All About Oak Wilt

When is Oak Wilt most active in North Texas each year?

Active Oak Wilt season has traditionally been indicated as running from Valentines' Day through Mothers' Day. However, each year, when we update our knowledge and training regarding this deadly disease, the season dates are becoming more and more conservative i.e. many experts peg the start date as February 1 and have it running through mid to late June each year.

These dates vary somewhat each year and depend on weather conditions. Oak Wilt is a fungal disease, and fungus thrives in the abundance of moisture and (relative) lack of sunlight; and thrives in mild temps (i.e. does not thrive in extreme cold or heat). Hence, the dates vary somewhat each year. The increasingly conservative dates, and the progression of the disease into more and more neighborhoods annually, take into account the seasonal fluctuations it would appear. Therefore, for the purposes of our future professional, responsible service to the community, White Rock Tree Wizards has established the active Oak Wilt season as running from February 1 through June 15.

What is the cause of Oak Wilt?

Oak Wilt is caused by the fungus Ceratocystis fagacearum. Oak Wilt is the most destructive disease affecting Red (Black) Oaks and Live (White) Oaks in Central Texas. The disease affects Black Oaks more aggressively than White Oaks which seem to have more resilience against it. New infection centers often begin when beetles carry Oak Wilt fungal spores from infected Red Oaks to fresh, open wounds on healthy Oaks. Wind also carries fungal spores. Wounds include any damage caused by wind, hail, vehicles, construction, squirrels, birds or pruning. Research has shown that both Oak Wilt fungal mats on infected Red Oaks, and insects that carry Oak Wilt fungal spores, are most prevalent in the Spring. Many experts believe that most of the tree mortality results from tree-to-tree spread of the pathogen through interconnected or grafted root systems, once an Oak Wilt center becomes established. Below is a brief description of how you can reduce the risk of fungal spread when pruning.

- Always paint fresh wounds on oaks, including pruning cuts and stumps, with wound dressing or latex paint immediately after pruning or live tree removal at all times of the year.
- Sterilize all pruning tools with Isopropyl Alcohol between sites and/or trees.
- If possible avoid pruning or wounding of Oaks during the Spring (currently defined as February 1 through June 15).

Reasons to prune in the Spring include:

- To accommodate public safety concerns such as hazardous limbs, traffic visibility or emergency utility line clearance or to satisfy citations from municipalities that your trees are too low over streets, sidewalks or alleys.
- To repair damaged limbs (from storms or other anomalies)
- To remove limbs rubbing on a building or rubbing on other branches.
- On sites where construction schedules take precedence, pruning any live tissue should only be done to accommodate required clearance.
- Dead branch removal where live tissue is not exposed.
- Pruning for other reasons (general tree health, non-safety related clearance or thinning, etc.) should be conducted before February 1 or after June 15.

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- Debris from *diseased* Red Oaks should be immediately chipped, burned, buried or removed from the site.

Regardless of the reasons or time of year, proper pruning techniques should be used. These techniques include making proper pruning cuts and avoiding injurious practices such as topping or excessive crown thinning. If you are uncertain about any of this information, you should consult with White Rock Tree Wizards, with a Texas Oak Wilt Certified arborist, or an Oak Wilt specialist from a city, county or state government agency such as the Texas A&M Forest Service or Texas A&M AgriLife Extension Service.

What are the most common symptoms of Oak Wilt?

The prominent symptom most commonly associated with Oak Wilt is the distinctive browning out of the veins in Live Oak leaves. This pattern that often reminds people of "fish bones" is called veinial necrosis. The veins in the leaf become yellow or brown and the leaf soon falls off the tree. Even after drying out and turning completely brown, the symptomatic leaf retains the distinctive darker veins. Unfortunately, veinial necrosis does not occur in red Oaks. Trees in this family defoliate in a manner similar to autumn with the leaves turning brown from the edges in and then falling off. Defoliation of a Red Oak at an odd time of the year should always be investigated. In addition to veinial necrosis in Live Oaks, there are other types of foliar symptoms including interveinial necrosis (the reverse of veinial necrosis) or veinial banding, tip burn (where the end of the leaf turns brown) and margin burn (where the entire edge of the leaf turns brown). Major defoliation (leaf loss) of a Live Oak other than during spring (when they normally replace their leaves) should be investigated.

Veinial necrosis is the classic Oak Wilt foliar symptom. Symptomatic leaves tend to drop from the tree soon after the symptom develops. Look for these leaves on the ground as well as on the tree. The number of symptomatic leaves that a tree generates varies a great deal from tree to tree.

Veinial banding (interveinial necrosis) is a less common symptom. At times this symptom appears on trees that are having a less severe reaction to the disease.

Tip burn is where the end of the leaf dies. Insects and chemicals might cause this also, so be careful making a diagnosis on tip burn alone.

Margin burn is similar to tip burn but the area of brown includes the end and sides of the leaf.

