



Tree Planting

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City of Fort Worth, Forestry Section

Dig Hole



Insert Tree



Questions?

Planting/Transplanting Trees

- What's the objective?
 - Shade
 - Aesthetics
 - Screening
 - Windbreak
 - Storm Water Abatement
 - Air Quality
 - Physical Barrier
 - Wellness
 - Food
 - Wildlife
 - Erosion
 - Building materials
 - Exercise/Fun/Profit

- **Pre-planting Considerations**
 - Site Selection / Assessment
 - Species Selection
 - Stock Types
- **The Planting Process**
 - Container Trees
 - Ball and Burlap Trees
 - Bare Roots
- **After Care**

Site Selection / Assessment

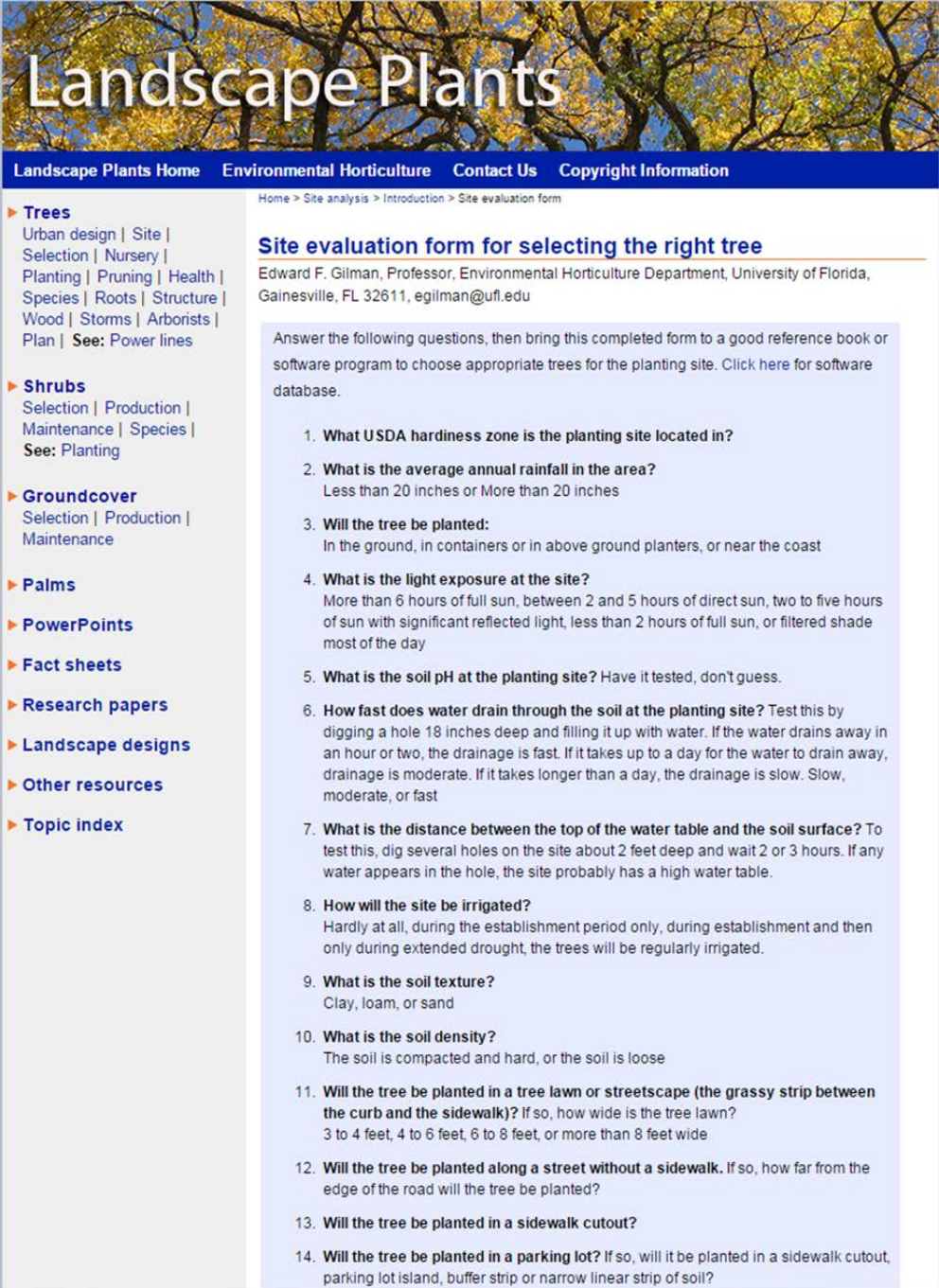
- Soils
- Light
- Topography/Slope
- Wind
- Water
- Maintenance
- Needs
- Conflicts
- Future Considerations

Site Evaluation and Selection

27 Site Considerations

(#27 lists fourteen different aspects)

9 page publication to elaborate



The screenshot shows the 'Landscape Plants' website. The header features the title 'Landscape Plants' in a large, white, serif font against a background of trees with yellow autumn leaves. Below the header is a blue navigation bar with links: 'Landscape Plants Home', 'Environmental Horticulture', 'Contact Us', and 'Copyright Information'. A breadcrumb trail reads 'Home > Site analysis > Introduction > Site evaluation form'. The main content area is divided into two columns. The left column contains a sidebar with a list of topics: 'Trees', 'Shrubs', 'Groundcover', 'Palms', 'PowerPoints', 'Fact sheets', 'Research papers', 'Landscape designs', 'Other resources', and 'Topic index'. Each topic is preceded by a right-pointing triangle icon. The 'Trees' section is expanded, showing sub-links for 'Urban design | Site | Selection | Nursery | Planting | Pruning | Health | Species | Roots | Structure | Wood | Storms | Arborists | Plan | See: Power lines'. The right column features the title 'Site evaluation form for selecting the right tree' in blue, followed by the author's name: 'Edward F. Gilman, Professor, Environmental Horticulture Department, University of Florida, Gainesville, FL 32611, egilman@ufl.edu'. Below this is a light blue box containing the instructions: 'Answer the following questions, then bring this completed form to a good reference book or software program to choose appropriate trees for the planting site. Click here for software database.' This is followed by a numbered list of 14 questions regarding site characteristics such as USDA hardiness zone, rainfall, light exposure, soil pH, drainage, and tree placement.

Landscape Plants

[Landscape Plants Home](#) [Environmental Horticulture](#) [Contact Us](#) [Copyright Information](#)

Home > Site analysis > Introduction > Site evaluation form

- ▶ **Trees**
Urban design | Site | Selection | Nursery | Planting | Pruning | Health | Species | Roots | Structure | Wood | Storms | Arborists | Plan | **See: Power lines**
- ▶ **Shrubs**
Selection | Production | Maintenance | Species | **See: Planting**
- ▶ **Groundcover**
Selection | Production | Maintenance
- ▶ **Palms**
- ▶ **PowerPoints**
- ▶ **Fact sheets**
- ▶ **Research papers**
- ▶ **Landscape designs**
- ▶ **Other resources**
- ▶ **Topic index**

Site evaluation form for selecting the right tree

Edward F. Gilman, Professor, Environmental Horticulture Department, University of Florida, Gainesville, FL 32611, egilman@ufl.edu

Answer the following questions, then bring this completed form to a good reference book or software program to choose appropriate trees for the planting site. Click here for software database.

