Understanding Decline in Trees: Construction Damage, Improper Planting and Pruning, Disease and Insects Specific to Oaks.

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Where does it begin

- Selecting the wrong tree given the site conditions
- Below ground – most cases are via planting too deep, using two small of a tree spade, improper tree planting methods from a pot
- Aboveground – pruning too much or too large of branches
Belowground

• 40% Belowground : 60% Aboveground

• Root Damage Kills The Tree Without Obvious Signs of Damage (years after damage occurred)

• Roots Are Very Shallow And Near The Surface.

• Roots Extend Out The Height Of The Tree Or More.
Root Systems are mostly shallow and spreading
(top 12-16 inches hold 80-90% of the roots)
Crown Root System

Roots = 3 - 7 x

Crown Area

Birds eye view

Crown

Root System
Work to protect the drip zone as a minimum
Soil Compaction Kills Trees

• Compaction Reduces Soil Air Pores.
• Difficult For Roots To Grow.
• Less Water Infiltration.
• 50% Air Space, 45% Mineral Soil, 5% Organic Matter,
• 25% Water in the air spaces.
Cutting Roots Kills Trees
Large Piles of Fill Dirt Kills Trees
Roads, Driveways, and Salt Kill Trees
2012
Improper planting leads to problems

- Too small of a tree spade
  
  Top dieback – slow growth
  Stress increases insect & disease infestation

- Better to buy a smaller tree with a root system
Tree Spade

5-10% of the roots remain
Improper planting leads to problems:

- Planted too deep (20-35 year problem)
- Top dieback – slow growth
- Stress increases insect & disease infestation
Improper planting leads to problems:

- Planted from a pot with girdling roots (20-35 year problem)
  - Top dieback – slow growth
  - Stress increases insect & disease infestation
Improper maintenance leads to problems

• Mower damage to the stem is a great pathway for disease and insects
Trenching & Cutting

• Younger Trees Can Survive With 50% of Their Root System.

• Older Trees Do Not Respond Well to Root Loss. Make Sure That No More Than 25% of the Root System Is Lost.
Avoid Minor Changes
Grade Changes
Avoid Root Zone Changes
Very Sensitive To Root Damage

- Oaks
- Hickories
- Honey Locust
- Kentucky Coffeetree
- White Bark Birch
- All Conifers
- Red Bud
Moderately Sensitive

- Sugar/Black Maple
- Ash
- Walnut
- Sycamore
- Hackberry
- Dogwood
- Ironwood
Fairly Tolerant

- Silver Maple
- Basswood
- Cottonwood
- Willow
- River Birch
Sensitivity to Damage

- Old Trees vs Young Trees
- Upland Species vs Bottomland Species
- Soil Characteristics
- Health and Vigor of Tree
Insect pests of Oak
Insect Borers

- Attack unhealthy trees
- Invasive insects that attack healthy trees are the exception
Roundheaded borers

- Roundheaded borers / Longhorned beetles
- Family Cerambycidae
Damage and Signs
Roundheaded Borer

Red headed ash borer

Host range: ash, oak, hickory, hackberry
Flatheaded borer

- Flatheaded borer / metallic woodboring beetle
- Family Buprestidae

http://hortipm.tamu.edu/pestprofiles/chewing/horbeet/bupresti.jpg
Flatheaded borer
Twolined Chestnut Borer

- Attack and kill stressed oaks
- Foliage wilts late in summer
- Prune out branches with symptoms as soon as observed
Noxious oak gall
Gall Management

• Difficult to manage
• Often little information on insect lifecycle to time sprays.
  – Sprays have to be applied before galls form
• No controls have proven effective against stem and branch galls.
• Leaf galls are cosmetic and do not harm tree.
Leaf feeders
Sawflies

- Look like caterpillars but are actually wasp larvae
- Do not have crochets on feet
- Often large groups feeding together
- Leaf feeders often cause window-paning damage
Scarlet oak sawfly
Gypsy Moth
Gypsy moth defoliation in WI
Common Diseases of Oak
Bur Oak Blight
Bur Oak Blight

- Observed since 2002
- Late season disease
- Caused by *Tubakia iowensis*
- Spread by rain and favored by wet spring
Bur Oak Blight

- Symptoms appear in July-Aug
- Death of leaf tissue along veins
- Generally lower canopy is more severely affected and increases with years
- Branch dieback, wood borers, tree death
Bur Oak Blight

• Diagnostic symptoms and signs:
  – Vein necrosis (other diseases can cause this)
  – Pustules on petioles
  – Attached overwintering leaves
Control

- Propiconazole (Alamo) injections
- Late May or early June
- Effect may last 2 seasons
- Injections may cause phytotoxicity
Oak wilt

- Very destructive in Eastern and Central U.S.
- Red oak group more susceptible than white oak group
- Trees in red oak group die 1-4 months after infection
- White oak group
  - Bur oaks die in 1-7 yrs
  - White oaks - up to 20 yrs
Oak Wilt

- Red oak group -
  - Symptoms appear in late spring or early summer
  - Spore mats under bark
  - Leaves discolor, wilt, fall off
  - Streaks in outer sapwood

- White oak group -
  - Symptoms more variable, slower to develop
Oak Wilt

- Insect vectors: picnic beetles (Nitidulids)
  - Attracted to spore mats
  - Fly to wounds on other oak trees, feed on sap
  - Spread fungus up to several hundred feet
Oak Wilt

- Avoid wounding March 1 through frost
  - Sap flows from wounds
  - Paint wounds made from March 1 to first hard frost
  - 80% of new outbreaks from wounding during construction

- Break root grafts
  - Trenching

- Woodlands: Do nothing
  - Often dies out naturally after local outbreaks