OAK WILT

Identification & Management in Texas

Texas A&M Forest Service

texasoakwilt.org

OAK WILT IDENTIFICATION & IMPACTS

What is oak wilt?

What is Oak Wilt?

- Caused by the fungus *Bretziella fagacearum*
- Primary vascular pathogen (disease) of oaks in Texas
- Invades the water-conducting vessels of the tree (xylem)
- Tree responds by plugging these tissues, resulting in a lack of water to the leaves
- Not oak decline

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The Impact of Oak Wilt

- Thousands of acres throughout Central and West Texas have been affected by oak wilt

- Oak wilt may reduce urban and suburban property values by 15-20%

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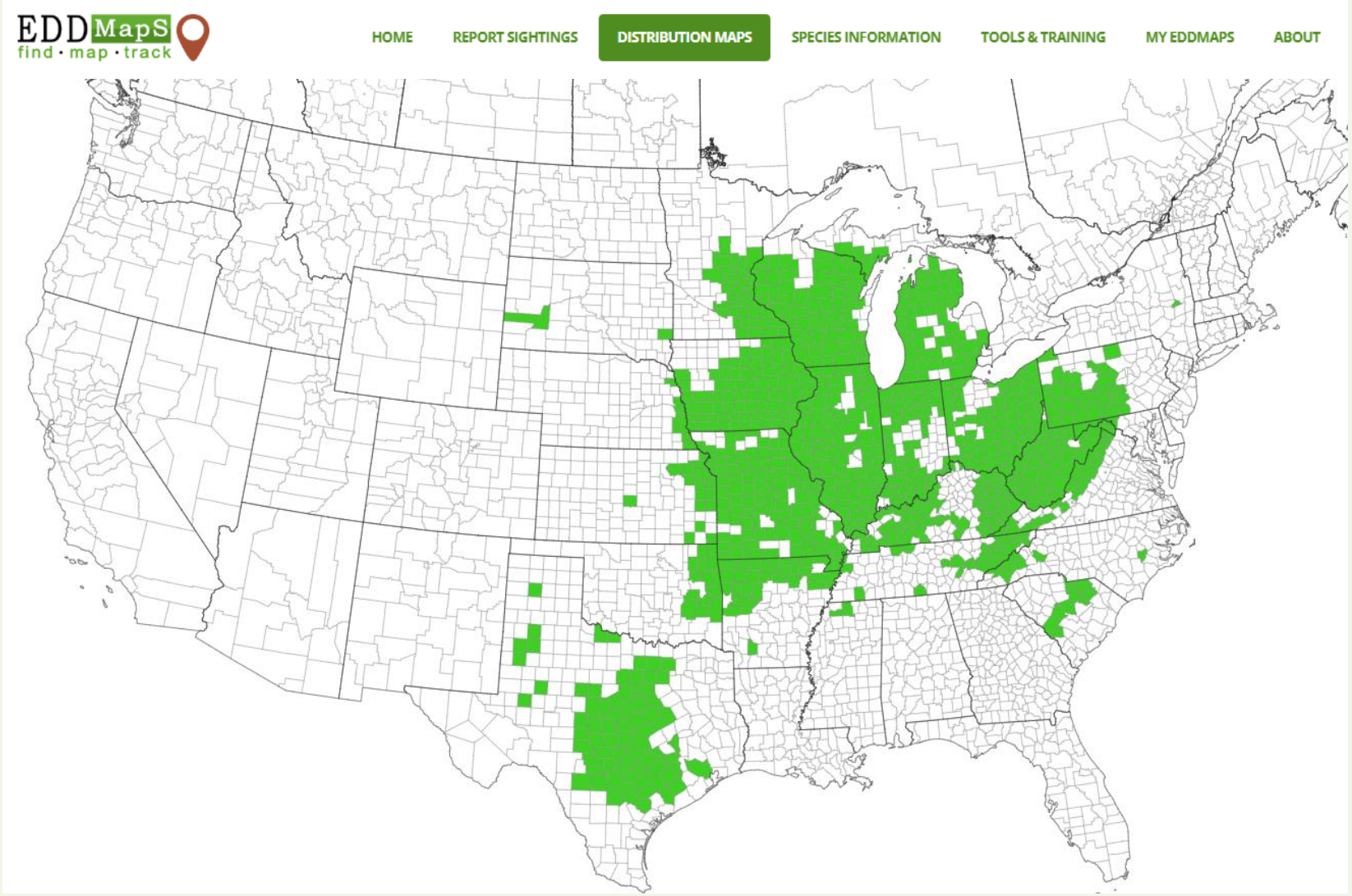
Where is Oak Wilt?