1. **What USDA hardiness zone is the planting site located in?**
2. **What is the average annual rainfall in the area?**
Less than 20 inches or More than 20 inches
3. **Will the tree be planted:**
In the ground, in containers or in above ground planters, or near the coast
4. **What is the light exposure at the site?**
More than 6 hours of full sun, between 2 and 5 hours of direct sun, two to five hours of sun with significant reflected light, less than 2 hours of full sun, or filtered shade most of the day
5. **What is the soil pH at the planting site?** Have it tested, don't guess.
6. **How fast does water drain through the soil at the planting site?** Test this by digging a hole 18 inches deep and filling it up with water. If the water drains away in an hour or two, the drainage is fast. If it takes up to a day for the water to drain away, drainage is moderate. If it takes longer than a day, the drainage is slow. Slow, moderate, or fast
7. **What is the distance between the top of the water table and the soil surface?** To test this, dig several holes on the site about 2 feet deep and wait 2 or 3 hours. If any water appears in the hole, the site probably has a high water table.
8. **How will the site be irrigated?**
Hardly at all, during the establishment period only, during establishment and then only during extended drought, the trees will be regularly irrigated.
9. **What is the soil texture?**
Clay, loam, or sand
10. **What is the soil density?**
The soil is compacted and hard, or the soil is loose
11. **Will the tree be planted in a tree lawn or streetscape (the grassy strip between the curb and the sidewalk)?** If so, how wide is the tree lawn?
3 to 4 feet, 4 to 6 feet, 6 to 8 feet, or more than 8 feet wide
12. **Will the tree be planted along a street without a sidewalk.** If so, how far from the edge of the road will the tree be planted?
13. **Will the tree be planted in a sidewalk cutout?**
14. **Will the tree be planted in a parking lot?** If so, will it be planted in a sidewalk cutout, parking lot island, buffer strip or narrow linear strip of soil?

Texas Tree Planting Guide

Texas Tree Planting Guide

HOME | FAQ



Express Tree Selector

The quickest way to find the best trees for your yard



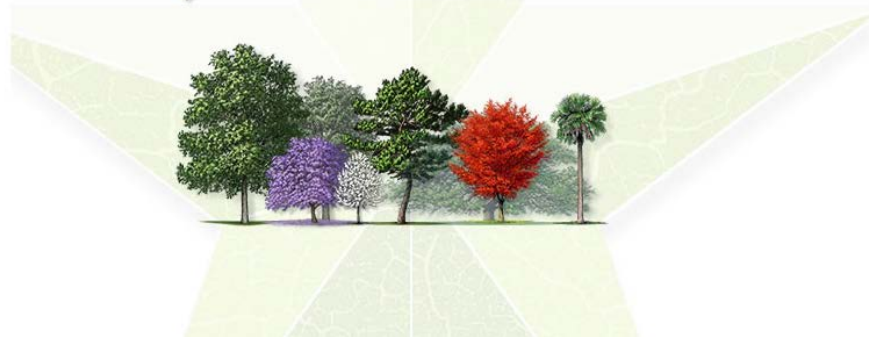
Custom Tree Selector

Gives you more choices for trees to plant in your yard



Tree Planting & Care

More info to help you buy, plant and care for your new tree



<http://texastreeplanting.tamu.edu>

A Visual Approach

Texas Tree Planting Guide

HOME | FAQ



Tree Planting Tools

Click on images below to view full illustrated guidelines.

Planning Before You Plant

-  Landscaping Around Your House
-  Planning For Your Available Space
-  Planting for Energy Efficiency

Knowing What to Avoid

-  Avoiding Problems With Your Tree
-  Planting Near Utility Lines
-  How to Select a Tree At the Nursery

Tree Planting and Maintenance

-  The Best Way to Plant Your Tree
-  Pruning Your Young Tree
-  How Big Your Tree Will Grow

<http://texastreeplanting.tamu.edu/TreePlantingTools.html>

Landscaping Around Your House

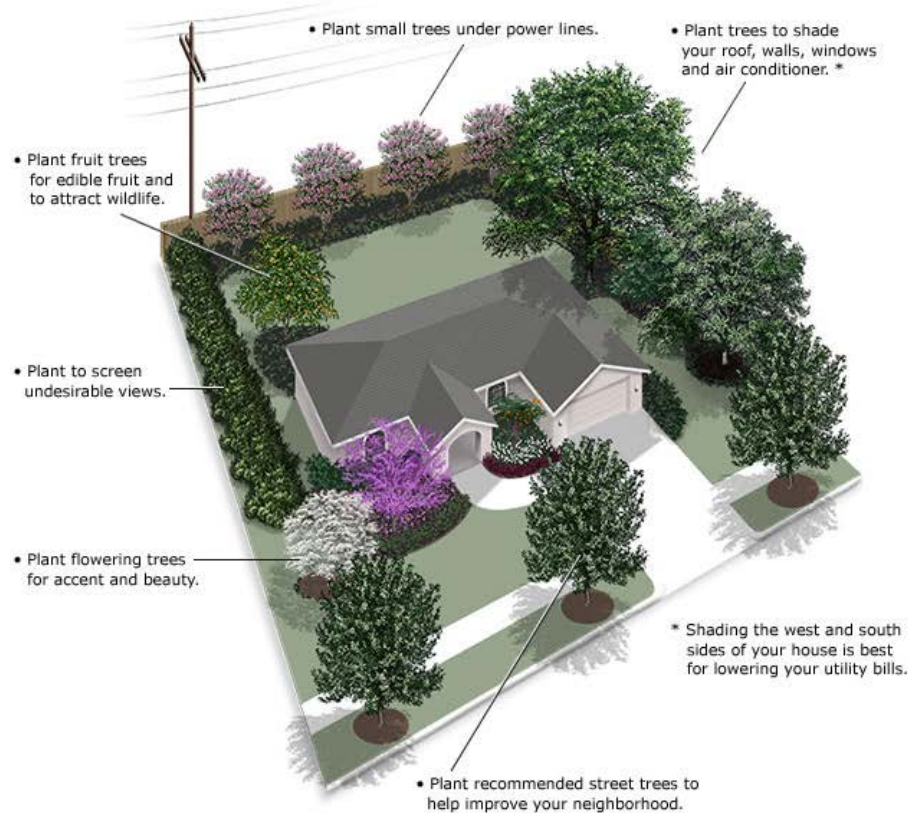


Illustration Copyright © Robert O'Brien



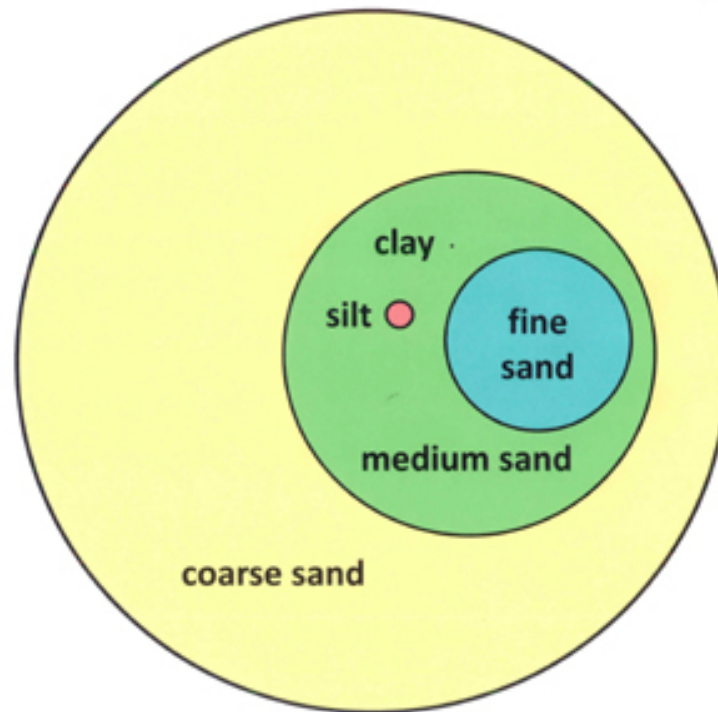
(en Español)



Site Selection / Assessment

- **Soils**

- Texture Class/Structure ([sand](#), silt, clay)
- Drainage
- pH
- Fertility



In-Field Soil Type Test(s)



IDENTIFY YOUR SOIL TYPE

the jar test

- 1 Fill a clear glass jar halfway with your soil sample.
- 2 Fill the remaining half with water, leaving 1" of air.
- 3 Attach lid, then shake the jar vigorously until you have broken up any clumps of soil.
- 4 Set the jar aside to rest, undisturbed, overnight.

