What Is Oak Wilt?

Oak wilt is one of the most destructive tree diseases in the United States. The disease has killed more than 1 million trees in 76 Central Texas counties. Oak wilt is an infectious vascular disease caused by the fungus *Ceratocystis fagacearum*. The fungus invades and disables the water conducting system in susceptible trees. All oaks can be infected with oak wilt, but some species of oak are more susceptible than others. Red oaks, particularly Spanish oak (*Quercus buckleyi*), are very susceptible to the fungus. White oaks, like post oak (Q. *stellata*) and bur oak (Q. *macrocarpa*), are resistant to the fungus and rarely die from the disease. Live oaks (Q. *virginiana* and Q. *fusiformis*) are intermediate in susceptibility to oak wilt. However, they are seriously impacted by the disease because of their tendency to form root sprouts that result in a vast interconnected root system allowing the disease to easily spread to adjacent trees.

Where is Oak Wilt Found?

Oak wilt has been found in over 76 counties and in almost every city in Central Texas, as well as Abilene, Midland, Lubbock, Dallas, Ft. Worth, College Station, Houston, and San Antonio. It can be a problem wherever live oaks tend to be the predominate tree. It does not matter whether they are transplanted or naturally grown. An individual tree's age, size or previous health status does not make it more or less likely to contract or die from oak wilt.

Can My Trees Get Oak Wilt?

ALL OAKS ARE SUSCEPTIBLE TO OAK WILT!

Generally, all oak trees are placed in one of two groups – red oaks or white oaks. Red oaks are the most susceptible to oak wilt and they will typically die within two to four weeks of symptom appearance. Common red oaks that are extremely susceptible to oak wilt include Spanish oak (*Quercus buckleyi*), Shumard oak (Q. *shumardii*), blackjack oak (Q. *marilandica*), and others.

Oaks in the white oak group are the least susceptible and tend to resist the disease. Very few white oaks have been identified with oak wilt in Texas. Even if a white oak contracts the disease, the tree will generally survive with little noticeable impact. Common white oaks include post oak (Q. *stellata*), bur oak (Q. *macrocarpa*), chinkapin oak (Q. *muehlenbergii*), and others.

Interestingly, live oaks are somewhat intermediate between the two groups of oaks but are very susceptible to the disease. Live oak is probably the most common oak tree in Central Texas and they succumb to oak wilt in the greatest numbers. Live oaks commonly form root sprouts which allow a number of trees to share a common root system. A tight group or grove of these trees is often called a live oak mott. If oak wilt infects one of the trees in the mott, the disease quickly spreads through the common root system to adjacent trees and an oak wilt infection center begins to develop.

How Does Oak Wilt Spread?

Oak wilt spreads to other oak trees in two ways – long distances with the aid of certain beetles or locally through common or grafted roots. Sap-feeding (nitidulid) beetles are believed to be responsible for much of the long distance spread of oak wilt. During the spring, the oak wilt fungus forms special spore-producing structures called fungal mats on red oaks. Nitidulid beetles are small (about 1/8-inch long) and are attracted to oak wilt fungal mats because the mats have a sweet, "fruity" smell. Mats form underneath the bark of diseased red oaks and are not known to occur on live oak trees. The fungal mats apply pressure under the bark causing a tiny crack to form.

These mats can be found on the trunk and major branches of red oaks. When a nitidulid beetle feeds on an oak wilt fungal mat, spores of the oak wilt fungus will cling to the body of the beetle. Nitidulid beetles also feed on tree sap associated with fresh wounds. If a beetle contaminated with oak wilt spores lands on a fresh wound on a healthy oak, then that tree can become infected. Tree wounds can be made by man or nature, but nitidulid beetles are attracted to both.

Once established, the fungus moves from one tree to the next through common or grafted roots.

How Quickly Can Oak Wilt Spread?

Because live oaks tend to grow from root spouts and can form root grafts very readily, all or most of the live oaks within a given area share a common root system. If one tree in a group of live oak trees becomes infected with oak wilt, the pathogen can spread through the common root system at an average rate of about 75 feet per year. An aerial photograph (below) shows how oak wilt has spread through live oak trees around the house on this ranch. Trees killed by oak wilt are gray. The dark green trees are juniper (cedar) and are not impacted by oak wilt.

How Can I tell If My Trees Have Oak Wilt?

The most reliable characteristic for diagnosing oak wilt in the field is what is called “veinal necrosis” of the live oak leaves. Apparently veinal necrosis only occurs on live oak. Symptoms on other infected oak trees are less distinct. Laboratory culture of the fungus is another way to confirm the presence of oak wilt. Veinal necrosis is characterized by chlorotic (yellow) veins that eventually turn brown. The leaves will fall from the tree and dead leaves with brown veins can be found on the ground under the tree.

Live oak trees infected with oak wilt usually die within two to four months. Adjacent trees begin to drop their leaves and die a few months later as the disease progresses from tree to tree through the interconnected root system.

Infected red oak trees don’t exhibit distinct symptoms. Leaves often turn pale green then brown and usually remain attached to the tree for a period of time. This can begin on one branch and quickly engulf the entire tree. Trees generally die within two to four weeks.

