



Tree Planting Workshop

Connie Head
Technical Forestry Services

Friday, February 20, 2009
Oxford Community Center
9:00 a.m. to 12:00 noon

Sponsored by the City of Oxford, the Oxford Tree Board, the Georgia Forestry Commission, and the USDA Forest Service

Workshop Content


- The Nature of Trees
- Tree Establishment
- Field Demonstrations



The Nature of Trees

Discussion Topics

- Benefits of Trees
- Biology
- Life Cycle



Benefits of Trees

- Environmental Benefits
- Economic Benefits
- Health Benefits
- Social Benefits
- Value of City Trees in Oxford

From the Georgia Forestry Commission, www.gfc.state.ga.us

Environmental Benefits

- Cleaner air
- Shading and cooling
- Cleaner water
- Noise reduction

FACT

1 acre of trees produces enough oxygen for 18 people every day

FACT

During a heavy rain, a healthy forest can absorb as much as 20,000 gallons of water in an hour

Economic Benefits

- Increased business value
- Increased home value
- Lower infrastructure and utility costs

FACT

Customers are willing to pay as much as 10% more for certain goods and services if businesses are located on tree-lined streets

FACT

Trees absorb and store an annual average of 13 pounds of carbon each year.

Health Benefits

- Increase in physical activity
- Increase in attention and focus
- Reduce asthma
- Mitigate illnesses and improve recovery

FACT

Health care costs associated with obesity top \$100 billion a year.

FACT

Post-operative hospital stays are shortened when patients have a view of trees and open spaces.

FACT

The American Lung Association estimates that ozone-associated health care costs Americans about \$50 billion annually.

Social Benefits

- Gathering places
- Reduction in domestic violence
- Reductions in crime
- Quality of life
- Aesthetics

FACT

Formulas have been developed that place a dollar value on trees and the benefits they provide. Tree values can reach more than \$30,000 for a single large tree in good condition.

Value of City Trees in Oxford

- City trees provide nearly \$10 of benefits for every \$1 in management costs.
- City trees provide \$239,890 in annual benefits.
- City trees provide net annual benefits that average \$131 per tree and \$86 per citizen.
- City trees provide annually \$124,453 in energy benefits, \$55,739 in stormwater benefits, \$4,511 in atmospheric carbon dioxide benefits, \$68,787 in stored carbon dioxide benefits, and \$59,093 in aesthetic and other benefits.

Value of City Trees in Oxford

- Water, willow, Southern red, and post oaks, along with pecans, sweetgums, and loblolly pines provide the greatest benefits on a per tree basis.
- Flowering dogwoods and water oaks are the most abundant city trees in Oxford, representing almost 30% of all city trees.
- The total replacement value for all city-owned trees is just over \$8 million dollars!

Biology

- Parts of a Tree
- Biological Needs

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
 - Buds are the site of apical growth increasing the height and width of the tree's overall crown
 - Leaves capture sunlight, absorb carbon dioxide, produce food (carbohydrates), and oxygen as a byproduct

Roots

- Woody roots
 - Structural
 - Permanent
 - Store carbohydrates
- Fibrous (feeder) roots and root hairs
 - Root hairs absorb water and nutrients
 - Temporary, living only 1 to 2 years, or less
 - Their function is enhanced by their symbiotic association with certain fungi, creating mycorrhizae

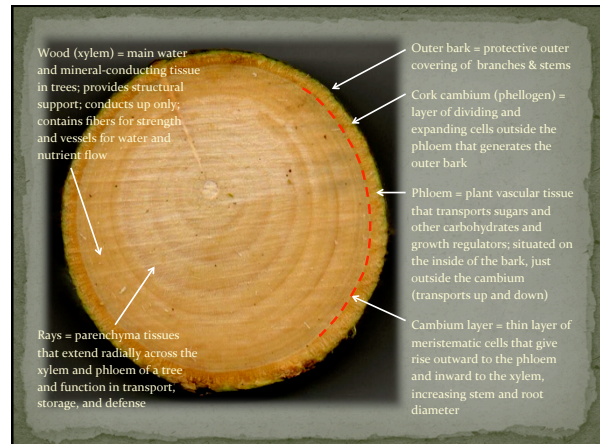
Location

- Most tree roots exist within the top 6 to 18 inches of soil
- They extend out from the tree 2 to 3 times the width of the crown
- Root plate
 - What the tree sits on
 - Encompasses the roots from the flare out 6 to 8 feet, until the roots become thumb-sized and rope-like



Trunk

- Supports the crown
- Transports water and minerals up the tree
- Contains growing points for lateral growth
- Size is commonly measured as DBH, the diameter at breast height, 4.5 feet above the ground