After 24 hours your jar's contents will have settled into distinct layers:

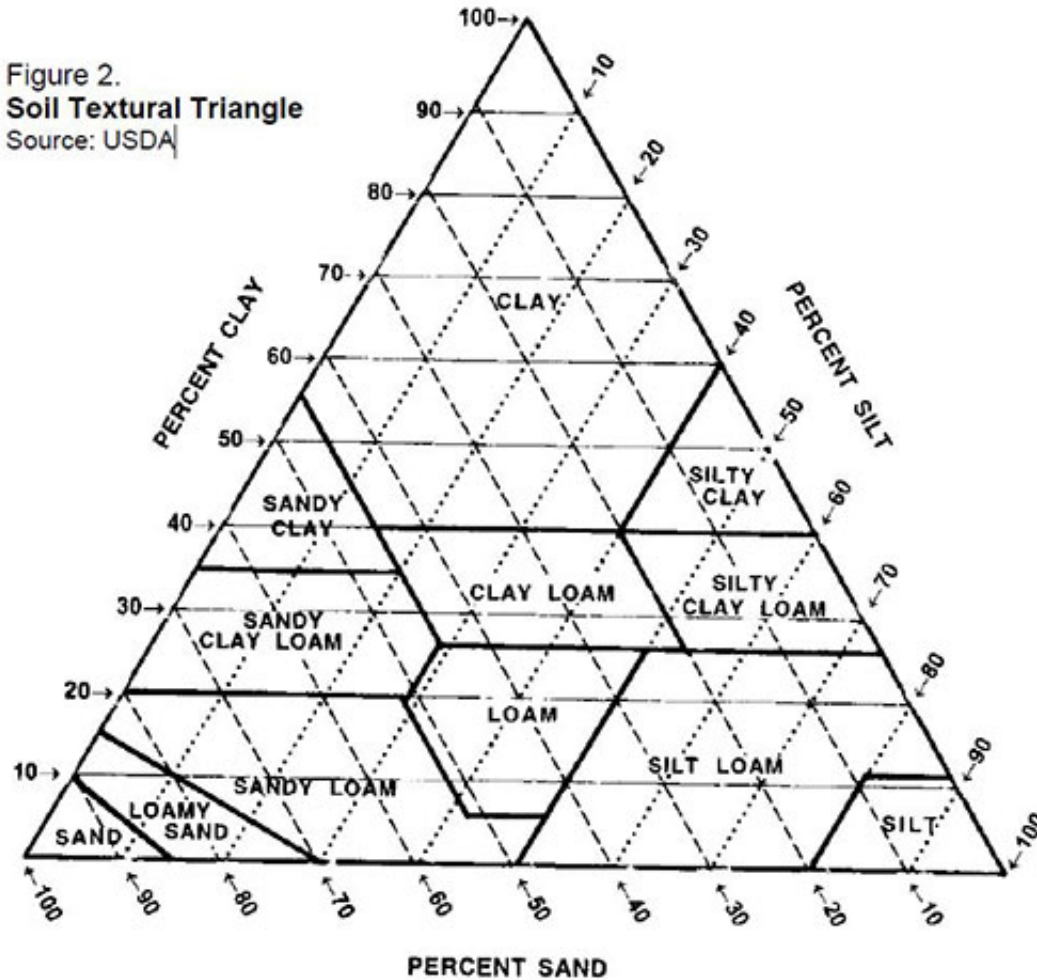
SAND

SILT

CLAY

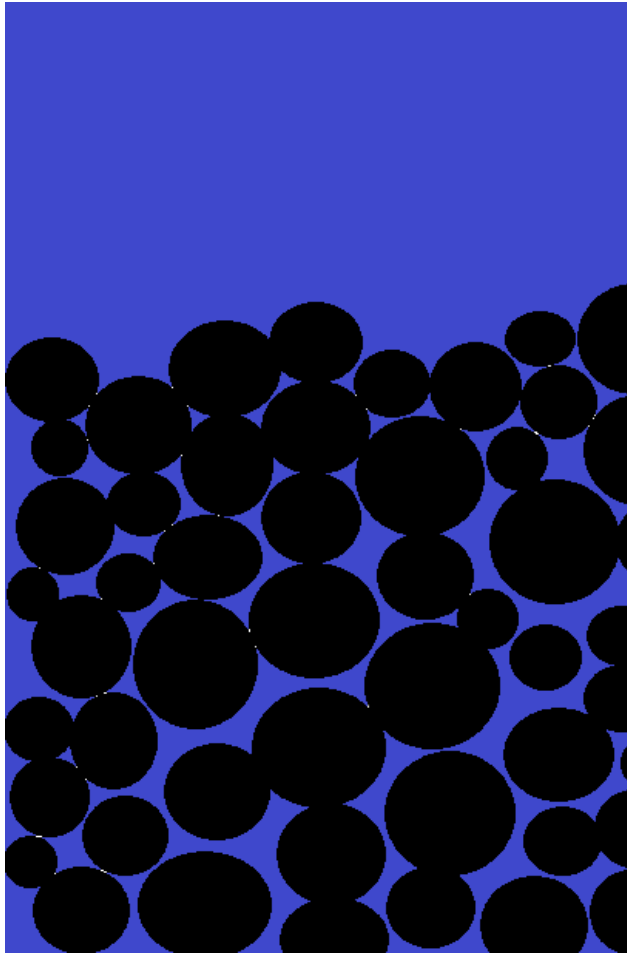
Soil Texture Classes

Figure 2.
Soil Textural Triangle
Source: USDA

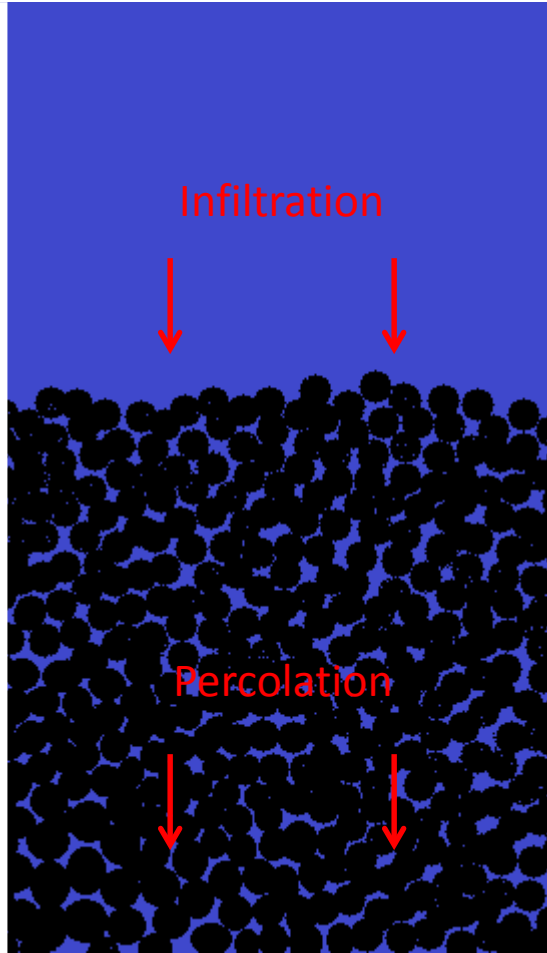


Drainage-Infiltration / Percolation

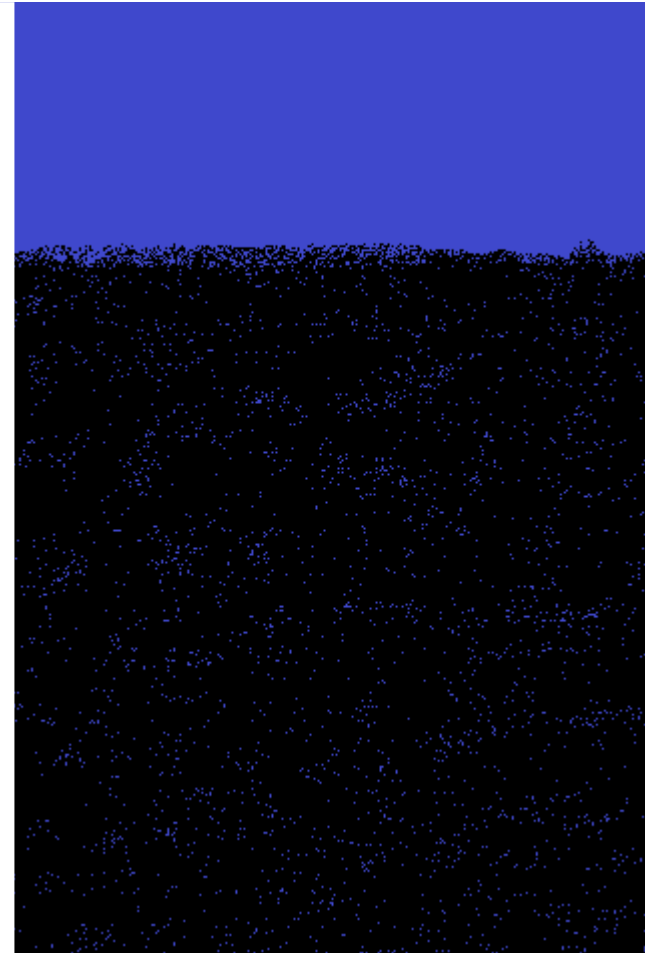
Sand



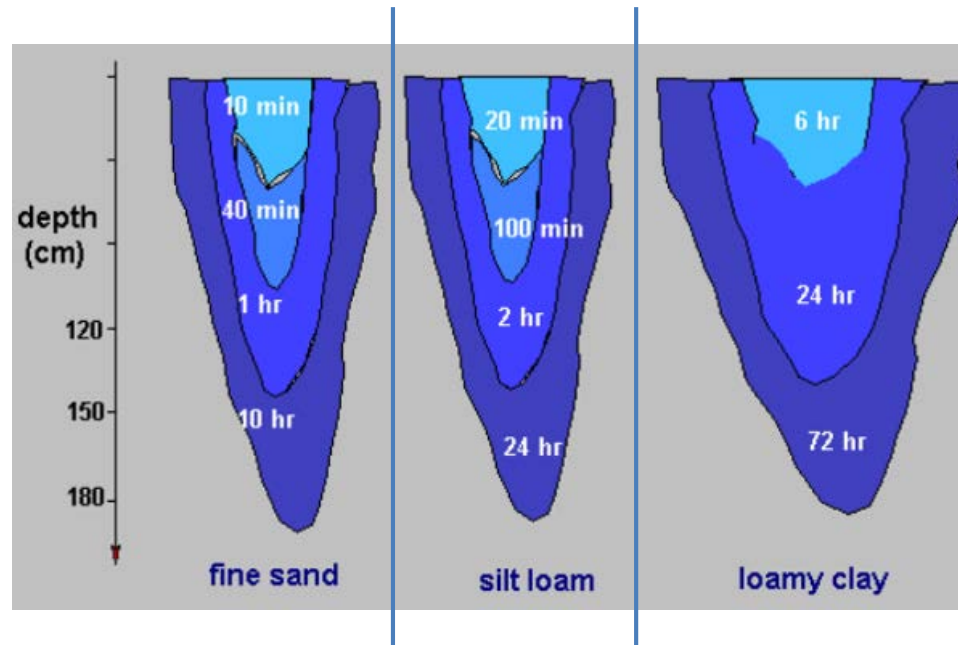
Silt



Clay



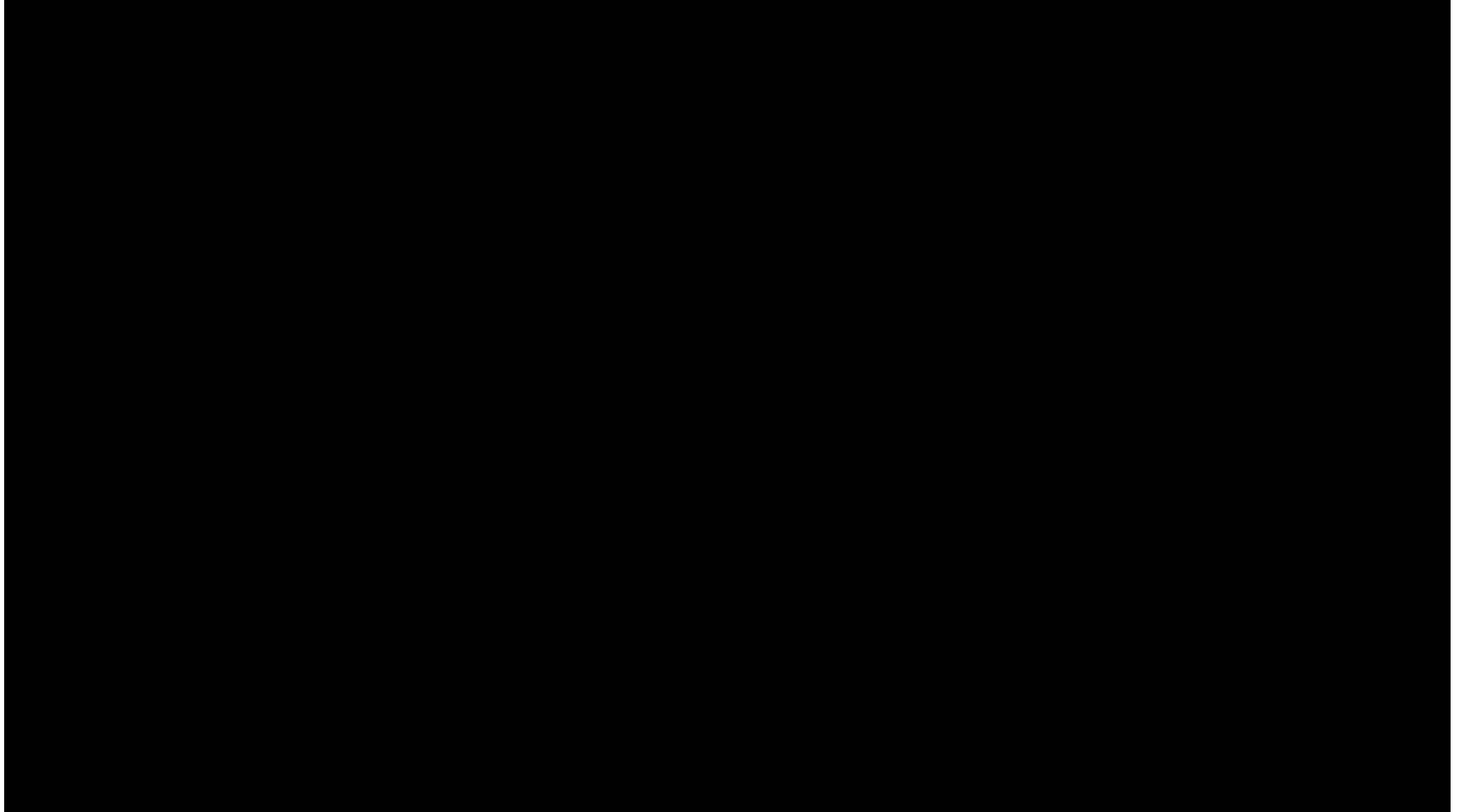
Water Movement in Soil



Note the dramatic differences in percolation time and distribution patterns between soil types



Water Movement in Soil



Soil Horizons



O (humus or organic)

A (topsoil)

E (eluviated horizon)

B (subsoil)

C (parent material)

R (bedrock)

O HORIZON

Surface litter:
Partially decomposed
organic matter

A HORIZON

Topsoil: Humus, living
creatures, inorganic
minerals

E HORIZON

Zone of leaching, mate-
rials move downward

B HORIZON

Subsoil: iron, aluminium
humic compounds are
accumulated and clay
leached down from A
and E horizons

C HORIZON

Weathered parent
material: Partial break-
down of inorganic
minerals

R HORIZON

Bedrock

Soil pH