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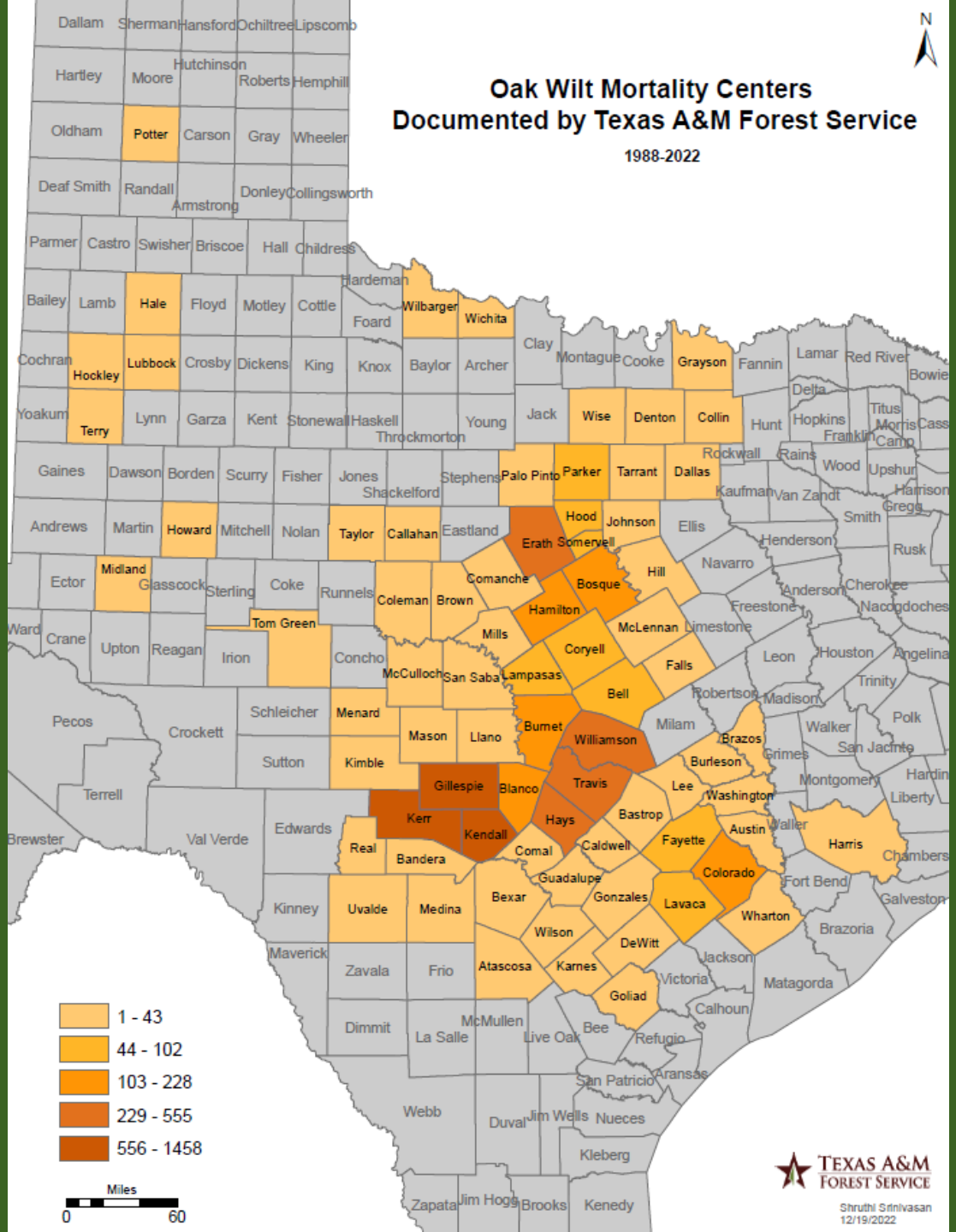
Oak Wilt in Texas

- 76 counties with confirmed oak wilt occurrences as of 2023
- Verified by lab sample, aerial detection, and on-site inspections
- First detected in Texas in 1961

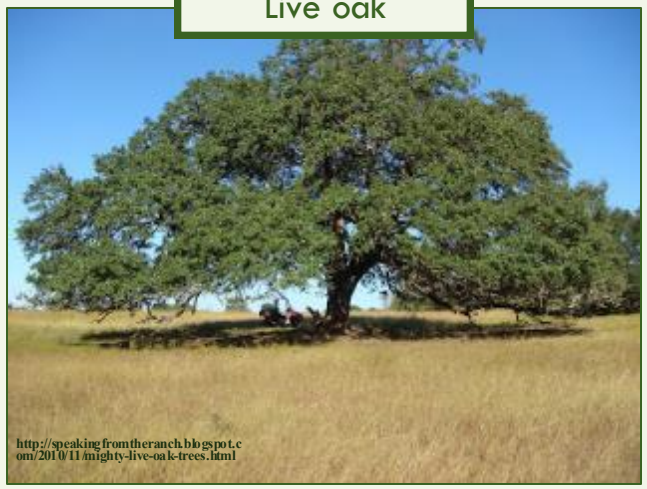


What Trees are Susceptible?

Red oak

White oak

Live oak



ALL OAKS!

- **Red Oaks** are extremely susceptible to the pathogen and play a unique role in disease spread.
- **White Oaks** are less susceptible to the disease; however, they are not immune to infection!
- **Live Oaks** are intermediate in their susceptibility to the fungus; however, they are seriously affected due to their vast, interconnected root systems that allow for disease spread among trees.

Oak species guide:

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How is Oak Wilt Spread?

Above ground (long distance) via sap-feeding beetles carrying fungal spores:

- Fungal spores are picked up from certain infected **red oaks** and carried to fresh wounds on other oak species
- New infection centers are started