The symptomatic patterns illustrated above persist in the leaf even after the leaf has dried out. Many times we look on the ground for the presence of fresh or old symptomatic leaves to help us determine if Oak Wilt is present.

A cluster of dead Live Oaks can be a symptom of Oak Wilt. This is especially true if the cluster continues to expand in size. Generally, Oak Wilt disease centers have completely dead trees at the center ringed by sick and dying trees further out followed by normal looking trees.

The presence of fungal mats (an example is shown to the left; with the bark having been cut away) on red Oaks is most definitely a sign of Oak Wilt. However, mats do not form on Live Oaks and they do not form on all infected Red Oaks. The mats are commonly hidden from view under the bark and are therefore not immediately obvious.

Oak Wilt can be confirmed by growing the fungus in the lab. Samples from trees suspected of having the disease can be harvested and sent to the Texas Plant Disease Diagnostic Laboratory in College

Diagnostic Laboratory in College Station, TX. However, due to the delicate nature of the fungus it can be difficult to get a viable sample. The result is that there are a fair number of false negatives from the sampling process.

Prevention of Oak Wilt

Many new Oak Wilt disease centers are caused by human activity. We can all take steps to reduce the chance of starting a new Oak Wilt center.

- Avoid pruning Oak trees between early February and mid-June.
- If it is necessary to prune susceptible trees, or if trees are wounded, use a wound paint (pruning sealer) immediately. **A new infection can be started quickly on a fresh wound (less than 15 minutes).** Wounds are naturally sealed off by the tree after about a week. So, painting old wounds is of no value (in preventing Oak Wilt). If you are trimming live tissue in Oaks during active Oak Wilt season, ideally, all wounds should be painted.
- Trench around active Oak Wilt centers to stop the spread of the fungus through common or grafted roots. (This is a solid protocol in theory however the practice in the urban forest poses hazards in actual practice. effective trenching needs to be conducted to a depth of at least four (4) feet and some roots responsible for the spread of Oak Wilt may be as deep as eight (8) feet and utilities are often buried at a depth of less than 12” to 18”).
- Watch trees in and around Oak Wilt centers for new infections. Take steps immediately to prevent additional spread.
- Sanitize cutting equipment with Isopropyl Alcohol before cutting on Oak trees so as to avoid the possibility of cross contamination.
- Avoid firewood infected with the Oak Wilt fungus, unless it has properly dried (12 months). Cover new firewood piles with clear plastic for one year. Make sure that the edges of the plastic are buried with soil to prevent insect migration out of the wood pile.
- See additional, important preventative measures in the Cultural Prevention/Treatment section of this article, below.

Development of Oak Wilt Chemical Treatment

Soon after Oak Wilt was identified in Texas, a program was initiated in the Department of Plant Pathology and Microbiology at Texas A&M University to develop a management program for this major problem. The results suggest consideration of utilizing both cultural and chemical approaches to disease management. The chemical approach employs a fungicide that is claimed to effectively Manage Oak Wilt.

Chemical Treatment

University researchers, agriculture extension agents, the Texas Forest Service, arborists and property owners have all been involved in evaluating potential fungicidal treatments. Candidate compounds were applied in many different ways: foliar sprays, soil drenches, and tree injections. It was not until the early 1980s that a fungicide containing Propiconazole (the

active ingredient in Alamo®) injected into symptomatic and non-symptomatic trees was found to be effective in controlling symptom expression. Because Oak Wilt affects the entire above ground portion of the tree, the technique of macro flare root injection is the most effective chemical treatment.

Many years of field application indicate that Propiconazole, when applied via Macro Flare Root Injection, has been effective, at least in the short-run, in controlling Oak Wilt. Survival rates of trees which are pre-emptively treated have approached 85%. When compared to a survival rate of 15% for untreated trees, the success of pre-emptive treatments has been good.

Preventative Chemical Treatment Is Most Effective

Oak Wilt symptoms appear after substantial internal damage to the tree has occurred. While the fungicide can control the Oak Wilt fungus, internal damage is not reversible. This is why the treatment is best performed as a preventative measure. Most trees that are treated preventatively do not experience a high degree of internal damage.

Treatment Timing

Timing is critical to success. There are two factors that enter into the timing equation:

1. The distance of the tree to be treated from the nearest known diseased tree.
2. The lifespan of the treatment.

The Texas Forest Service has utilized aerial photography to determine the expansion of Oak Wilt disease centers. The advancement of the disease averages 75 feet per year. However, there are large variations of disease spread. Many centers expand faster or slower than the average. In addition, the disease movement is often not the same in all directions. Disease center expansion is also dependent on weather conditions and tree population. Both wet weather and high tree density appear to accelerate disease movement.

