

Oak Wilt

Oak wilt, an infectious disease caused by the fungus *Bretziella fagacearum*, invades and disables the water-conducting system in oaks. All oaks can be infected by this fungus. Red oaks, particularly Texas red oak (aka Spanish oak), Shumard oak, blackjack oak, and water oak are the most susceptible to the fungus and may play a role in the establishment of new oak wilt infections. Live oak and Texas live oak are intermediate in susceptibility but are seriously affected due to their tendency to grow with vast, interconnected root systems that allow movement of the fungus among adjacent trees. White oaks (post, bur, Mexican white, white shin, Lacey, and chinquapin) do show some tolerance to the disease; however, all oaks can be infected by this fungus. White shin oak, Lacey oak, and chinquapin oak can grow in stands with interconnected root systems, enabling the fungus to possibly infect adjacent trees, like disease spread among live oaks.

The successful management of oak wilt depends on a correct diagnosis of the disease and an understanding of how the pathogen and different oak species interact.

Diagnosis:

Foliar symptoms, patterns of tree mortality, and the presence of fungal mats can be used to diagnose oak wilt. However, laboratory isolation of the fungus is recommended to confirm the diagnosis. An instructional video is available on [texasoakwilt.org](https://www.texasoakwilt.org) for proper techniques in sampling and submission to the [Texas Plant Disease Diagnostic Lab](#). A trained expert should be consulted when diagnosing oak wilt.

Texas A&M Forest Service has seven regional offices throughout Central Texas with staff available to provide technical assistance to landowners concerned about oak wilt on their property. For more information, use the [Find My Forester](#) from the [texasoakwilt.org](https://www.texasoakwilt.org) website feature to identify and contact the TAMFS representative serving your county.

Overland Spread:

Red oaks play a key role in the establishment of new infection centers. The oak wilt fungus is spread overland by insect vectors and by humans through the movement of wood from infected red oaks to other locations. Fungal mats form beneath the bark of certain diseased red oaks in spring. Fungal mats do not form white or live oaks. Individual fungal mats produce spores for only a few weeks. The fruity odor of fungal mats attracts many kinds of insects, the most important of which are sap-feeding beetles. The fungus is transmitted by these small beetles as they emerge from mats carrying spores and visit fresh wounds on healthy oaks. Fungal mats commonly form on standing trees,

but they can also develop on logs, stumps, and fresh-cut firewood from diseased red oaks.

Localized Spread:

Live oaks grow in large, dense groups called motts with interconnected roots. The fungus is transmitted from one tree to another through these root connections. As a result, patches of dead and dying trees (infection centers) are formed. Infection centers among live oaks in Texas expand at an average rate of 75 feet per year, varying from no spread to 150 feet in any one direction. Root spread can also occur among connected red oaks and connected white oaks. Occasionally, the oak wilt fungus is transmitted through connected roots between other oak species, called grafted roots, but movement through grafted roots is slower and occur over shorter distances than in live oaks.

Management:

There are four approaches used to manage oak wilt in Texas. Successful management depends on an integrated program, sometimes incorporating all four approaches. The first approach attempts to prevent the formation of new oak wilt infection centers by eliminating diseased red oaks, handling firewood properly, proper timing of pruning, and painting wounds on healthy oaks. The second approach involves trenching or trenching and roguing to disrupt root connections responsible for root transmission of the pathogen. The third approach is the injection of the fungicide propiconazole into individual, high-value trees to help reduce crown loss and extend the life of the tree. The fourth approach is planting other tree species to create diversity in the landscape and to mitigate the impact of oak wilt. Oak wilt infection centers are more easily suppressed when detected early, before they become too large. The 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 should be repeated while the diseased site is still small.

These measures will not cure oak wilt but can significantly reduce tree losses.

Prevention:

The best way to prevent oak wilt infection is to avoid pruning oaks between February 1st and June 30th. Immediately paint all wounds incurred to oak trees regardless of the time of year.

Infected red oaks that die in late summer, fall or early winter should be cut down and burned, buried, or chipped soon after discovery to prevent fungal mat formation the following spring. If this is not possible, the trees should be injected with herbicide or

deeply girdled with an axe and stripped of all bark two to three feet above the soil line. Drying of the wood before spring discourages the formation of fungal mats.

The sap-feeding beetles are most active in springtime. Fungal mats are present in springtime. Most new infections occur in springtime. This is due to sap-feeding beetles carrying oak wilt spores from fungal mats to fresh wounds on oaks. All wounding of oaks (especially pruning) should be avoided from February 1 through June 30. If there are imminent safety issues that must be addressed before the no-prune period is over, make as few pruning cuts as possible and immediately paint all cuts.

The best time to prune oaks (and most trees) is during fall and winter. This recommendation is not only for oak wilt prevention, but also for overall tree health. Pruning oak trees in the heat of the summer is stressful for both the trees and you.

While sap-feeding beetles are less active from July to January, they are never completely inactive, hence the recommendation to paint all wounds (pruning cuts, freshly cut stumps, and damaged surface roots) on all oaks, immediately after each cut, year-round. These wounds should be treated immediately with paint to prevent exposure to contaminated sap-feeding beetles. Any type of paint (latex, oil-based, spray-on, brush-on, or wound dressing) will suffice. If you are pruning high up in the canopy of the tree, make sure you can paint the wounds. Do not cut it if you cannot paint it.