“An acid is defined as a substance that tends to release hydrogen ions (H^+). Conversely, a base is defined as a substance that releases hydroxyl ions (OH^-). All acids contain hydrogen ions, and the strength of the acid depends upon the degrees of ionization (release of hydrogen ions) of the acid. The more hydrogen ions held by the exchange complex of a soil in relation to the basic ions held (Ca, Mg, K), the greater the acidity of the soil.”

Soil pH For The Rest Of Us

Concentration of Hydrogen ions compared to distilled water	1/10,000,000	14	Liquid drain cleaner, Caustic soda
	1/1,000,000	13	bleaches, oven cleaner
	1/100,000	12	Soapy water
	1/10,000	11	Household Ammonia (11.9)
	1/1,000	10	Milk of magnesium (10.5)
	1/100	9	Toothpaste (9.9)
	1/10	8	Baking soda (8.4), Seawater, Eggs
	0	7	"Pure" water (7)
	10	6	Urine (6) Milk (6.6)
	100	5	Acid rain (5.6) Black coffee (5)
	1,000	4	Tomato juice (4.1)
	10,000	3	Grapefruit & Orange juice, Soft drink
	100,000	2	Lemon juice (2.3) Vinegar (2.9)
	1,000,000	1	Hydrochloric acid secreted from the stomach lining (1)
10,000,000	0	Battery Acid	

Typical Soil Range

Soil Fertility

2525 Joe B Rushing Rd
Fort Worth, TX 76119

Sample received on: 12/9/2014
Printed on: 12/22/2014
Area Represented: 39000 sqft

Tarrant County
Laboratory Number: 424467
Customer Sample ID: F1M
Crop Grown: SHADE TREES

Analysis	Results	CL*	Units	ExLow	VLow	Low	Mod	High	VHigh	Excess.	Fertilizer Recommended	