Research has shown that the effective lifespan of a treatment is about 2 years. Generally, two fungicide applications are required. The time frame between injections is 18 to 24 months. For large trees the interval may be shortened to 12-18 months. Some researchers claim that after two or possibly three treatments, the threat has usually passed a particular area and further treatments may not be necessary. Inspection of your trees by an Arborist experienced with Oak Wilt, on a regular basis, is recommended to verify that the risk of disease has passed.

While the best time for tree treatment may be in the spring after the new leaves have set, successful treatments can be made at any time that there are sufficient green leaves on the tree to be treated. We have found that if the Oak Wilt threat is imminent, and chemical treatments have been decided upon, a treatment should be made soon to achieve the greatest effect.

In our experience, university researchers (where the research is primarily funded by the chemical manufacturers) naturally report optimistic results for chemical treatments. What we have seen in actual practice, however, is that once an Oak has contracted Oak Wilt, with or without fungicidal treatments; when the injections are dis-continued, the tree ultimately dies. In the larger scope, it has further been seen that fungus is extremely difficult to kill. So, once fungicidal injections are dis-continued, the tree usually dies.

Cultural Prevention/Treatment

On the other hand, vigorously healthy trees have been shown to have the most effective defense against disease. The best preventative practices, in addition to those mentioned earlier, are summarized as follows:

1. The single best thing *you, the homeowner* can do to enhance the health of your

trees is to properly water them. Water in the vicinity of the drip-line. DO NOT water at or near the base of the tree as this will engender (fungal) root rot. Practice deep watering, so that the water saturates the soil to a depth of 4" to 6" i.e. water for fewer, longer periods of time vs frequent shorter periods of time. Thoroughly saturate the soil. Water each tree 10-15 gallons of water per diameter inch, weekly, 52 weeks of the year; and water 2 times weekly in decreased in temperatures of 95 degrees or more. For instance, a 10 inch caliper tree should receive 100 to 150 gallons of water, in a single watering session, weekly. General rules of thumb for water output: A typical sprinkler system will typically put out about 12 gallons per minute. A garden hose, turned on full-blast, will typically dispense about 5 gallons per minute.

2. The next best thing *you* (or your Tree Care Professional) can do toward the vigorous health of your trees is to properly nourish them. If you want to do this yourself, you will ideally feed your trees four (4) times per year i.e. the beginning of Spring, Summer, Fall and Winter. The Spring and Summer feedings should feature a Nitrogen-rich nutrient mix for Chlorophyll production and hence vigorous food-manufacturing capability. Fall and Winter feedings should feature a Potassium-rich nutrient mix for root-system health. Fall, and especially Winter; is the most active growing season for the root-system; which is why watering in the Fall and Winter is so vitally important. Many home-owners are not aware of this fact. If you want to hire a Tree Care Professional to conduct the proper feeding of your trees, they will most likely recommend Deep Root Feeding (or Soil Injections; or Soil Amendments; its' all essentially the same thing by various phrasing). Deep Root Feeding is probably going to be more costly because it is a far more effective way to feed your trees. The nutrients are injected to a depth of 4" to 6" which is where the feeder roots are. That way the nutrients do not get swept away by wind or water. Also, the nutrients are already in solution so they are immediately available to the tree. Further, the best soil-injected nutrient-solutions feature other extremely helpful agents toward vigorous tree health such as Beneficial Bacteria, which has an inoculating effect against disease; Beneficial Fungi which helps the root-systems take up water and nutrients much more efficiently, and organic material which loosens the soil and thus allows for better water penetration, and, lowers the pH of the soil. Much of our soils in North Texas are slightly alkaline (pH is higher than ideal). Further, in soils which are near new construction (driveways, sidewalks, foundations, etc) lime from the concrete leaches out into nearby soils and substantially raises the pH. If the pH is too high (or too low) the trees cannot take up the nutrients efficiently. The quality of proper Deep Root Feeding should reduce the frequency requirement for feeding to one or two times per year; generally.

3. Careful, conscientious trimming/pruning/surgery. We touched on this earlier. A professional arborist will always sterilize his/her cutting tools prior to beginning any type of surgery on your live trees to prevent the spread of Oak Wilt and other pathogenic disease. A professional arborist will always immediately seal the (important i.e. 4"+ diameter) wounds with tree wound dressing. A professional arborist will always practice ISA Category II surgery (make flush final cuts, just outside the growth collar, and first make under-cuts, to avoid bark-strip; to encourage rapid wound-healing). If you are trimming your own trees, you should do the same.

Conclusions

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Oak Wilt is a deadly disease and can kill Red Oaks in as little as 30-45 days. Contact White Rock Tree Wizards before you work on your trees or if you suspect that you have an Oak Wilt concern.

Information included in this article is based upon the substantial experience and field research, and supplemented by the most recent information regarding Oak Wilt from published articles and bulletins provided by The Department of Plant Pathology and Microbiology at Texas A&M University, Texas A&M Forestry Service and by Texas A&M AgriLife Extension Service.

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