Sap Beetle

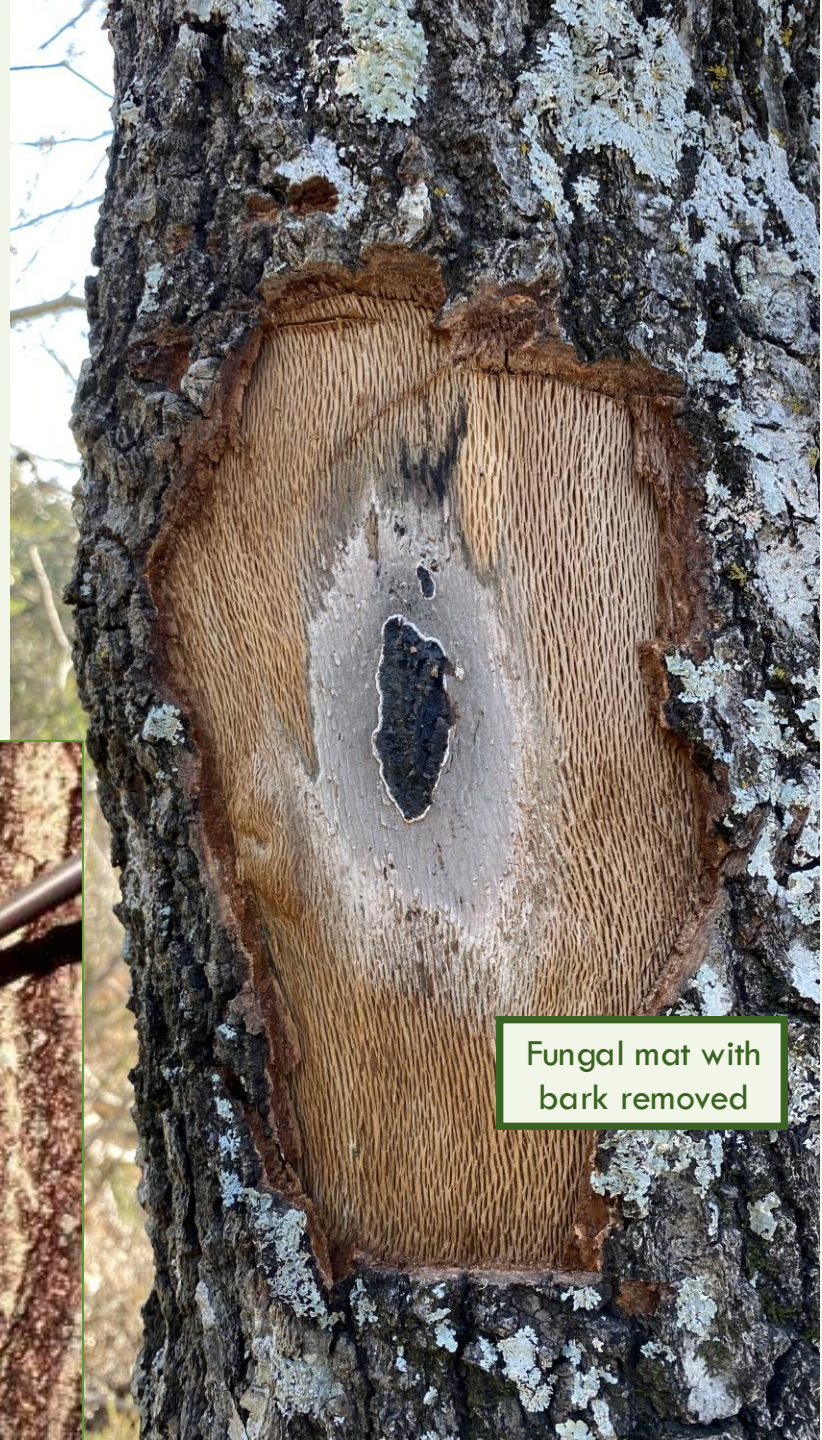
Fungal Mat on Red Oak

Fresh Wound on Different Oak

Fungal Mats in Red Oaks

- Contain oak wilt fungal spores
- Only form on infected **red oaks**
- Form under the bark
- Can have multiple per tree
- Produce a sweet odor like rotting fruit which attracts sap beetles
- Trees infected in fall/winter are more likely to produce mats the following spring
- Mat production is accelerated by cool, moist weather (typically springtime)

Pressure crack from fungal mat underneath



Fungal mat with bark removed

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How is Oak Wilt Spread?

Underground (localized) via interconnected root systems:

- The fungus travels from tree to tree in the interconnected root system
- This occurs primarily in **live oaks** and is responsible for the majority of spread and tree deaths in Central Texas
- Rate of spread averages **75 feet per year** through the root system

Live Oak Mott

Root Grafts

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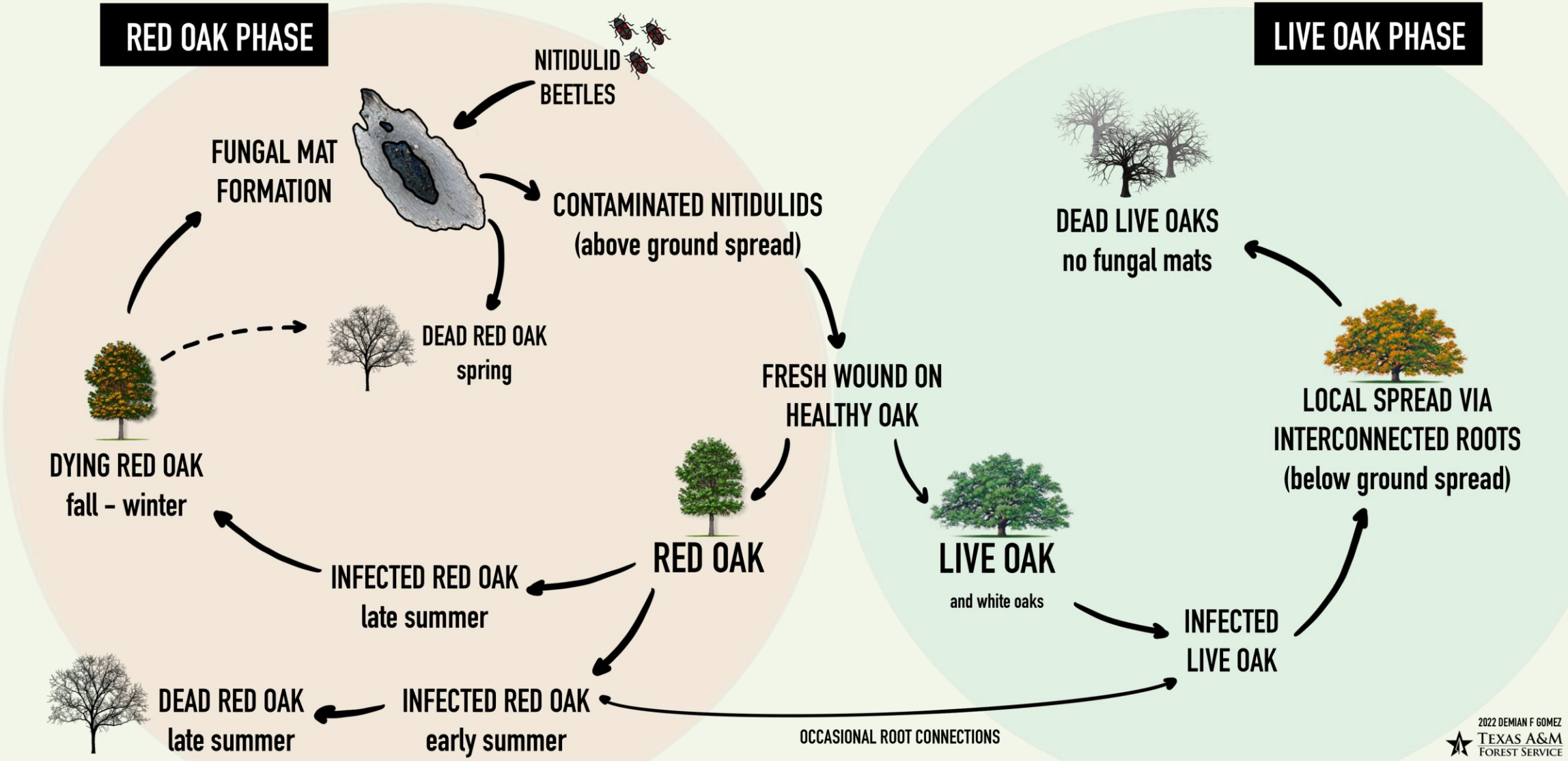
Oak Wilt Disease Cycle