pH	7.6	(6)	-	Slightly Alkaline								
Conductivity	592	(-)	umho/cm	Slight							CL*	Fertilizer Recommended
Nitrate-N	16	(-)	ppm**									0.7 lbs N/1000sqft
Phosphorus	154	(50)	ppm									0 lbs P2O5/1000sqft
Potassium	442	(175)	ppm									0 lbs K2O/1000sqft
Calcium	10,764	(180)	ppm									0 lbs Ca/1000sqft
Magnesium	277	(50)	ppm									0 lbs Mg/1000sqft
Sulfur	19	(13)	ppm									0 lbs S/1000sqft
Sodium	26	(-)	ppm									
Iron	32.74	(4.25)	ppm									
Zinc	6.48	(0.27)	ppm									
Manganese	6.58	(1.00)	ppm									
Copper	2.25	(0.16)	ppm									
Boron	1.31	(0.60)	ppm									
Limestone Requirement										0.00 lbs/1000sqft		
Textural Analysis Test (hydrometer)				Detailed Salinity Test (Saturated Paste Extract)								
Sand	43	%		pH	7.4							
Silt	18	%		Conductivity	0.72 mmhos/cm							
Clay	39	%		Sodium	37 ppm	1.611 meq/L						
Textural Class:	Clay Loam			Potassium	10 ppm	0.268 meq/L						
Organic Matter	4.11	%		Calcium	175 ppm	8.743 meq/L						
				Magnesium	7 ppm	0.604 meq/L						
				SAR	0.75							
				SSP	14.35							

*CL=Critical level is the point which no additional nutrient (excluding nitrate-N, sodium and conductivity) is recommended. **ppm=mg/kg

Phosphorus: Phosphorus is highly elevated, avoid phosphorus containing fertilizers and organics for the next 5 years, retest annually.

