

# Oak Wilt in Leon Valley

City Council Meeting

July 21, 2018

# Purpose

- To explain Oak Wilt prevalence, identification, and prevention; and
- To encourage all residents with Oak trees to consult with either the Texas Forestry Service or a private Oak Wilt specialist, if Oak Wilt is suspected
- To prevent the spread of Oak Wilt in Leon Valley

# Background

- Leon Valley has had Oak Wilt in the Monte Robles and Castle Estates neighborhoods for years
- It has now “jumped” over from Castle Estates on Evers Road to the Forest Oaks neighborhood
- Some residents have made many attempts to stop the spread, but to no avail
  - Carl Raba trenched, but still lost all of his Oaks

# Purpose

- Oak Wilt is one of the most destructive tree diseases in the United States
  - Killing oak trees in central Texas at epidemic proportions
- Oak wilt is an infectious disease caused by the **fungus** *Ceratocystis fagacearum*
  - invades and disables the water-conducting system in susceptible trees
- All oaks (*Quercus* spp.) are susceptible to oak wilt to some degree, but some species are affected more than others
- Successful management of oak wilt depends on correct diagnosis & understanding how the pathogen spreads between different oak species

# Oaks Affected

- Red Oaks - particularly Texas (aka Spanish), Shumard, Blackjack, & Water oaks are **extremely susceptible** & may play a unique role in the establishment of new oak wilt infections
- White Oaks - include Post, Bur, Mexican White, White Shin, Durand, Lacey, & Chinkapin oaks
- Although White Oaks **show some tolerance** of the disease, all oaks are susceptible to the fungus
- Live Oaks - **are intermediate** in susceptibility to oak wilt, **but are most seriously affected** due to their tendency to grow from root sprouts & form vast interconnected root systems that allow spread of the fungus between adjacent trees

# Oak Wilt Identification

- Foliar symptoms, patterns of tree mortality, and the presence of fungal mats are all indicators of oak wilt
  - Laboratory isolation of the fungus is recommended to confirm the diagnosis
  - A trained expert should be consulted when in doubt
- Most live oaks defoliate & die over a 1- to 6-month period following initial appearance of symptoms
- Some live oaks take longer to die, & a few untreated trees may survive many years in various stages of decline
- Occasionally, a few live oaks in an oak wilt center may escape infection & remain unaffected by the disease

# Oak Wilt Identification

- Red Oaks never survive oak wilt & often die within 3 to 4 weeks following the initial appearance of symptoms
- During summer months, diseased Red Oaks can be spotted from a distance, because of their bright autumn-like coloration in contrast to the surrounding greenery
- Leaves on diseased Live Oaks often develop chlorotic (yellow) veins that eventually turn necrotic (brown), a symptom called veinal necrosis
- Initially, the leaf vein is a darker green than the rest of the leaf
- This early symptom is called vein banding & is seen before veinal necrosis develops in leaves on the tree

# Oak Wilt Identification

- Defoliation may be rapid, & dead leaves with brown veins often can be found under the tree for months after defoliation
- Leaves may exhibit other patterns of chlorosis & necrosis, but symptoms are less reliable than veinal necrosis for diagnosing oak wilt in live oaks
- Foliar Symptoms on Red Oak are less distinct - in early spring, young leaves simply wilt, turning pale green and brown, usually remaining attached for a period of time
- Mature leaves develop dark green water soaking symptoms or turn pale green or bronze, starting at the leaf margins and progressing inward
- This can begin on one branch and quickly engulf the entire tree
- Red oaks generally die within 4-6 weeks





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# Oak Wilt Identification

- Fungal mats are reliable indicators for diagnosis of oak wilt
- These specialized spore-producing structures most often form in the spring on red oaks that developed advanced symptoms of oak wilt the previous late summer or fall
- Red Oak infections in late spring & summer usually do not give rise to fungal mats due to high temperatures and low soil moisture conditions
- Fungal mats can be found by looking for inconspicuous narrow cracks in the bark of dying red oaks leading to hollow areas between the bark and wood
- They have a distinctive odor similar to fermenting fruit & can be exposed for inspection by chopping away the loose bark