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Oak Wilt in Live Oaks

- Rapid defoliation
- Death in 3 to 6 months
- Spread to adjacent trees
- No fungal mat formation
- About 5-15% survival rate with no treatment
- Leaf symptoms: veinal necrosis, vein banding, tip burn, and marginal necrosis

Veinal necrosis

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Oak Wilt in Live Oaks

Tip Burn / Marginal Necrosis

Veinal Necrosis

Vein Banding

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Oak Wilt in Red Oaks

- Typically maintains leaves, then defoliate
- Flagging: branches turn brown or red
- Death in 4 to 6 weeks
- Possible spread to adjacent trees
- Possible formation of fungal mats
- 100% mortality (no survivors)
- Bronzing leaves

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Lab Samples

- Samples can be taken and sent to a lab to confirm the presence of oak wilt
- Learn how to take a sample with this video
- For more information, contact the Texas Plant Disease Diagnostic Lab:
  - (979) 845-8032
  - PlantClinic@ag.tamu.edu
  - plantclinic.tamu.edu

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OAK WILT MANAGEMENT

There is no cure for oak wilt,
but managing the disease can significantly reduce tree losses.

Oak Wilt Management

Early detection and prompt action are essential for successful management of oak wilt.

Three key management approaches:

- Prevention
- Species diversity
- Mitigation
  - *Trenching*
  - *Fungicide Injections*

PREVENTION

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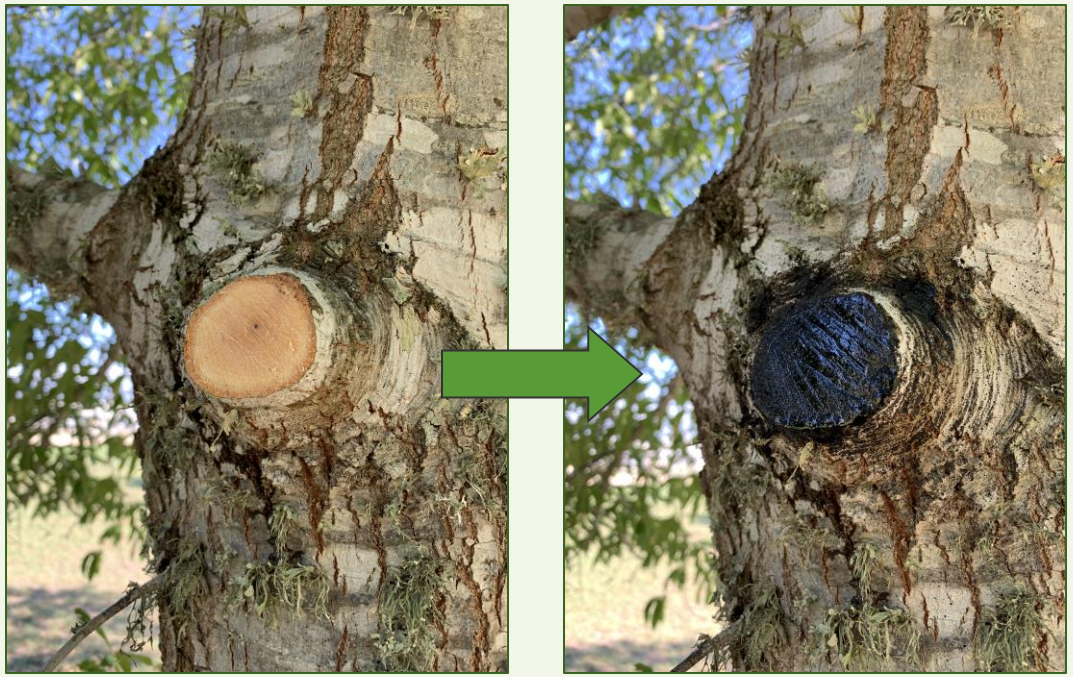
Pruning

- Peak beetle activity and fungal mat production occur in the spring; therefore, avoid wounding and pruning oaks from **February through June** unless there is an immediate safety concern
- Painting fresh wounds to discourages sap beetles from visiting by blocking the sweet scent coming from the tree

Pruning

- Regardless of season, **immediately paint** all pruning cuts and other wounds to oaks
- All cuts or wounds must be painted
- Likelihood of spreading oak wilt on tools is rather remote, BUT other diseases can be spread on tools, so tool sterilization is always recommended



Pruning Guidelines:

Beetle Activity

- Beetles are active and can carry spores year-round
- However, in Texas **peak activity is February-June**
- Paint open cuts/wounds **immediately**, every time
- Avoid wounding in peak times
- Beetles are native and part of the ecosystem