Prevention plays an important role in the management of oak wilt. Landowners and homeowners can take an active role in oak wilt prevention by taking the following steps:

1. Avoid pruning or wounding oaks between February 1 and July 1. This is the time of year when oak wilt fungal mats are most likely to form and nitidulid beetles are active. If a nitidulid beetle carries oak wilt spores from a fungal mat to a fresh wound on an uninfected oak tree, the fungus could become established in the disease-free tree. The least hazardous periods for pruning are during the coldest days of midwinter or extended periods of hot weather in mid- to late summer.

2. Sterilize/Sanitize all pruning equipment between trees using denatured methyl alcohol (shellac thinner), isopropyl alcohol, or a general purpose household disinfectant such as Lysol, Listerine, Pine-Sol or related products. Using household bleach is NOT recommended as it can be corrosive to pruning tools as well as people.

3. Immediately paint all wounds on oaks to prevent contact with contaminated beetles. Wounds should be painted, regardless of the time of year they were made, with commercial tree wound dressing or latex paint (color doesn't matter!). Wounds can be either man made or natural and include freshly-cut stumps and damaged surface roots.

4. Do not transport or buy unseasoned firewood. Fungal mats may form on unseasoned red oak firewood infected with oak wilt making it possible to spread oak wilt to uninfected areas. Seasoned firewood (dried for at least one year) should not present a threat of

spreading oak wilt. Also, burning infected wood cannot transmit oak wilt.

5. Promptly remove and either burn or bury all red oaks that are dying or have been recently killed by oak wilt. Generally, this would be oak wilt-infected red oaks that die in the late summer or fall. This will prevent nitidulid beetles from spreading spores from fungal mats that may form on the trees in the fall or the following spring.

How Can I Treat My Trees if They Have Oak Wilt?

There are two main recommendations that are generally given to treat oak wilt infection areas:

1. Stopping the spread through the roots

Measures can be taken to break root connections between live oaks or dense groups of red oaks to reduce or stop root transmission of the oak wilt fungus. The most common technique is to sever roots by trenching at least 4 feet deep with trenching machines, rocksaws or ripper bars. Trenches more than 4 feet deep may be needed to assure control in deeper soils. Correct placement of the trench is critical for successful protection of uninfected trees. There is a delay between colonization of the root system by the fungus and appearance of symptoms in the crown. Therefore, all trees with symptoms should be carefully identified first. Then, the trench should be placed a minimum of 100 feet beyond these symptomatic trees, even though there may be healthy trees at high risk inside the trench. Trees within the 100 foot barrier, including those without symptoms, may be uprooted or cut down and removed to improve the barrier to root transmission. Tree removal should be initiated after trenching, starting with healthy trees adjacent to the trench and gradually working inward to include symptomatic trees.

Oak wilt centers are more easily suppressed when treated early, before they become too large. Untreated trees immediately outside the treated area should be closely monitored for several years. If the pathogen appears to have crossed the barrier, the same measures (new trenching and treatment of trees within the barrier) should be repeated while the diseased site is still small.

2. Fungicide treatment

The fungicide propiconazole (Alamo) can be used as a preventative to reduce oak wilt symptoms in live oaks when applied before infection. Limited success may also be achieved in trees with therapeutic injections during the earliest stages of infection. The fungicide is injected into the tree's water-conducting vascular system through small holes drilled into the root flare at the base of the tree. Treatment success depends on the health condition of the candidate tree, application rate, and injection technique. *Injection should be done only by trained applicators*.

When Should I Prune My Oak Trees?

New oak wilt centers are started when a contaminated beetle finds a fresh wound on a healthy oak tree.

Insect populations in general increase during mild spring like weather and mild spring like weather is when fungal mats are most likely to form. So the most likely time a contaminated beetle will find your tree is when the weather is mild.

The best time to prune is when a contaminated beetle is least likely to find your tree. *The heat of summer and the cold of winter are when the beetle populations are the lowest and fungal mats are least likely to form. Therefore that is the best time to prune to prevent against an oak wilt infection.*

Can My Trees Get Oak Wilt from the Smoke of Burning Diseased Wood?

No, the fungus that causes oak wilt is very heat sensitive. The problem with firewood is the potential for storing contaminated wood. If the wood came from an oak wilt center and has fungal mats, then the beetles can fly off and infect the healthy trees in your yard.

The best precaution is to always buy well-seasoned firewood. Once the wood has dried out to the point where the bark is falling off and the wood is cracked then the fungus that causes oak wilt is no longer viable (alive).

Read more about the oakwilt suppression project of 2013:
http://texasforestservice.tamu.edu/uploadedFiles/TFSMain/Manage_Forest_and_Land/Forest_Health/Stewardship/OW%20Suppression%20Project%202013(2)%20-%20%20Billings.pdf

Download an information sheet about identification and management of oak wilt:
http://texasforestservice.tamu.edu/uploadedFiles/TFSMain/Manage_Forest_and_Land/Forest_Health/Stewardship/Identify_and_Manage_Oak_Wilt.pdf

Visit the Oak Wilt Partnership website at http://texasoakwilt.org/