# Laboratory Diagnosis

- Oak wilt diagnoses may be confirmed by isolating the fungus from diseased tissues in the laboratory
- Samples may be submitted to: **Texas Plant Disease Diagnostic Laboratory, 1500 Research Parkway, Suite A130, Texas A&M University Research Park, College Station, TX 77845**
  - The Plant Disease Diagnosis Form must be submitted with samples
  - Please note the instructions on the second page of the form
- A county extension agent, Texas A&M Forest Service forester, or trained arborist should be consulted for proper collection and submission of samples

# Fungal Mats

- Red oaks play a key role in the establishment of new infection centers
- The oak wilt fungus is spread overland by insect vectors & by man through movement of wood from infected red oaks to other locations
- Fungal mats form beneath the bark of certain diseased red oaks in spring, but do not form on live oaks
- Individual fungal mats produce spores for only a few weeks

# Fungal Mats

- The fruity odor of fungal mats attracts many kinds of insects, the most important of which are sap-feeding nitidulid beetles
- The fungus is transmitted by these small beetles as they emerge from mats & visit fresh wounds on healthy oaks
- Fungal mats are most commonly formed on standing trees, but they can also develop on logs, stumps, & fresh firewood cut from diseased red oaks

# Root Spread

- Live oaks tend to 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 & dying trees (infection centers) are formed
- Infection centers among live oaks in Texas expand at an average rate of 75 ft per year, varying from no spread to 150 ft in any one direction
- Occasionally, the oak wilt fungus is transmitted through connected roots between other oak species, but movement through roots is slower & occurs over shorter distances than in live oaks

# Root Spread



# Oak Wilt Management

- There are three primary approaches used for oak wilt management in Texas
- Successful control usually depends on an integrated program incorporating measures from all three approaches
  - Attempt to prevent the formation of new oak wilt infection centers by eliminating diseased red oaks, handling firewood properly, & painting wounds on healthy oaks
  - Trenching or other measures to disrupt root connections responsible for root transmission of the pathogen
  - Injections of the fungicide propiconazole (Alamo™) into individual, high-value trees help reduce crown loss and may extend the life of the tree
- These measures will not cure oak wilt, but can significantly reduce tree losses



# Oak Wilt Management

- Infected red oaks that die in late summer, fall or early winter should be cut down & either burned, buried, or chipped soon after discovery to prevent fungal mats that may form on these trees the following spring
- If not possible, trees should be injected with herbicide or deeply girdled with an ax and stripped of all bark 2 to 3 ft above the soil line
- Drying of the wood before spring discourages formation of fungal mats

# Oak Wilt Management

- All wounding of oaks (including pruning) should be avoided from February through June
- The least hazardous periods for pruning are during the coldest days in winter and extended hot periods in mid- to late summer
- Regardless of season, all pruning cuts or other wounds to oak trees, including freshly-cut stumps and damaged surface roots, should be treated immediately with paint to prevent exposure to contaminated insect vectors
- Any type of paint (latex, oil-based, spray-on, brush-on, or wound dressing) will suffice

# Oak Wilt Management

- Transporting unseasoned firewood from diseased red oaks is a potential means of spreading the oak wilt fungus
- Oak wilt can't be transmitted by burning infected firewood; however, fungal mats may form on unseasoned oak firewood in storage
- Presently, no vectors have been proven to transmit the fungus from live oaks to other oak trees, but diseased wood from any oak species should never be stored near healthy oak trees unless precautions are taken
- It is best to purchase wood that has been thoroughly dried for at least one full year
- If firewood from diseased trees is stored near healthy oak trees, it should be covered with clear plastic with the edges buried to prevent insects from leaving the pile

# Oak Wilt Management

- Trees cannot get oak wilt from the smoke of burning diseased wood - 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 visit the fungal mats & fly off & infect the healthy trees in your yard
  - The best precaution is to always buy well-seasoned firewood
  - If you cut down infected oaks, cover the wood with a clear plastic for one year - this will ensure that the fungus is killed by the summer heat
  - Once the wood has dried out to the point where the bark is falling off & the wood is cracked, then the fungus that causes oak wilt is no longer viable (alive)