Transporting unseasoned firewood from diseased red oaks is a potential means of spreading the oak wilt fungus. Oak wilt cannot be transmitted by burning infected firewood; however, fungal mats may form on unseasoned red oak firewood in storage. It is best to purchase wood locally that has been thoroughly dried for at least one full year. If an infected red oak cannot be disposed of immediately or the unseasoned red oak firewood is from an unknown origin, it should be covered with clear plastic with the edges buried to prevent insects from leaving the pile. The likelihood of spreading oak wilt in tools is rather remote; however, other diseases can be spread on tools. It is always good practice to sterilize tools between trees.

Trenching

Once oak wilt has been confirmed on the property, measures can be taken to mitigate additional tree loss. Trenches can 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 four feet deep with trenching machines, rock saws, or ripper bars. Trenches more than four feet deep may be needed to assure control in deeper soils. Trenches should be placed a minimum of 100 feet away from infected trees. There is a delay between colonization of the fungus and appearance of symptoms in the crown; therefore, all trees with symptoms should be carefully identified first.

Correct placement of the trench is critical for successful protection of uninfected trees.

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Rouging

Trees on the diseased side of the trench, especially those without symptoms, may be uprooted (rogued) or cut down and removed to improve the barrier. Tree removal should be initiated after trenching, starting with non-symptomatic trees adjacent to the trench and gradually working inward to include symptomatic trees. This creates further root disruption making it more difficult for the disease to breakout of the contained trenched area.

Oak Wilt Fungicide Injection:

Propiconazole is the only fungicide scientifically tested and proven effective (when properly applied prior to infection) for use as a preventative treatment to protect live oaks. Limited success also may be achieved in trees treated 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 flares at the base of the tree. Treatment success depends on the health of the candidate tree, application rate, and injection technique.

Fungicide injection does not stop root transmission of the fungus; therefore, this treatment is used best in conjunction with trenching or to protect individual, high-value trees in situations where trenching is impractical. Healthy live oaks at high risk of infection in advance of an expanding infection center are preferred candidates for injection. Foliar symptoms can be used in selecting trees as candidates for preventative or therapeutic treatments. A tree with foliar symptoms of oak wilt, as well as any non-symptomatic oak tree immediately adjacent to a tree with symptoms, should receive a therapeutic treatment. If symptoms are observed in more than 30 percent of the crown, it is unlikely a fungicide injection will be effective. Injections of non-symptomatic oak trees at greater distances from symptomatic trees (75 to 100 feet) will yield the best results for preventative treatments.

There are several steps in the macro-injection process that require careful attention following tree selection. Mixing the fungicide solution, exposing and drilling holes in the flare roots, connecting the injection apparatus to the tree, and monitoring uptake must be done according to label specifications and directions. Treatment may take several hours. Information and training are available through Texas A&M AgriLife Extension Service or Texas A&M Forest Service offices. An instructional [video](#) is available on

texasoakwilt.org. The services of a [professional arborist](#) or other experienced person may be required to ensure proper injection.

Diversity Plantings:

Planting a variety of tree species can lessen the impact of oak wilt and other tree diseases. Diversity planting enhances property aesthetics and can raise property values. Diverse tree species create/improve wildlife habitat and benefit birds and pollinators. Select (preferably) native trees suitable for local site conditions and environment and avoid planting monocultures. Diverse landscapes are always more insect and disease resistant than monocultures. Diversity defends against future forest health issues.

Please visit our [Recommended Trees](#) page on texasoakwilt.org to find native tree species to plant in your area. You can also find suitable trees by visiting the [Texas Tree Selector](#) website. Learn how you can obtain native seedlings from the Texas A&M Forest Service West Texas Nursery as part of the [Central Texas Restoration & Recovery Program](#). Lastly, refer to [Texas Tree Planting Guide](#) for information on proper planting techniques.

Cost-Shares:

Texas A&M Forest Service (TAMFS) has administered a federal cost-share program, the Texas Oak Wilt Suppression Program (TOWSP), to assist landowners in their fight against oak wilt since 1988. The overall goal of the TOWSP is to minimize the spread of oak wilt (*Bretziella fagacearum*) in Central Texas.

Trenching to contain the spread of oak wilt, roguing inside the trench, or removal of certain diseased red oaks may qualify for limited cost-shares. Cost-shares for trenching are capped at 50% of approved costs up to \$2,000 per cooperator per year and multiple cooperator project costs are capped at 50% of approved costs up to \$6,000 per project per year. Cost-shares for roguing or pushing are capped at 50% of the approved costs up to \$2,000 per cooperator per year. Cost-shares for removal of certain diseased red oaks are capped at 50% of approved costs with a maximum of \$2000 per cooperator per year.

All treatments must be installed according to TOWSP guidelines and approved by TAMFS personnel. Project guidelines include full containment of the oak wilt center within installed trenches and relative isolation of the disease center from other disease centers in the immediate area. Trenches must be installed to a minimum depth of four feet and located no closer than 100 feet from symptomatic trees. Roguing or pushing must happen within the boundaries of the cost-shared trench. Federal guidelines on the protection of cultural resources must also be followed and approved. Red oak removals have specific guidelines and are only approved for cost-shares by TAMFS

personnel. Land use and time of infection and/or death of red oaks will be considered as not all infected red oaks will form fungal mats.

An application for cost-shares must be approved before any cost-shareable treatment can begin.