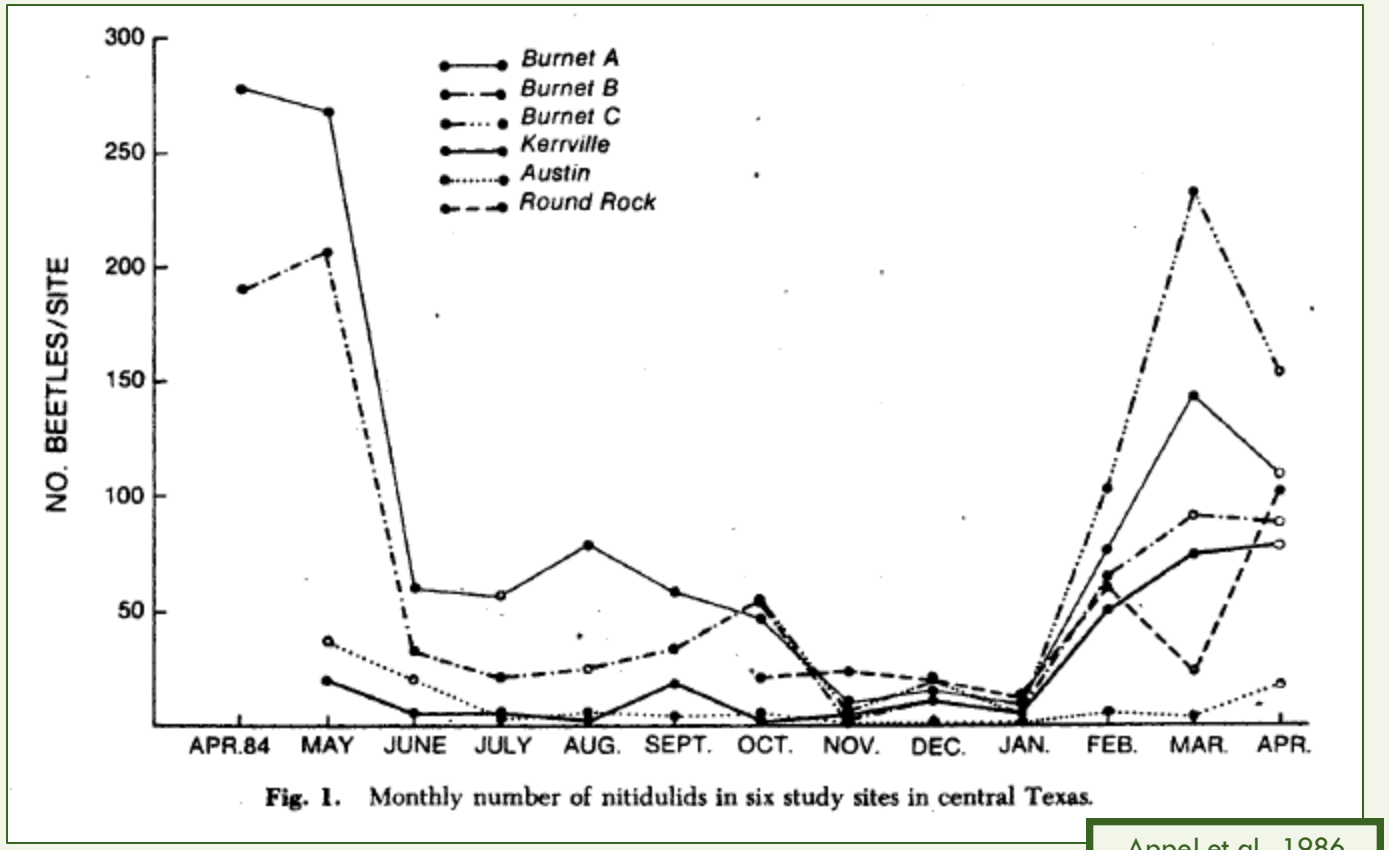


Fig. 1. Monthly number of nitidulids in six study sites in central Texas.

Appel et al., 1986

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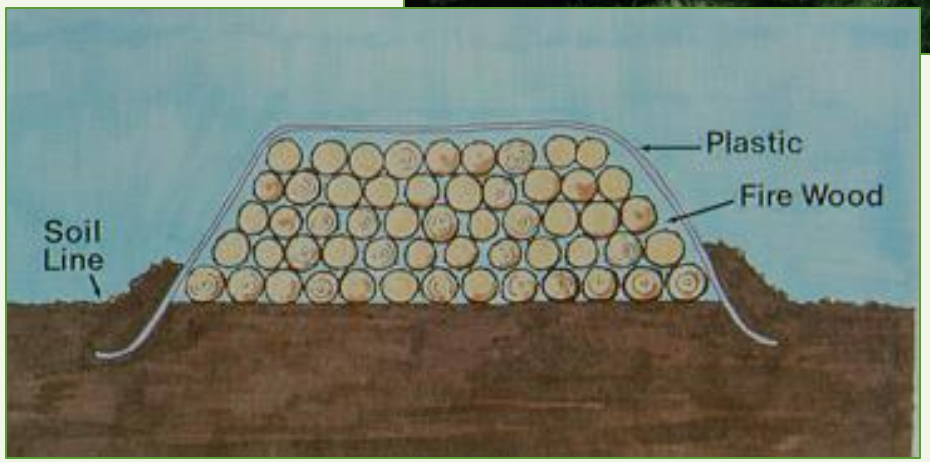
Red Oak Removal & Firewood

- To prevent fungal mat formation, destroy infected **red oaks** quickly by:
  - *Burning*
  - *Chipping*
  - *Burying*

- **Never store** infected red oaks for firewood use!
- Red oak firewood can produce fungal mats, attractive to beetles
- Do not move firewood
- Oak wilt cannot spread while burning or in smoke



Tree removal for oak wilt:

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White & Live Oak Firewood

- With **white/live oak** infected firewood:
  - Only use dry, well-seasoned firewood
  - Leave unseasoned firewood on-site for one year before moving
  - White/live oak firewood cannot produce fungal mats

Tree removal for oak wilt:

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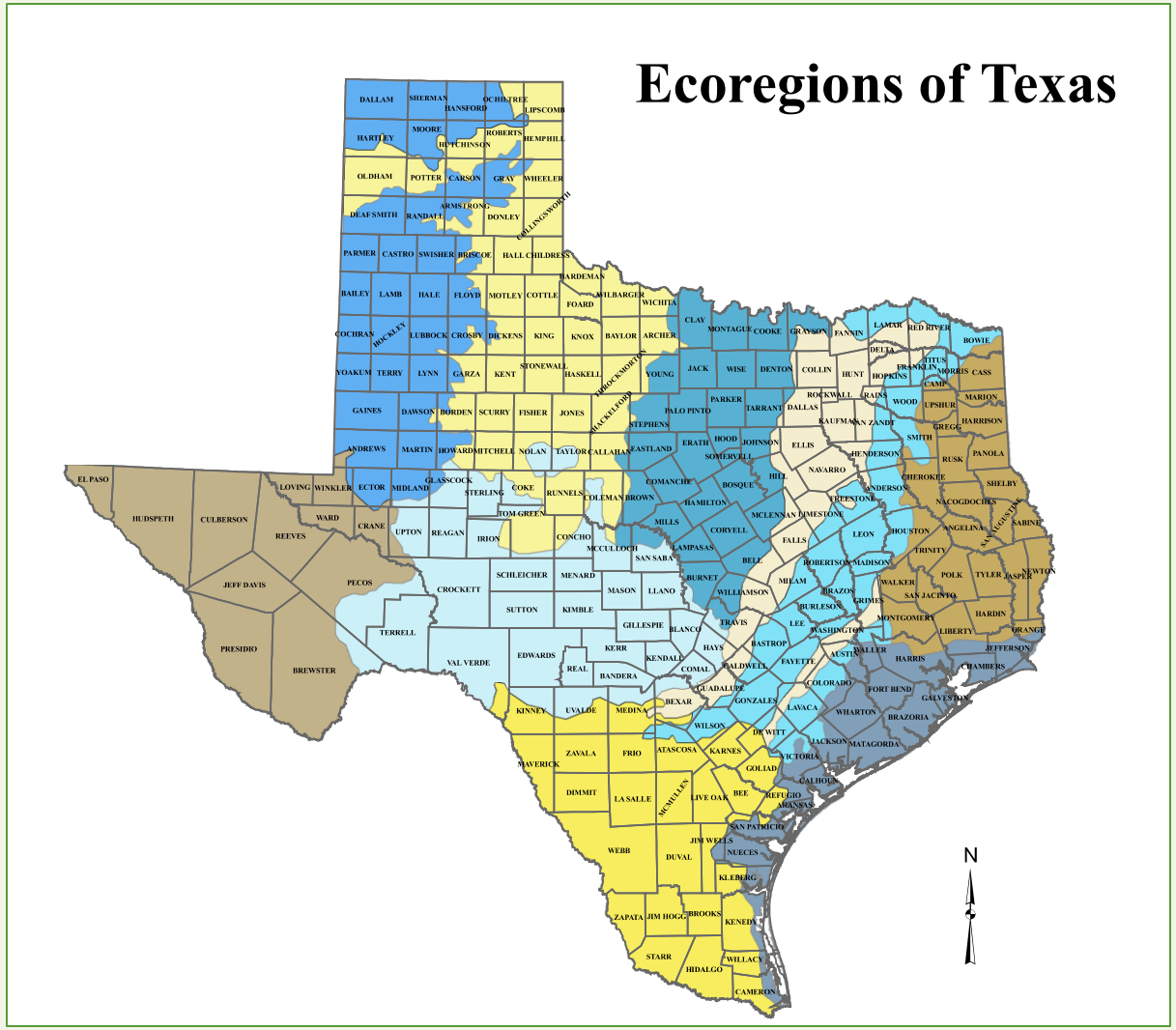
Species Diversity

Select trees that are:

- Native or adapted to the local environmental conditions
- Tolerant of temperature extremes, amount and pattern of precipitation, and local soil conditions
- Not invasive nor detrimental to the local environment
- Suitable for the space available – right tree, right place



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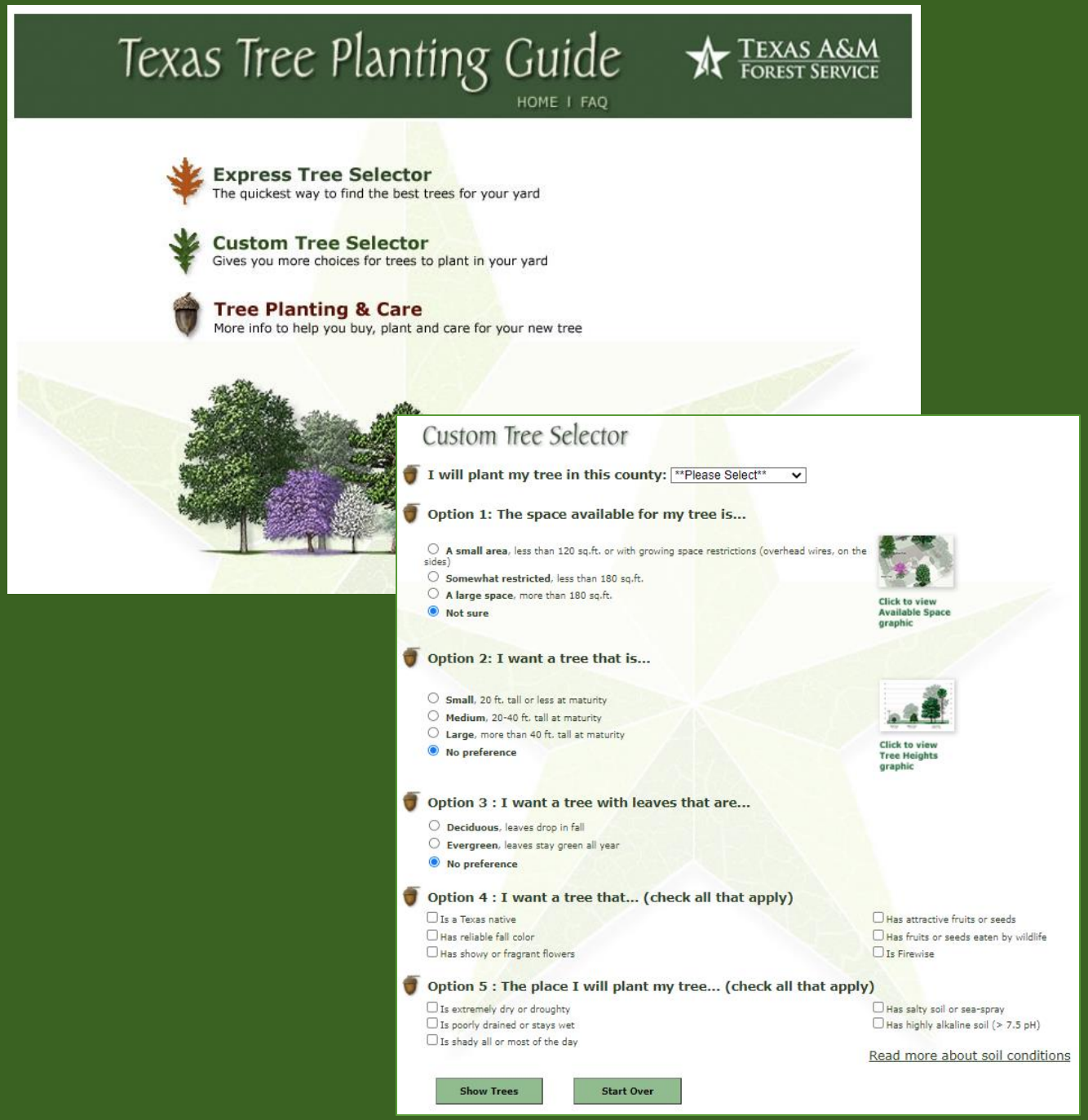
Species Diversity

