


Eight Step Program to Oak Wilt Management

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A Plan For Reducing Losses To The Oak Wilt Fungus

Oak wilt is a major disease problem on live oaks, Shumard oaks, Spanish oaks, water oaks, black jack oaks and other members of the red oak family. Vast areas of the Texas Hill Country have been devastated by the fungus that causes the disease called oak wilt. Researchers, foresters and Extension workers at Texas A&M University have developed a program to stop this needless loss of one of Texas's most precious natural resources. This program is known as the "Eight Step Program to Oak Wilt Management." When implementing any disease management program, it is important to start early in the disease development. Each of the following eight steps is important to preventing and controlling oak wilt.

Step 1. Identify the Problem (See Photo): An accurate diagnosis is important to the control of this disease. Leaf symptoms, pattern of spread, rate of tree mortality and laboratory isolation of the fungus from infected tissue are all means of identifying an oak wilt infection. The following table summarizes the diagnostic characteristics of oak wilt infection.

Table 1: Field Identification of Oak Wilt		
	Live Oak	Red Oak/Black Jack Oak
Leaf Pattern		
Veinal necrosis	Yes (See Photo)	No
Veins remain green but the area between veins is light green to yellow	Yes (See Photo)	No
Tip of leaf turns brown (half leaf)	Yes (See Photo)	No
All leaves on tree turn reddish brown	Yes	Yes (See Photo)
Wilting and necrosis progress inward from tips	No	Yes (See Photo)
Tree Defoliation		
Leaves are retained on a tree for a short period of time after tree death	No (See Photo)	Yes (See Photo)
Rate of Tree Mortality		

7 – 30 days	No	Yes
30 – 90 days	Yes	No
Spread Pattern		
Tree to tree	Yes	Not Always
Isolated trees	Yes	Yes

1. This condition is more often observed in early spring and only when all of the leaves turn reddish brown. Leaves will be retained on tree for a short time after tree death.
2. Some trees will vary with the rate of mortality.

Step 2. Create a Buffer Zone: Oak wilt fungus transmission through root spread between adjoining trees accounts for most of the tree loss in oak wilt centers. Root spread can be stopped by creating a buffer zone between the oak wilt center and healthy trees. A trench (**See Photo**) should be established at least 100 feet from the last symptomatic tree. Using a rock saw, commercial ditching machine or a backhoe, the trench is dug at least 48 inches deep. The trench is immediately filled. It severs the roots between neighboring trees and prevents fungus spread between trees through root connections.

Step 3. Sanitation: Remove dead (**See Photo**) or diseased trees in the oak wilt center if they are not going to be treated with a systemic fungicide. Trees should be burned in place when possible, especially if Spanish, Shumard, water and black jack oaks are present in the disease center. These species of oak trees form fungal mats (**See Photo**) that produce spores which can spread infection. Spores become attached to the bodies of sap feeding insects attracted by the sweet smelling fungal mats, and spread to healthy trees (**See Photo**), creating new disease centers.

Step 4. Pruning: Plant sap on the surface of a cut or wound attracts sap feeding beetles. During insect feeding, the fungus spores transported by the beetles are dislodged on to the tree's surface, germinate and infect the new host. Studies have shown that the beetles are most active in the early spring. This is also the time when the fungal mats are actively producing spores. Avoid pruning between February 15 and June 15, the period for maximum insect and fungal mat activity. This window of spread will vary depending upon location in the state. In the South Texas area, the timing will be slightly earlier, but in the Panhandle the timing would be later. When possible prune trees between December 1 and February 1, or between July 1 and October 1.

Step 5. Protecting Pruning Cuts or Wounds: Trees near oak wilt centers that are wounded or that must be pruned during the most active insect and fungal mat season, should be protected with a wound paint. These materials provide a protective layer between the fresh cut and the sap feeding beetles. Apply the paint in a thin layer immediately after wounding. Most products have either an asphalt or latex base. All cuts greater than 1/2 inch should be painted. Wound paints should always be used when pruning trees in the immediate vicinity of an oak wilt center. Trees within 3 miles of an oak wilt center should be painted during critical periods of insect and fungus activity. Paint is not required for trees in areas free of the oak wilt fungus.