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

Biological Needs

- Trees need specific moisture and light conditions to thrive
- These needs vary by species
- Most importantly, tree roots have specific soil conditions that allow them to function in the uptake of water and nutrients

Soil Conditions

- Texture (type of particles)
- Structure (arrangement of particles)
- Pore space (50% is ideal)
 - Macropores (filled with air)
 - Micropores (filled with water)
- Organic materials, living and dead (5% is ideal)
- Mineral matter (45%)
- Oxygen/carbon dioxide balance
- pH—acidity (<7.0) or alkalinity (>7.0)
 - 5.8 to 7.0 is typical range for most native trees

Life Cycle

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

Newly Planted Trees

- Adjusting to their new site
- Require about 3 years to become established
- Maintenance needs include
 - Mulch
 - Watering
 - Training/pruning
 - Inspection
 - Protection



Tree Establishment

Discussion Topics

- Species, Tree, and Site Selection
- Transport and Handling
- Site Preparation and Planting
- After Planting Maintenance

Species, Tree, and Site Selection

- What comes first—species or site selection?
- If you need a tree for a specific site, then you select a species that matches the site
- If you want to plant a certain species, you must find a site that matches the species' requirements
- Consider the following when selecting a species/site
 - Available space
 - Soil conditions including soil moisture
 - Light conditions

Available Space

- Consider
 - Presence of overhead and underground utilities
 - Presence of hardscape—sidewalks, curbs, streets, walls
 - Amount of soil volume available
 - Presence of buildings
 - Pedestrian traffic
 - Vehicular traffic
- **DO NOT PLANT ANYTHING BUT A SMALL MATURING TREE BENEATH OVERHEAD UTILITY LINES**

Transport and Handling

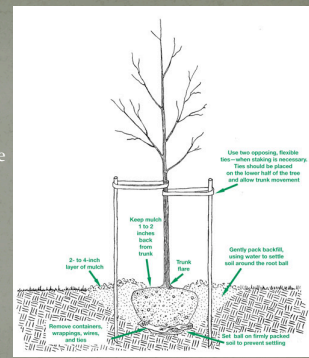
- Protect tree leaves and buds while transporting from nursery to storage to planting site by wrapping the tree with landscape fabric or a light tarp
- Protect the buds on the main leader—if it is knocked off, you will create a forked stem
- Protect the bark and avoid skinning the trunk or branches when the tree is moved
- Do not lift the tree by the trunk; lift only by the root ball or the straps around the root ball
- Do not store the trees on their sides, especially on pavement; this could burn and kill the cambium layer



Site Preparation and Planting

- Aerate the soil in the planting area
- Till, or dig and aerate the soil
- Create a shallow hole that is only as deep as the root ball but 2 to 5 times wider
- The more compacted the soil, the wider the hole should be
- The sides of the planting hole should be sloped inward toward the center
- The sides of the planting hole should be broken up, scarified, to encourage root penetration out of the planting hole

- Set the tree on firmly packed, undisturbed soil
- First roots should be 2 inches or less below the soil surface
- Remove all straps, twine, wire basket, and burlap
- Fill the hole only with the original soil
- Use water to settle the soil, watering half-way through the fill process
- Do not form a soil ring
- Stake only if necessary as in the diagram
- Apply 2 to 4 inches of good quality organic mulch



Drawing from International Society of Arboriculture, www.treesaregood.com, used with permission

After Planting Maintenance

- Water
 - The larger the tree at planting, the longer the time (months) it will need to be watered; the smaller the tree, the shorter the time
 - Water 2 to 3 times a week for the first 2 to 3 months in the ground
 - Water at least weekly during the first growing season
 - Apply 2 to 3 gallons of water per inch of trunk diameter
 - Water directly over the root ball

From the University of Florida, Department of Environmental Horticulture website, *Irrigation After Planting* by Dr. Edward Gilman, <http://hort.ifas.ufl.edu/woody/irrigation2.html>



Watering aids such as Treegators, Ooze Tubes, Treecamels, or buckets with a small hole in the bottom can be used to water trees slowly without runoff.

Treegators hold 20 gallons of water and 2 can be zipped together as seen in this photo.

Mulching

- Why do you mulch trees?
- What type of mulch do you use?
- Where do you mulch trees?
- When do you mulch trees?