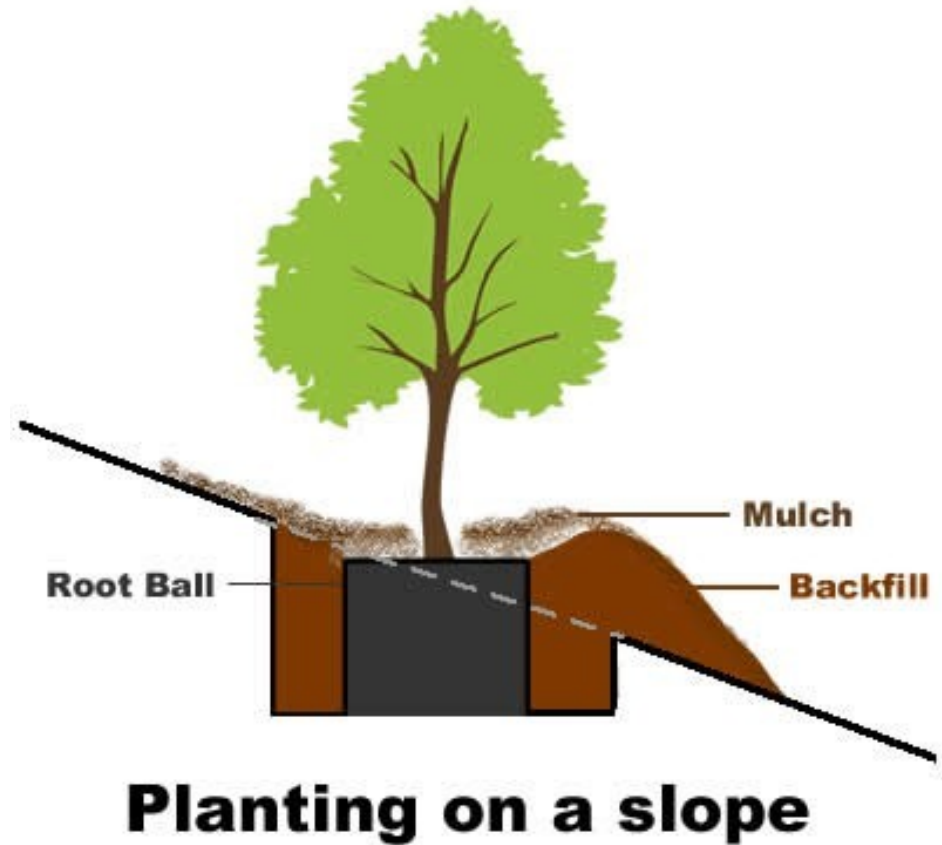
Site Selection / Assessment

- **Light**

- Reflected light and/or reflected heat
- Exposure affects soil moisture
- Shade Tolerant: most maples and hollies, persimmon, redbud, rusty blackhaw, roughleaf dogwood, red mulberry, Eve's necklace, Carolina buckthorn
- Shade Intolerant: most pines and junipers, pecan, black walnut, desert willow, sycamore, willows
- Somewhere In-Between: most oaks, ash, hackberry/sugarberry

Site Selection / Assessment

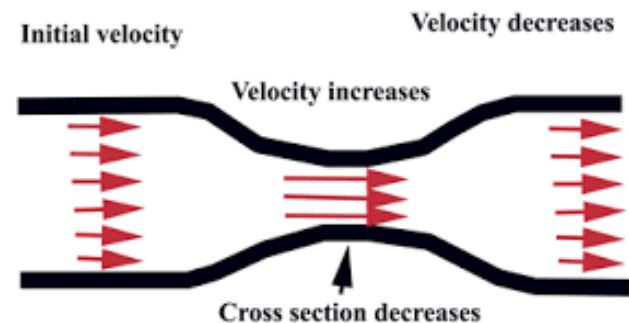
- **Topography/Slope**
 - Movement of water is downslope
 - Top of hill dries out quickly
 - Bottom of hill may stay wetter than expected
 - Western/southern exposures



Site Selection / Assessment

- **Wind**

- Growing conditions affect failure susceptibility (limited soil space, deflected roots, shallow soil)
- Species prone to breakage/toppling
- Increased evapotranspiration
- Venturi effect / Downdraft effect



Site Selection / Assessment

- **Water**

- Establishment period
- Watering methods
- Persistently wet/dry soils
- Correlation to other site characteristics

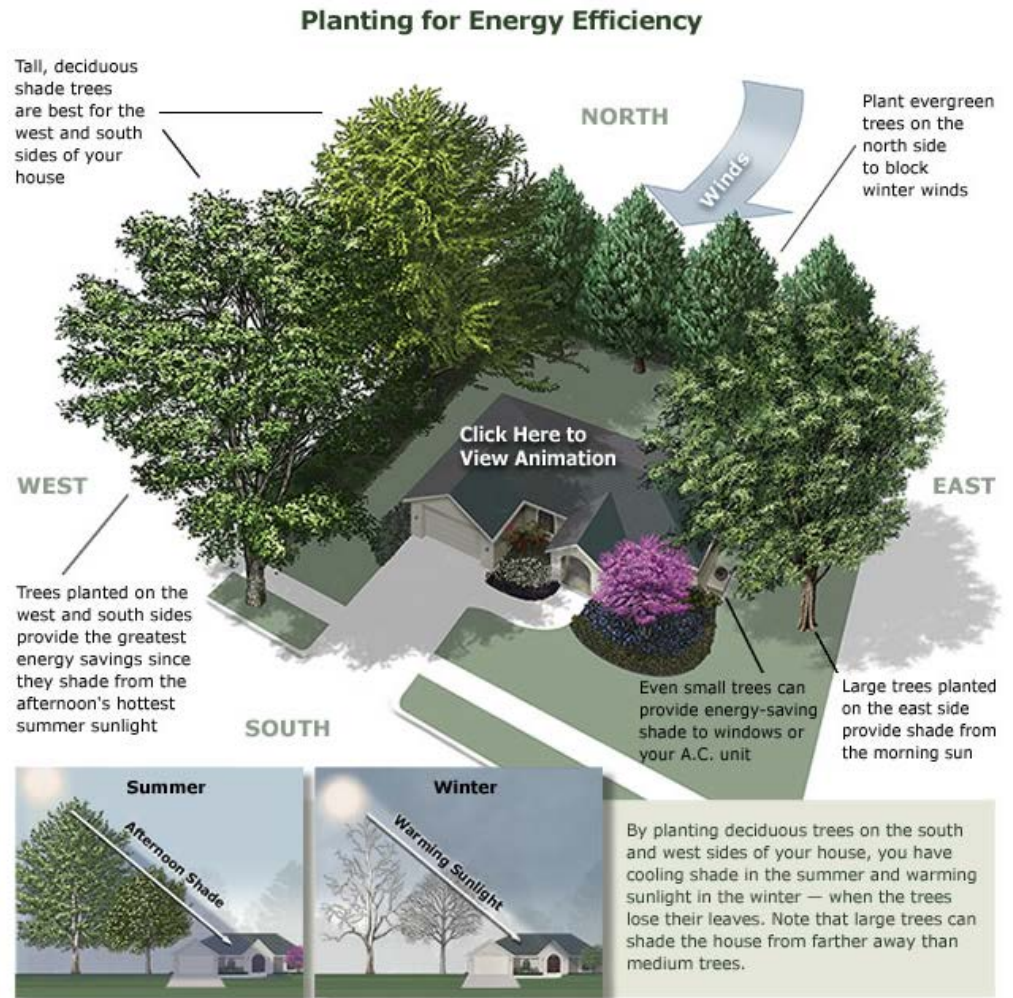
- **Maintenance**

- Ease of access
- Increased maintenance due to location?

Site Selection / Assessment

- **Needs**

- Shade
- Energy efficiency
- Wind screen
- Noise buffer
- Aesthetics
- Food
- Wildlife



Site Selection / Assessment

- **Conflicts**

- Wires
- Signs/Signals
- P.O.S.E
- Property Lines
- Legal Restrictions

- **Future Considerations**

- Room to Grow
- Visibility
- Maintenance

Avoiding Problems With Your Tree

- Avoid blocking visibility of traffic signs or street corners.



- Avoid planting trees too close together.

- Avoid planting too close to house, chimney or other structure.



- Avoid planting too close to sidewalks, streets or driveways.

- Avoid blocking access to utility transformers.

- Avoid planting large trees near utility lines. Plant trees smaller than 20 feet instead.



