Oak Wilt in Wisconsin's Forests

Biology, Symptoms and Management

FOREST HEALTH FACTSHEET

Wisconsin Department of Natural Resources, Division of Forestry, Forest Health Program, Revised January 2021

LOCATIONS

Oak wilt is a deadly disease that affects oak trees. First documented in 1944, oak wilt has since been confirmed in most of Wisconsin's counties (Figure 1). Oak wilt is widespread and common throughout central and southern Wisconsin; however, the disease is still uncommon in northern Wisconsin (Figure 2).

Figure 1: *County distribution of oak wilt in Wisconsin.*

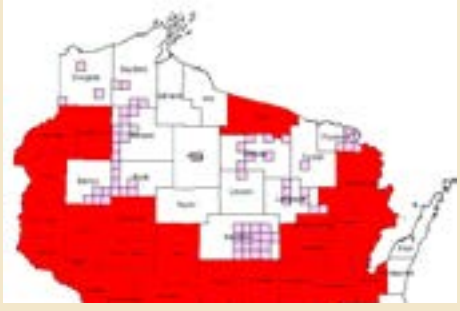

Figure 2: *Known distribution of oak wilt in northern Wisconsin townships. Pink squares mark townships of 36-square-miles where oak wilt is present in part. Oak wilt is common and widespread in counties in red.*

IMPACT

Oak wilt kills thousands of trees each year in forests, woodlots and urban areas. Oak wilt can even attack and kill healthy trees. The disease is a particularly serious problem for species in the red oak group such as northern red, northern pin and black oaks. Once wilting symptoms are apparent on a red oak, the infected tree will lose most of its leaves and die within approximately one month. Among the white oak group, bur and swamp white oaks demonstrate moderate tolerance to the disease; living several years after symptoms first appear. White oaks experience even slower disease progression and may survive infection.

BIOLOGY

Oak wilt is caused by the fungus *Bretziella fagacearum*. The fungus grows through the infected tree's water conducting system, causing the tree to wilt and die. Oak wilt is introduced to an area by sap-feeding beetles that carry oak wilt spores to fresh wounds. Spore-bearing fungal mats develop under the bark in the fall or spring following the death of the infected tree (Figure 3). The sap feeding beetles are attracted to the fungal mats and can transport oak wilt spores to fresh wounds or to recently cut oak stumps. Once in an area, the disease spreads to nearby oak trees through interconnected (grafted) root systems, creating an expanding pocket of dead oak trees.

IDENTIFICATION

Leaves will wilt and drop from the upper canopy first. Symptoms progress down the tree rapidly (Figure 4).

Figure 3: *Fungal mats produce oak wilt spores and grow underneath the bark of trees killed by the disease.*

Figure 4: *Leaves of infected trees will wilt and drop to the ground in summer.*

Figure 5. *Infected leaves appear dull green/ bronze, water-soaked but partially green, and will drop rapidly in mid-summer.*

Wilting symptoms are observed from June through September, most commonly in July and August. Leaves of the infected trees turn dull green or bronze, and look water-soaked (Figure 5). Unlike normal leaf fall, the leaves of infected trees drop to the ground when they are still partially-green. The symptoms of oak wilt are similar to those of other pest, disease and abiotic issues. A symptomatic tree should be sampled and examined by a laboratory for proper diagnosis, especially if active management is being considered.

PREVENTION

Once the disease exists in a stand, it is difficult to control. **Prevention of this disease is the best approach.** The greatest risk of oak wilt transmission occurs in the spring and early summer, when oak wilt spore-carrying beetles are abundant and fungal mats are fresh. To help reduce risk, the DNR developed the *Oak Harvesting Guidelines to Reduce the Introduction and Spread of Oak Wilt.* These recommend harvesting only during the non-restricted period if your stand is in a county that has oak wilt or is within 6 miles of a county with oak wilt (Figure 1).

Harvesting restricted periods are dependent on your location in the state (Figure 6) and are:

North Zone: April 15 to July 15
South Zone: April 1 to July 15

However, the guidelines' Exceptions and Modifications allow for stand-level flexibilities. Please read the guidelines for more information at dnr.wi.gov, keyword "oak wilt."

If oak trees need to be pruned during the harvesting restricted periods, apply wound sealer immediately after the wound is made to prevent the introduction of spores by sap-feeding beetles.

Figure 6: *Map of counties in the north and south Harvesting Restriction Zones.*

MANAGEMENT

Although management to control the below-ground spread of oak wilt can be complicated and costly, active management can be successful. Controlling below-ground spread requires disrupting the movement of the fungus through root grafts from infected trees to healthy trees. Physical severing of the root system using a vibratory plow or a trencher has proven to be effective if plow lines are placed correctly. Recently, field trials have shown some promising results to contain the below-ground spread of oak wilt by using herbicides on, or by uprooting the entire root mass of, healthy oaks that border the infected pocket.

Trees that have died of oak wilt will harbor spores for approximately 1 year after death. Once root grafts have been disrupted, dead and live trees inside a pocket should be harvested to limit the spread of the disease by beetles. If you are interested in options for active management of oak wilt, please contact your local DNR forester or DNR forest health specialist.

FIREWOOD

Keep firewood local.

Moving infected firewood can spread oak wilt long-distances to a previously disease-free area. Keep firewood local and consider covering it with 4 mil plastic until the bark is loose. Wood from dead trees with loose bark, and from apparently healthy trees with no wilting symptoms, does not pose a risk for the spread of oak wilt.

Wisconsin has developed a number of requirements pertaining to the movement of firewood. For more information about firewood restrictions, please visit dnr.wi.gov, keyword "firewood."

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For more information about oak wilt, please visit bit.ly/WIOakWilt
To contact DNR Forest Health staff, please visit bit.ly/DNRForestHealthStaff