- Avoiding planting monocultures (planting only one species)
- Create diversity in the landscape
- Avoid wounding oaks during planting
- For more planting information and recommended trees for your area, visit texasoakwilt.org

Species Diversity

- Google: Texas Tree Selector
- Or go to texastreeplanting.tamu.edu

- Best time to plant a tree: fall
- Texas Arbor Day - first Friday of November



MITIGATION

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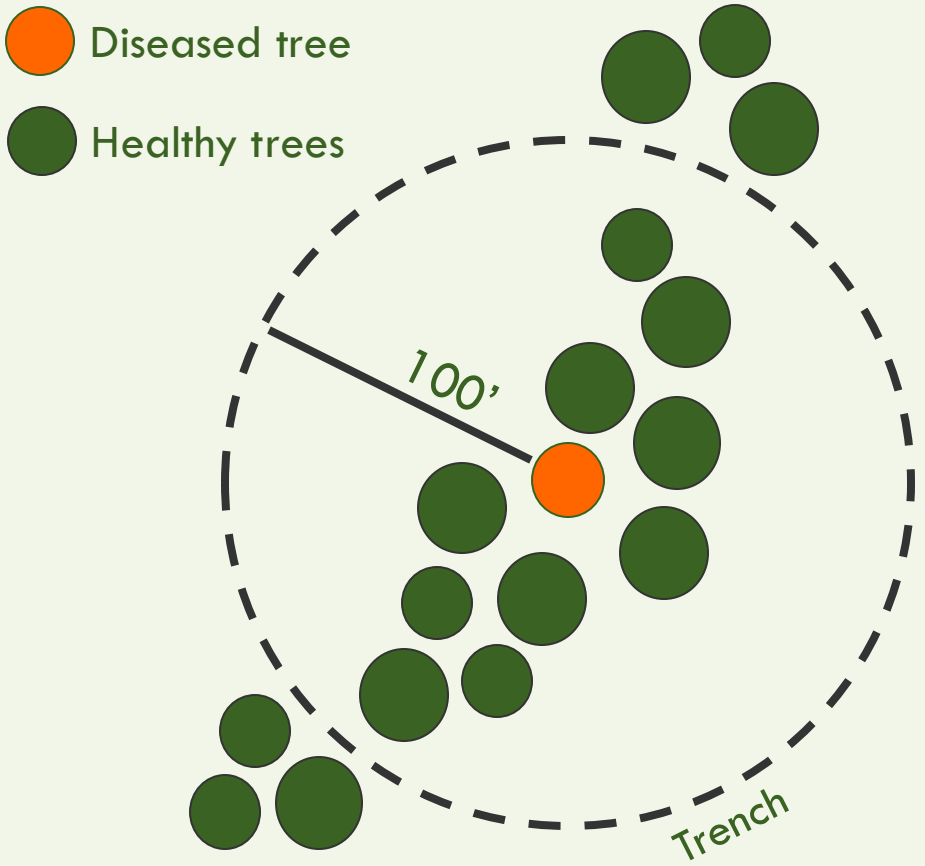
Trenching

The goal of installing a trench is to halt the spread of oak wilt moving through interconnected root systems by severing these connections

Trenches must be:

- Placed a minimum of **100 feet** ahead of the disease (from drip line)
- Excavated to at least 4 feet deep (sometimes deeper)
- Designed to sever **all** root connections to be effective



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Trenching

- Equipment choice should be based on site characteristics and not solely on meeting minimum depth requirements
- Backfill the trench using same soil
- Pushing all oaks down (‘roguing’) within the barrier may improve effectiveness because it increases root detachment

Rocksaw

Backhoe

Excavator

Fungicide Injections

- Used to protect individual oaks in advance of an expanding oak wilt center
- Best candidates for injection are healthy, non-symptomatic oaks up to 75-150 feet from symptomatic trees
- Injection does not stop root transmission of the fungus
- Injections only protect the individual tree injected, when successful

Fungicide Injections: Macro System

- Success depends upon the level of infection, the application rate, and injection technique
- Several products are currently labeled and registered for this treatment
- Propiconazole based fungicides
    - *Macro-injections in the root flares have been **scientifically proven** effective and continue to be the industry standard*

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Fungicide Injections

Root Flare Injection Advantages:

- Bark is thinner below the soil line
- Increases the number of potential injection sites
- Spreads out the wounding, especially if future injections are needed
- Research has demonstrated superior distribution of the fungicide throughout the tree

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Fungicide Injections

- To hire someone: costs around $15-20/diameter-inch
- DIY
  - *You can move the soil away beforehand, but do not pre-drill the holes*
  - *Inject on a sunny morning*
  - *Holes do not need to be painted*
- Second injection recommended 18-24 months after initial injection

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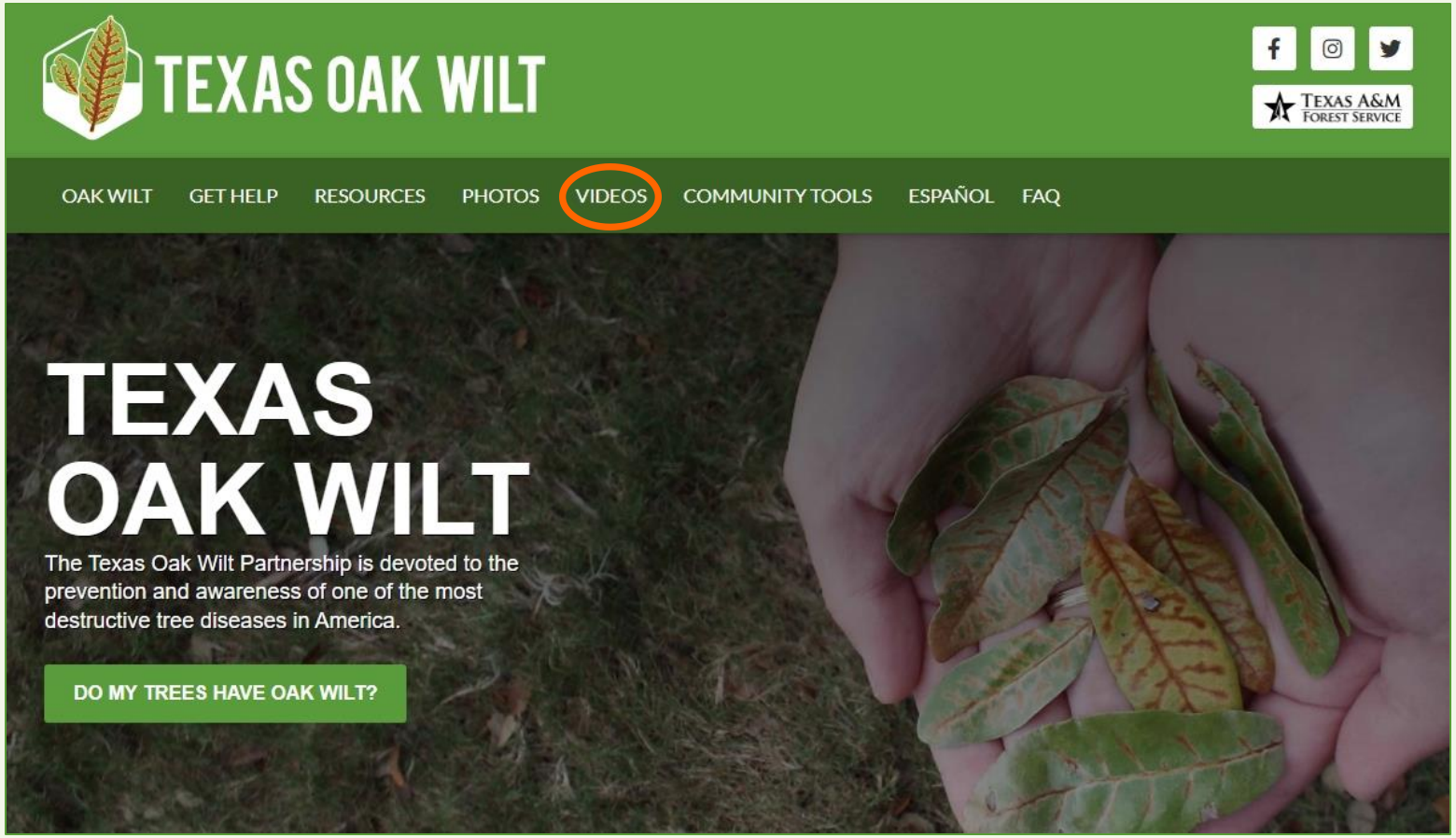
Fungicide Injections

For more information and instructional videos, please visit texasoakwilt.org



OAK WILT SUPPRESSION PROJECT

The overall goal is to minimize the spread of oak wilt (*Bretziella fagacearum*) in Central Texas

Oak Wilt Suppression Project

- Cost-shares may be available to private landowners for the following efforts:
  - Containment trenching around oak wilt centers
  - Pushing or roguing all oaks within the boundaries of cost-shared trenches
  - Removal of diseased red oaks

- Trenching: 50% of actual costs not to exceed $2000 per individual per year with a maximum of $6000 per project per year
- Roguing or pushing: 50% of actual costs not to exceed $2000 per individual per year
- Red oak removal: 50% of actual costs not to exceed $2000

Cost Share Info:

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Cost Share Criteria

- Complete containment of the disease center (natural land features can possibly be used)
- Relative isolation of the disease center from other disease centers
- High potential for fungal mat formation (red oaks)
- Compliance with Cultural Resources Preservation Act

Cost Share Info:

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NOT Eligible for Cost-shares

- Removal of dead trees
- Trenching around healthy stands of trees
- Secondary trenches
- Engineering charges, consulting fees, or permit fees
- Loss or reduction in revenues from the land
- Stump grinding
- Fungicide treatments (injection)
- Replanting or landscaping

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Oak Wilt Site Visits

- Identify if it is oak wilt through:
  - Pattern of mortality
  - Foliar symptoms
  - Taking a sample
- Discuss management options:
  - Plant other trees
  - Plan for fungicide treatments
  - Trenching plan

Find your local contact:

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QUESTIONS?

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