Also Avoid:

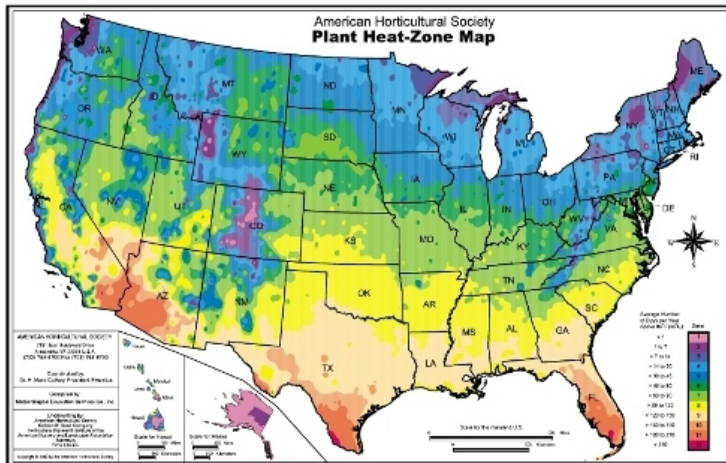
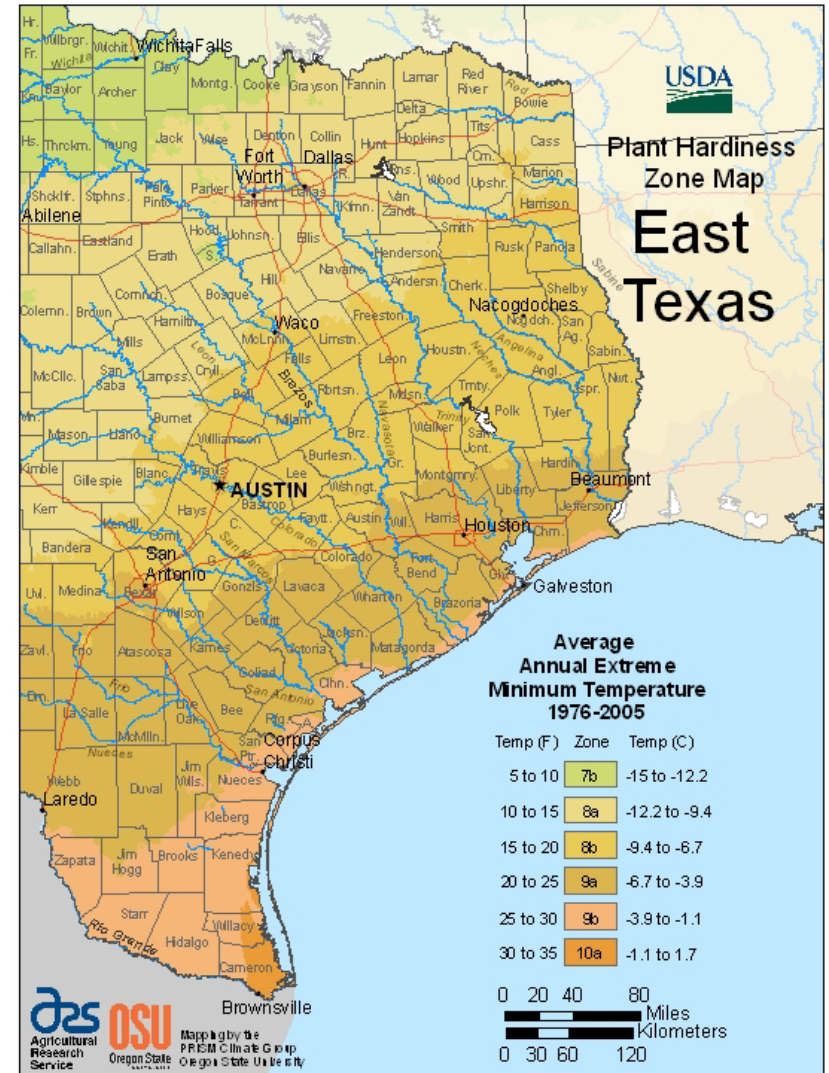
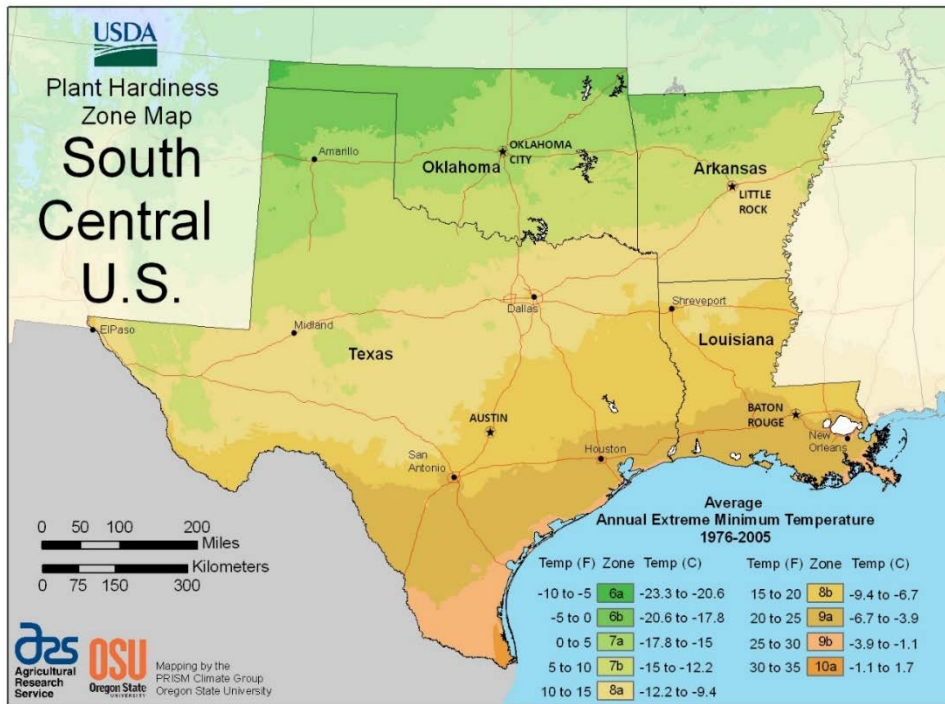
- Encroaching on a neighbor
- Blocking views
- Shading garden

Species Selection

** Often goes hand-in-hand with site selection **

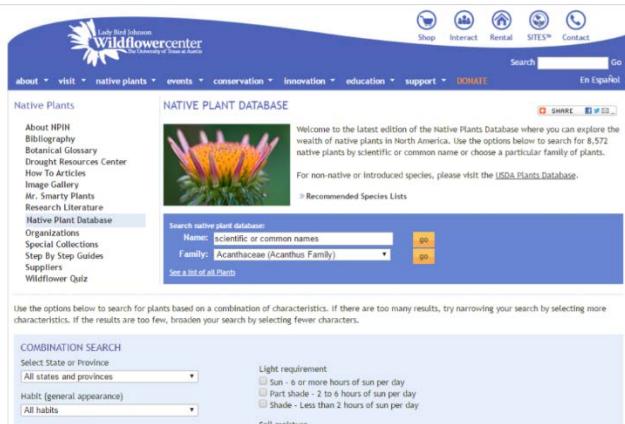
- Mature Size (large, medium, small)
 - How large is “large”?
- Hardiness/Heat Zones
- Light/Water/Soil Requirements
- Native, Adapted or Both?
- Evergreen vs Deciduous
- Hazardous Potential
 - Requires a “target”
- Disease/Pest/Character Flaws

Hardiness / Heat Zones



Species Selection

- Numerous sources available
- Use local/regional tools when possible
- Observe your surroundings
- Availability is greatest limiting factor



A B C D E F G H I J K L M N O P Q R S T U V W X Y Z ALL



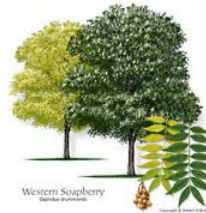
Silverbell, Two-winged
Common Name: Two-winged Silverbell
Halesia diptera
Tree Size: Small
Leaf Type: Deciduous
Comments: Makes a nice patio specimen

[More About this Tree](#)



Smoketree, American
Common Name: American Smoketree
Cotinus obovatus
Tree Size: Small
Leaf Type: Deciduous
Comments: One of the best trees for fall color. Might be hard to find in the nursery.