Step 6. Firewood: Firewood cut from tree species that form oak wilt mats can spread the fungus. If questions arise about where the trees were cut for wood or the species of tree cut, it is best to cover the wood pile with clear plastic. Make sure the edges are tucked into the soil to prevent insect spread (**See Photo**). For trees that die in the spring or early summer, firewood can be safely cut by the fall. As the tree dries, it can no longer support growth of the oak wilt fungus. Also, the oak wilt fungus is not a good competitor with other fungi or bacteria that invade dead wood. Smoke from burning diseased logs does not represent a problem. Heat from the fire kills all spores or beetles that might be present. It is suggested that firewood be burned during the season it was purchased and not stored for the following season.

Step 7. Tree Injection With Systemic Fungicide: Trees within the buffer zone can be treated with a systemic fungicide (**See Photo**). Alamo is the product labeled for use in the control of oak wilt. It is applied by injecting the fungicide into the root flares. Alamo is most effective when applied as a preventive treatment. However, it can be applied after the tree develops symptoms. Trees that are symptomatic have less chance of complete recovery than those that are free of symptoms. Trees with more than 30% canopy loss should not be treated.

Step 8. Replanting: In some areas, oak wilt has already caused extensive losses to landscape trees. Property owners can successfully replant live oaks, Spanish, Shumard and water oaks if precautions are taken to avoid wounds. It is always best to use a mixed planting of trees to add variety to the landscape and reduce the chance of a recurrence of oak wilt or similar disease problems. Post oak is a species of white oak that is resistant to the fungus but cannot be successfully replanted due to slow root development. Overcup oak, bur oak, white oak and other members of the white oak family are resistant to the fungus and can be planted in oak wilt centers. Chinkapin and swamp chestnut oak are chestnut oaks that can be grown in some areas of Texas and have some resistance to the oak wilt fungus. Cedar elm and Chinese elm are suggested for planting in many of the areas where oak wilt is a problem. Chinese pistache, ball cypress and flowering pears are other trees that can be planted in most areas where oak wilt is a problem. Before planting a tree, check with your local County Extension Agent, County Horticulturists, Arborists, Forester or Nurserymen on how that tree will do in your location.

How To Sample For Oak Wilt Diagnosis

How samples are taken and handled is vital to the success of a laboratory analysis. By following the steps outlined below, the chance of recovery is greatly improved.

- Select symptomatic limbs from trees.
- Dead limbs and those in an advanced state of decline cannot be used for isolation.
- Samples should be 1.5 to 2 inches in diameter and 6 inches long.
- Send in leaf tissue from sampled limbs. These will help to diagnosis the problem if the oak wilt fungus is not isolated from the limb samples. Keep the two samples separate.
- Keep samples cool during sampling and shipping, but not freeze tissue.
- Ship samples in sealed plastic bags. Do not add water or wet materials to the sample.
- Ship in an ice chest with a frozen freezer block.
- Ship by bus, overnight mail or bring in person to the laboratory. The samples should be shipped on a Monday, Tuesday or Wednesday. The samples will arrive at the laboratory, so that they can be processed that week.

- Results from the isolations will be available in 2 to 3 weeks. Reply time depends on how fast the fungus develops in culture.
- To aid in the diagnosis the following information is helpful (please complete submission form D1178 if sending to the Texas Plant Disease Diagnostic Lab):
 1. When did the problem develop?
 2. How many trees are involved?
 3. Does the problem appear to be spreading?
 4. Has anything been done over the root system of the tree? As a rule of thumb, the roots extend beyond the trunk 2.5 to 3X the distance between the trunk and the tree's drip line.
 5. If trees are dying, how fast is the mortality?
- Ship the samples and completed forms to the:

Texas Plant Disease Diagnostic Laboratory
1500 Research Pkwy.
Suite A130
Texas A&M University, Research Park
College Station, TX. 77845
Telephone No. (979) 845-8032

Contact your County Extension Agent, County Extension Horticulturist, Texas Forestry Representative or Extension Plant Pathologist for more information on oak wilt.

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