



CENTRAL HARDWOOD NOTES

Oak Wilt

Oak wilt, a major disease of oak trees in North America, is caused by a fungus. It infects the sapwood and stops sap flow to the branches, twigs, and leaves. When sap flow is restricted during the growing season, trees wilt and soon die. In addition to killing trees, oak wilt makes it more difficult to export oak logs to other countries. Logs must be free of oak wilt before shipment. However, our knowledge of oak wilt makes it possible to safely export oak logs to other countries without the risk of transmitting the fungus.

Diagnosing Oak Wilt

The leaf symptoms and pattern of disease development in a stand are the best clues for diagnosing oak wilt. The first obvious symptom is a change in leaf color from green to pale green, yellow, and then brown. Close examination of infected trees reveals diagnostic symptoms, which are: drying or “bleaching” of leaf margins and tips, progressive inward browning of leaves from the margins and tips, yellowing and browning of leaf veins and midribs, and premature accumulation of both green and symptomatic leaves beneath trees. If either the trunk or the lateral roots are dead when leaf symptoms develop, the disease is probably not oak wilt but root rot or oak decline.

Symptoms of Stand Infections

Another characteristic of oak wilt is separate “infection centers” within a stand. These infection centers vary in size from a small pocket of trees to large acreages with many trees. The largest oak wilt infection centers have been discovered in natural stands of live oak trees in central Texas. Generally, trees of the same species make up an infection center. The typical infection center is composed of dead trees in the center, surrounded by partially dead trees, with initially infected trees along the perimeter. The most active part of the infection center is along its perimeter, where diagnostic leaf symptoms develop.

How to Tell Oak Wilt from Oak Decline

Most red oaks die soon after infection with the oak wilt fungus, but white oaks may only develop a few symptoms in one or two branches. When red oaks survive oak wilt, they exhibit thin crowns, dieback, and decline. These symptoms may be confused with what is commonly called “oak decline,” however, in oak decline separate infection patterns or centers are not evident. Instead, several oak species may be affected and they are usually widely scattered throughout the stand. Also, the diagnostic leaf symptoms of oak wilt are not present.

Limiting the Losses

The amount of damage caused by oak wilt varies with the value of affected trees and composition of the stand. High value or urban trees justify more protection than scrub oaks on poor sites. However, oak wilt in low value trees should not be ignored. Infections in these trees may later spread to valuable trees. The potential for damage is higher in pure oak stands than in mixed stands. Pure stands have extensive root grafts, which serve as conduits for transmission, and may account for about 95 percent of the new oak wilt infections each year. Insects may transmit the remaining 5 percent and are very important because they start new infection centers.

Stopping Transmission by Root Grafts

Losses can be limited by disrupting the normal transmission of oak wilt. Infection center expansion through root transmission must be stopped. You can do this by destroying root connections between infected and non-infected trees. A 3-foot-deep trench or plow line between the trees will disrupt most interconnected roots. The entire infection center should be encircled with the trench or plow line about 50 feet beyond the perimeter of infected trees. Another way you can limit disease spread through roots is to kill trees of the affected species along the perimeter of the infection center. Trees should be injected with silvicides that kill roots.

In cities and suburbs infected trees should be removed as soon as the disease has been positively identified if there are nearby oaks. Adjacent, uninfected oaks can be protected by trenching between healthy and diseased trees.

Stopping Transmission by Insects

The number of new infection centers can be minimized by reducing insect transmission. You can do this by preventing the fungus from releasing spores and by reducing the number of fresh wounds on trees in the springtime. Oak wilt-infected trees should be killed immediately with silvicides or by tree girdling. When trees are killed soon after infection, other fungi colonize the wood and prevent spore release by the oak wilt fungus. If infected trees are not deadened, fungal mats may develop under the bark and provide spores for insect transport to fresh wounds on healthy trees. Tree wounding through logging, road building, and pruning should be avoided in the springtime if oak wilt spores are being released and insects are active in nearby stands. Logs cut from trees in or near oak wilt infection centers should not be moved outside the affected area unless they are processed for lumber or burned for firewood. These precautions will help contain oak wilt infections.

Oak wilt affects only a small portion of the oak stands in the United States. When properly managed, this disease is not a serious threat to commercial oak production.

Restriction on Oak
Timber Products

There are no restrictions on the domestic use of oak bolts, logs, lumber, or veneer because of the oak wilt disease. Even diseased trees can be used for firewood, bolts, and logs. (However, care should be taken not to wound residual trees when cutting and hauling out of oak wilt areas.)

Oak logs from counties having the oak wilt disease must be fumigated prior to export to foreign countries. Kiln dried lumber may be exported without restriction.

Robert Lewis, Jr.
Northeastern Forest Experiment Station
USDA Forest Service
Broomall, Pennsylvania