Evaluating Tree Health and Condition

City of Oxford
Tree Maintenance Workshop
Friday, June 19, 2009 – 9:00 a.m. to 12:00 noon

Connie Head
Consulting Urban Forester
Technical Forestry Services
(706)202-5279 / tfshead@aol.com

Workshop Content

- Review
- Evaluating Tree Health and Condition
- Field Demonstrations

Parts of a Tree

- Roots
  - Anchor and support the tree
  - Absorb water and nutrients
  - Require oxygen to survive
- Trunk
  - Supports the crown
  - Transports water, minerals, and food
- Crown
  - Composed of scaffold limbs, branches, twigs, buds, and leaves
  - Leaves capture sunlight, absorb carbon dioxide, produce food (carbohydrates), and oxygen as a byproduct

Roots and Their Function

- Tree roots are located within the top 6 to 18 inches of soil
- They extend out from the tree 2 to 3 times the width of the crown
- Large, woody roots are located within the first 6 to 8 feet from the trunk and they keep the tree upright
- Trees must be able to produce and store ample amounts of food through photosynthesis to remain healthy
- Small, fibrous tree roots absorb water and nutrients as the building blocks for growth
- Tree roots require oxygen
- Without adequate root systems and favorable soil conditions trees will not remain safe and healthy

Trunk

- Supports the crown
- Transports water and minerals up the tree
- Contains growing points for lateral growth

Crown

- Scaffold limbs
  - Hold up the branches and leaves
  - Contains growing points (cambium, other meristematic tissues)
- Branches and twigs
  - Hold the leaves
  - Include leaf buds and twig buds that are the growing points (cambium, apical meristem)
- Leaves
  - Capture sunlight
  - Produce food for the tree

Life Cycle

- Newly planted trees
- Juvenile trees
- Established trees
- Mature trees
- Declining trees

Mature Trees

- Growth slows
- Live wood to dead wood ratio is decreasing
- Crowns flatten out
- Limbs grow thicker and heavier
- Trees develop unique character
- Maintenance needs include
  - Deadwood pruning
  - Regular inspections
  - Protection
  - Possibly supplemental support (cabling and bracing)
  - Possibly lightning protection

Declining Trees

- Very slow or minimal growth
- Lose mass
- Gaps appear in crown where major limb failures have occurred
- Branches sprout along the stem
- Nearing the end of its life
- Maintenance needs include
  - Deadwood pruning
  - Regular inspections
  - Removal

Inspection

- Keep a list of trees in marginal condition
- Inspect trees in marginal condition at least once per year, preferably in early summer
- Check structural problems in winter when leaves are off the tree
- Check pruning needs in the summer when branches are loaded with leaf weight
- Look for signs and symptoms of insect and disease problems on a daily basis during regular work activities

Evaluating Tree Health and Condition

Topics

- Susceptibility and Stress
- Insect and Disease Signs and Symptoms
- Mechanical Damage
- Structural Defects
- Prevention
- Assessing Risk of Failure
- Tools for Assessing Failure Risk
- Tree Removal Decisions

Susceptibility and Stress

- Stress increases a tree's susceptibility to insects and diseases
- Stress originates from extremes of temperatures, moisture, or light (too much or lack of)
- Stress can be created when a tree is wounded or too much live wood is removed from a tree
- Wounds create an entry point for insects and diseases
- Trees do best in a favorable environment that is stable

Insect and Disease Signs

- Sign = physical evidence of an insect or disease agent
  - Insect on tree
  - Fungal fruiting bodies, mushrooms, conks
  - Cankers
  - Entry or exit holes
  - Brood galleries
  - Pitch tubes
  - Frass

Insect and Disease Symptoms

- Symptom = tree's reaction to the insect or disease agent
  - Dieback
  - Wilting
  - Flagging of leaders
  - Chlorosis (yellowing)
  - Leaf browning
  - Leaning

Wood Borers

- Long-horned beetles
- Dogwood borer (caterpillars, clear-wing moths)
- Bark beetles (Ips, Southern Pine Beetle, Black Turpentine Beetle, ambrosia beetles)
- Signs = pitch tubes on trunk

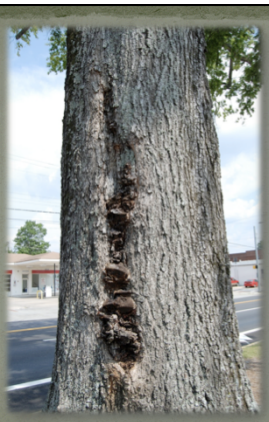
- Symptoms = branch or whole tree dieback
- Controlled with insecticides or removal

