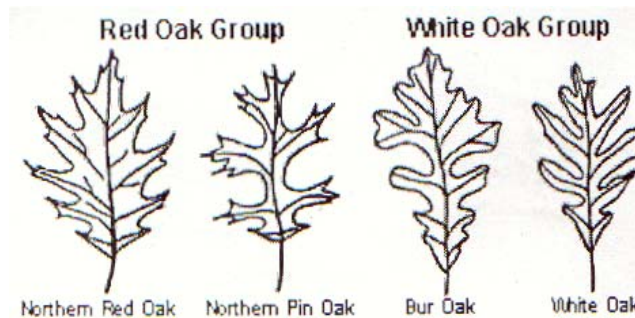
The fungus, *Ceratocystis fagacearum*, which grows in the vessels that carry water and nutrients through the tree, causes oak wilt. It is introduced into the tree by feeding sap beetles or via root grafts with other oaks. The oak attempts to protect itself by producing compounds, called tylosis, and gums to stop the fungus. The growth of the fungus and the oak's reaction eventually cut off its water supply.

Subsequently, the oak wilts and eventually dies. The rate of infection spread is dependent upon the species of oak and the overall health of each tree.

Identification

Northern red, northern pin, eastern pin oak: These species, *Quercus rubra*, *Quercus ellipsoidalis*, and the introduced *Quercus palustris* are highly susceptible to oak wilt. The first apparent symptom in northern red and the pin oaks is wilting of the leaves at the top of the tree, which rapidly involves the entire crown. The leaves of red and the pin oaks turn a dull green, bronze, or tan beginning at the outer portions of the leaf. The base of the leaf and the portion around the main vein are the last to change.

White, bur, swamp white oak: These species, *Quercus alba*, *Quercus macrocarpa*, and at the north most edge of its range, *Quercus bicolor* are somewhat resistant to oak wilt. The wilting leaves of white, bur, and swamp white oaks turn brown from the leaf tip toward the leaf base, and the color changes tend to resemble normal fall coloration. Infection usually occurs in scattered branches of the crown. Depending upon the health of the tree, it may take many years to succumb to the disease and, in some cases, trees compartmentalize and stop the spread of the fungus.



Diagnosis

Field diagnosis for oak wilt is not always conclusive. Therefore, the Forestry and Natural Resources Division may sample, at its discretion, suspected trees and submit the samples to the Minnesota Department of Agriculture Shade Tree Disease Laboratory or the University of Minnesota Plant Disease Clinic for testing. Approximately four weeks are needed for the laboratory to culture the sample and make a diagnosis.

Spread

Ninety percent (90%) of oak wilt disease is spread in its vegetative form through the vascular system in natural root grafts with nearby oaks of like species (e.g. red oak to red oak).

Ten percent (10%) of oak wilt is spread overland by sap beetles of the Family *Nitidulidae* (often referred to as sap beetles) inadvertently carrying the oak wilt fungus from spore mats formed on infected red oaks to fresh wounds on uninfected oaks. Only the red oak family will produce the spore mats, but this method of spread is capable of infecting any wounded oak species.

Control Methods

Identification of infectious trees is of primary importance in controlling the spread of oak wilt. Once suspect trees are identified, the property owner can exercise four options or combinations as recommended by the Forestry and Natural Resources Manager or his representative.

Root graft transmission, the primary cause of infection, can be controlled through a mechanical trench, which is about ninety percent (90%) effective, or a chemical barrier, Vapam™ (soil sterilant), which is about fifty percent (50%) effective. These are placed between infected and healthy trees of like species, as space permits prior to the removal of diseased trees.

The second option can be viewed as preventative and/or therapeutic. A fungicide, Alamo™, injected into the vascular system at the base of the tree, is now being used to supplement mechanical trenching and replacing it where rough terrain prevents accessibility by trenching equipment. Infected white oak group trees can be treated directly with an injection. Recent findings indicate promise in the injection of red oak trees, which have yet to display symptoms. For more information about this process call the Forestry and Natural Resources Manager.

The third control measure is sanitation, which involves the removal of the diseased red oak group trees. The white oak group need not be removed, since they do not produce spore mats for overland transmission by the sap beetle.

The fourth control measure is girdling the diseased tree. Girdling involves cutting around the diseased tree's entire trunk approximately 1 ½" deep, excluding bark. This will cause the area where the fungus may produce spore mats to dry and not allow formation. If girdling is successful, removal is not required from a disease standpoint, but may be desirable from an aesthetic standpoint.

Oak wilt is a unique disease. With red oaks, at certain times, prompt removal is critical. At other times, one or a combination of the other methods is appropriate.

The Forestry and Natural Resources Manager or his representative, on a case-by-case basis, will determine the most appropriate control method and its timing, or combination of methods and their sequence.

Call the Forestry and Natural Resources Manager's office when you first recognize symptoms of oak wilt. The Forestry and Natural Resources Manager can be reached at (952) 988-8400 for more information.

Preventing Oak Wilt

- Frequent inspection of trees for damage, wilting, etc . . .
- Prompt care for damaged trees. Apply pruning sealant to any wounds immediately (April 1 - July 31). Yearly variations in weather may shift or expand this window.
- Avoid pruning or wounding during spring and early summer (April 1 - July 31). Yearly variations in weather may shift or expand this window.
- Tree climbing irons should never be used on live, healthy oak trees.