# Oak Wilt Management

- 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 ft deep with trenching machines, rock saws, or ripper bars - more than 4 ft may be needed to assure control in deeper soils
- The City will be trenching Forest View, from Evers to the Forest Oaks Pool to a depth of 6 ft

# Oak Wilt Management

- Correct placement of the trench is critical for successful protection of uninfected trees
  - There is a delay between colonization of the fungus & appearance of symptoms in the crown; therefore, all trees with symptoms should be carefully identified first
- The trench should be placed a minimum of 100 ft beyond these symptomatic trees, even though there may be “healthy” trees at high risk of infection inside the trench
  - Trees within the 100-ft barrier, especially those without symptoms, may be uprooted or cut down and removed to improve the barrier
- 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 Management

- 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 (new trenching and treatment of trees within the barrier) should be repeated while the diseased site is still small

# Oak Wilt Management

- Propiconazole (Alamo™) 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, & injection technique
- Injection should be done only by trained applicators



# Oak Wilt Management

- Fungicide injection does not stop root transmission of the fungus
- 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
- The City will be injecting a demonstration tree on Forest View after the trenching

# Oak Wilt Management

- There are several steps in the injection process that require careful attention following tree selection
- Mixing the fungicide solution, exposing and drilling holes in the flare roots, 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
- The services of a professional arborist or other experienced person may be required to assure proper injection

# Integrated Approach

- Early detection & prompt action are essential for successful management of oak wilt
- The specific measures taken depend on several circumstances but should include appropriate combinations of the following:
- Prevent New Infections
  - Cut and dispose of diseased red oaks immediately
  - Avoid wounding oak trees, including pruning, from February through June
  - Sterilize/sanitize all pruning equipment between trees and paint all wounds and fresh stumps regardless of season
  - Handle oak firewood cautiously, burn all firewood before spring, and never store unseasoned oak wood from infected trees near healthy oaks
  - Cover unseasoned firewood (from infection centers and unknown origins) with clear plastic and bury the edges of the plastic

# Integrated Approach

- Stop the Spread through Root Connections
  - Install a trench at least 4 ft deep & 100 ft beyond the perimeter of infection centers (last symptomatic tree) to break up root connections
  - Cut or uproot all trees within the 100-ft barrier (except those injected with fungicide)

# Integrated Approach

- Inject High-Value Oaks with Fungicide
  - Identify susceptible, high-value oak trees in proximity to expanding oak wilt infection centers
  - Consult a trained and licensed arborist (with certified applicator's license) for treatment of susceptible trees with injections of propiconazole (Alamo™)
- Plant Resistant Trees
  - Plant trees that are resistant to oak wilt and adapted to central Texas
  - Favor a diversity of tree species
  - Avoid wounding susceptible oaks during planting

# Cautions

- **CAUTION**
  - Pesticides used improperly can be injurious to humans, animals, and plants
  - Follow directions & heed all precautions on the labels
- **DISCLAIMER**
  - The use of chemical, trade, or institution names in this presentation is for the information & convenience of the audience
  - Such use does not constitute official endorsement or approval by the U. S. Department of Agriculture or the Texas A&M Forest Service of any product or service at the exclusion of others that may be available

# Contacts & Credits

- Local contact is Mark A. Kroeze, CF, CA, Community Forester, Texas A&M Forest Service, 15110 Jones Maltsberger, San Antonio, TX 78247
  - C: 210-859-9253 O: 210-494-4771 email: mkroeze@tfs.tamu.edu
- The slides in this presentation came from the [texasoakwilt.org](http://texasoakwilt.org) website, which were adapted from the Forest Service, Southern Research Station publication “How to Identify and Manage Oak Wilt in Texas”
- Brochure is also available for download from U.S. Department of Agriculture, Forest Service, Southern Research Station, New Orleans, LA How-To SR-1, Revised April 2003.
  - How to Identify and Manage Oak Wilt Brochure (411 KB) – Texas A&M Forest Service, Revised November 2008.
  - How to Identify and Manage Oak Wilt in Texas Fact Sheet (73 KB PDF)
  - Cómo identificar y manejar el marchitamiento del encino en Texas (133 KB PDF)

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