Mulching

- Tree **ROOTS** should be mulched, at least annually, to:
 - Recreate natural forest conditions
 - Conserve soil moisture
 - Improve soil aeration, structure, and drainage
 - Increase organic matter content
 - Improve soil fertility (some types)
 - Moderate soil temperatures
 - Suppress weeds
 - Reduce damage by mowers and weed trimmer close to tree trunks
 - Reduces erosion
 - Give landscape a well cared for and uniform look

From the International Society of Arboriculture, *Proper Mulching Techniques*, www.treesaregood.org

Inorganic Mulches

- Inorganic mulches do not improve soil structure, add organic materials, or provide nutrients
- Do not decompose and do not have to be replaced often
- Types of inorganic mulches
 - Stone
 - Lava rock
 - Pulverized rubber
 - Geotextile fabrics
 - Black plastic

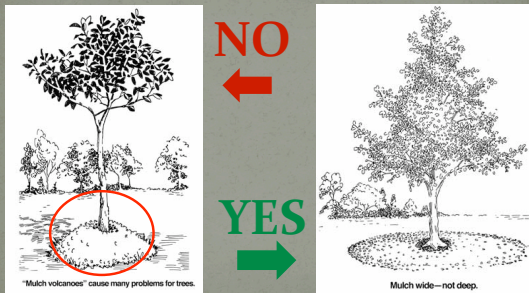
From the International Society of Arboriculture, *Proper Mulching Techniques*, www.treesaregood.org

Organic Mulches

- Decompose in the landscape and improve soil quality and fertility
- Must be replenished regularly
- Types of organic mulches
 - Wood chips (aged at least 3 months)
 - Pine needles
 - Hardwood and softwood bark
 - Leaves
 - Compost mixes
 - Cocoa hulls, pecan shells, peanut hulls
- Choose a material that best matches the tree's own leaf litter characteristics, especially pH

From the International Society of Arboriculture, *Proper Mulching Techniques*, www.treesaregood.org

Mulching



From the International Society of Arboriculture, *Proper Mulching Techniques*, www.treesaregood.org; used with permission.



Good Mulching

- Looks like good quality organic mulch (composted wood chips)
- Mulch could be a little thicker
- Mulch bed has been edged possibly damaging roots near the surface
- Dripline is still farther out than edge of mulch
- Keep mulch pulled away from the trunk

Mulching Techniques

- Limit the depth to 2 to 4 inches
- Replenish regularly, but avoid top dressing and over-mulching
- Mulch out to the tree's dripline
- Keep mulch 6 inches away from the trunk of the tree
- Expand the mulch ring every year as the dripline distance increases
- Avoid using mulch from large piles of leaves or wood chips going through anaerobic (low oxygen, high moisture) decomposition due to high acidity and toxic byproducts (alcohol, methane)

From the International Society of Arboriculture, *Proper Mulching Techniques*, www.treesaregood.org

Inspection

- Look for signs of stress, including branch dieback
- Look for signs and symptoms of insect or disease problems
- Keep records of tree planting locations, species and cultivars, and survival
- Remove stakes and ties after the first growing season
- Begin training pruning in winter after the first growing season



The Tree Planter's Pledge

- *I WILL plant trees where they have room to grow to maturity, without restriction.*
- *I WILL only plant small maturing trees beneath overhead utility lines to avoid future conflicts.*
- *I WILL handle trees with care while they are transported from the nursery to the planting site, cover them during transport, avoid wounding the trunk or limbs, store them in a cool environment, and keep the root ball moist at all times.*
- *I WILL NEVER lift or move trees by the trunk.*

- *I WILL remove all wire, burlap, straps, and twine from root balls prior to filling the planting hole to avoid eventual root and stem girdling or water wicking out of the planting hole.*
- *I WILL plant trees at the depth they would be if naturally occurring (first order roots within 2 inches of the soil surface) to avoid conditions favorable for the development of stem girdling roots.*
- *I WILL NOT create a soil ring around the trunk unless runoff is unavoidable.*

- *I WILL mulch trees annually with good quality organic mulch for the benefit of tree roots, expanding the mulch area as the tree and its roots grow.*
- *I WILL NEVER pile mulch around the trunk “volcano” style to avoid trunk decay and discourage stem girdling roots.*
- *I WILL water newly planted trees regularly in the absence of rainfall until they are well established (up to 3 years) to ensure survival and reduce tree planting costs.*

- *I WILL only stake trees if necessary and I WILL remove all staking and wires after 1 year to avoid girdling the stem and reducing tree health and longevity.*
- *I WILL prune young trees to train their structure beginning 1 year after planting, removing forked stems which could later develop included bark, and then prune as needed thereafter to increase their long-term health, strength, and safety.*

Some Final Thoughts...

- **You have the most impact on tree health in your community.**
- **You can keep city trees healthy by maintaining them according to standards.**
- **PLANT TREES RIGHT!**
- **MULCH TREES PROPERLY!**
- **PRUNE TREES PROPERLY and REGULARLY!**
- **PROTECT TREES AND THEIR ROOTS!**
- **NEVER TOP TREES!**



THANK YOU!

Connie Head
Consulting Urban Forester
Technical Forestry Services
706.202.5279 / tfshead@aol.com