Sucking Insects

- Aphids
- Scale
- Signs of infestation include scaly formations on branches, honeydew production
- Symptom = low vigor, dieback of leaves and twigs
- Can be controlled with insecticides

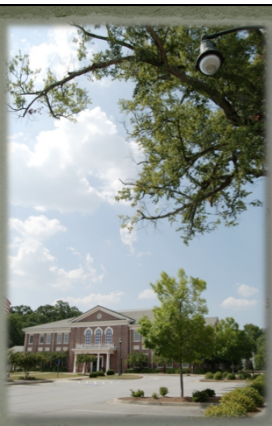
Hypoxylon Canker

- Sign = flat patches of grayish or brownish fungal fruiting structures
- Symptom = tree is dead
- There is no treatment



Trunk Decay

- Sign = fungal fruiting structures
- Signs = depressed linear area on trunk, cavity, decayed wood, wounds
- Symptom = tree shows signs of crown dieback
- There is no effective treatment



Trunk Decay

- Crown dieback may also be a symptom of root damage

Seridium and Botryosphaeria (Bot) Canker

- Affects Leyland cypress
- Symptom = browning and dieback of branches
- Keep mulched and water every 5 to 7 days in absence of rain

Fire Blight

- Bacterial disease
- Affects members of the rose family (Bradford pear)
- Symptom = browning, flagging, and dieback of the branch tips
- Plant disease-resistant varieties

Leaf Diseases

Tar spot

Leaf scorch

- Great variety of diseases that affect leaves
- Most are not serious as tree's replace their leaves annually
- Sign = spots
- Symptom = scorching

Mistletoe

- Neither an insect or disease, but a parasitic plant pest
- Removes water and nitrogen from the tree
- Causes tree decline and eventual death that is difficult to reverse
- Remove at first sign of infection
- If left it will rapidly multiply through the action of birds eating the very sticky seeds and excreting them onto branches

From *Treating Mistletoe in Trees* by Dr. Kim D. Coder, University of Georgia, Warnell School of Forestry and Natural Resources, http://www.warnell.uga.edu/h/publicservice/h/publicservice/publications/

Mechanical Damage

- Wounds with bark removal on the trunk, limbs, roots
- Wounds with bark removal from mowers and weed trimmers
- Crushing wounds to trunk
- Broken limbs from lack of clearance for trucks and equipment

Structural Defects

- Girdling roots
- Cracks and splits
- Forked stems with included bark
- Trees with excessive or sudden lean
- Central column of decay
- Open cavities

Prevention

- PREVENTION IS THE BEST TREATMENT
- Prevention is always more cost-effective than treatment or removal and replacement
- Follow best management practices from time of planting and throughout a tree's life
- Protect trees throughout their lives to keep them as safe and healthy as possible
- Inspect trees regularly
- Avoid tree stress

Prevention

- Avoid wounding
- Prune when trees are young
- Select good quality trees and disease resistant species
- Avoid introducing insects and diseases from other areas, sources, or wooded areas
- Water trees during droughts
- Mulch trees to the greatest extent possible
- Do not fertilize trees with suspected problems, especially those with bacterial infections

Assessing Risk of Failure

- Observe changes in tree health and condition over time
- Look for areas of decay on the roots, trunk, and limbs
- Look for cavities
- Look for sudden leans
- Explore the history of the tree and its environment
- Observe and learn about the common insect and disease problems in the area, and upcoming threats

Assessing Risk of Failure

- Trees with a central column of decay and no opening
  - A 50% loss of trunk wood due to a column of decay or a cavity results in only a 6% loss in stem strength
  - When cavities occupy more than 60-70% of the stem, they have a relative strength loss of 87 to 76%, and stem strength loss is considered unacceptable
- When an opening is present, the strength loss is greater for the same size cavity without an opening
  - A 50% loss of trunk wood in a hollow stem with an opening equivalent to 30% of the trunk circumference results in a 34% loss in strength

Tools for Assessing Failure Risk

- CTLA condition rating system in the Guide for Plant Appraisal, 9th Edition
- ISA Hazard Rating Guide

Tree Removal Decisions

- Trees should be removed
  - When they are in an advanced state of decline
  - When their risk for whole tree failure is high
  - When their hazard rating is high and the risk cannot be mitigated
  - When they have lost greater than ½ of their crown
  - When they are located where they either currently or will eventually cause a future conflict with infrastructure
  - When they produce excessive litter that causes a public safety concern
  - When they have been abused, neglected, poorly maintained and are no longer an asset

Field Demonstrations

THANK YOU!

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