[More About this Tree](#)



Soapberry, Western
Common Name: Western Soapberry
Sapindus drummondii
Tree Size: Medium
Leaf Type: Deciduous
Comments: Bright yellow fall color and large, amber berries in fall through winter.

[More About this Tree](#)



Sumac, Prairie Flameleaf
Common Name: Prairie Flameleaf Sumac
Rhus lanceolata
Tree Size: Small
Leaf Type: Deciduous
Comments: Root sprouts and suckers require regular maintenance to keep tree shape.

[More About this Tree](#)



Sweetgum
Common Name: Sweetgum
Liquidambar styraciflua
Tree Size: Large
Leaf Type: Deciduous

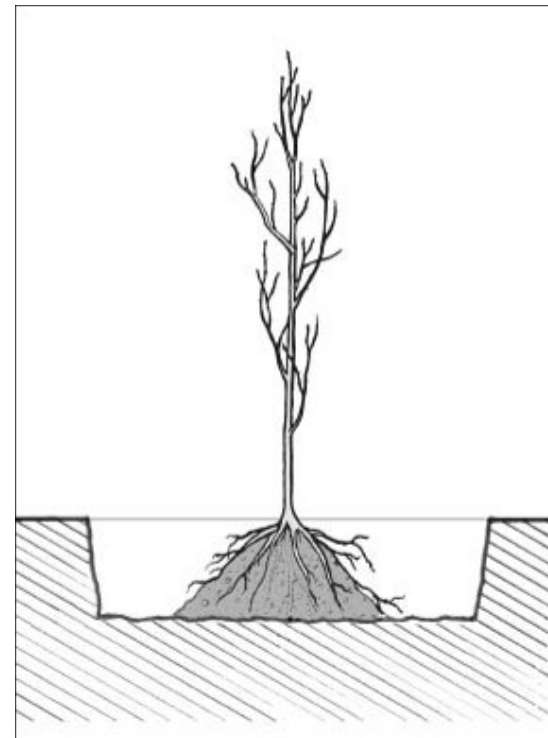


Sycamore
Common Name: Sycamore
Platanus occidentalis
Tree Size: Large
Leaf Type: Deciduous
Comments:

Stock Types

- **Bare Root**

- Shortest window for planting
- Common method for fruit trees
- Popular for mass planting or mitigation sites
- Method may be applied to other stock types
- Roots are visible
- Take extra care with grafted trees



Missouri Gravel Bed

- Adaptation of bare root method
- Uses gravel/sand substrate with regular irrigation
- Produces lots of fine absorbing roots
- Not a growing method, but a planting preparation method
- Fine roots can dry out very quickly
- Preparation of stock to prep for MGB stage is labor intensive
- Can be affordable way to utilize bare roots with greater survival rates



Stock Types

- **Ball and Burlap (B&B)**
 - Common with very large material
 - Mortality rate can be a concern
 - Requires either special equipment or is very labor intensive
 - Lower cost of production than containers
 - Root condition is a mystery



Stock Types

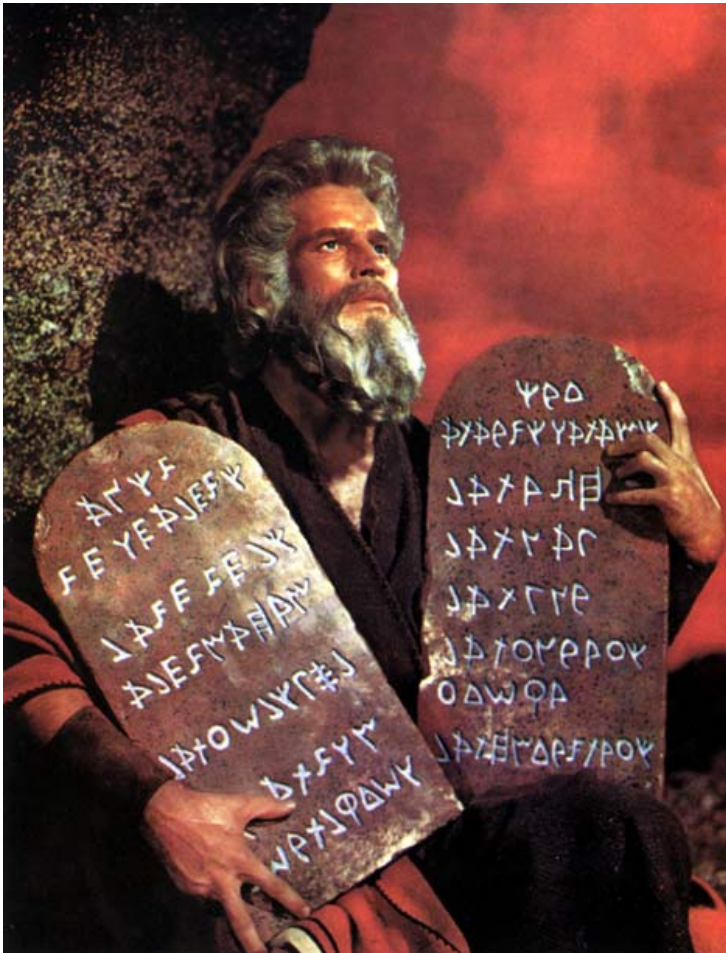
- **Container Trees**

- Available in many sizes
- Can be planted year-round
- Typically lower level of “transplant shock”
- Root system can likely be inspected
- Root defects are common
- Production is expensive (high initial outlay)



The Planting Process

The 11th Commandment



- Thou shalt plant a \$10 dollar tree in \$100 hole (rather than a \$100 tree in a \$10 hole).

General Considerations

- Trees are an investment

- Initial outlay
- Ongoing maintenance (best spent early)
- Dividend yield (benefits...the longer the better)

- Timing

- Fall, Winter, Spring, Summer

- Legal Obligations

- Call before you dig (two business days prior)
- Dial 811 or visit www.texas811.org
- Contractor's responsibility if work is "hired out"

$$0 = CF_0 + \frac{CF_1}{(1+IRR)} + \frac{CF_2}{(1+IRR)^2} + \frac{CF_3}{(1+IRR)^3} + \dots + \frac{CF_n}{(1+IRR)^n}$$

Or

$$0 = NPV = \sum_{n=0}^N \frac{CF_n}{(1+IRR)^n}$$



Root Flare

- Find/expose the root flare
 - aka trunk flare
- Important area for air/gas exchange
- Exposed flares have lower probability for girdling roots and decay
- Exposing flares often uncovers root defects
- Growth rate greatly diminished and mortality significantly higher when planted too deep
- Beware of grafted trees



The Hole Truth

- Dig a hole 2-5 times the width of the root ball, but only as deep as the top of the root flare (slightly less is often even better)
- Saucer shaped hole aids in root spread
- Keep the soil in piles near the edge of the planting hole (you'll need it)
- Break up any glazing on the walls of the hole
- Checking depth
- Digging deeper
- Peds/Clods/Rocks/Other stuff



Placing the Tree (Containers)

- Remove the container (roll, slide, cut, etc.)
- Support the weight of the tree by the root ball, not the trunk or limbs (except with bare root and MGB trees)
- Place tree in center of hole and upright (check from multiple sides)
- Check and recheck depth
- Lift (by root ball) and fill/pack, as needed
- Pay attention to scaffold branches to determine if tree needs to be turned



Root of the Problem

- Any container grown tree may be prone to circling roots
- Shaving is most effective
- Slicing is better than nothing
- Both methods can be done with some success on large root balls after tree is in hole with a sharp spade



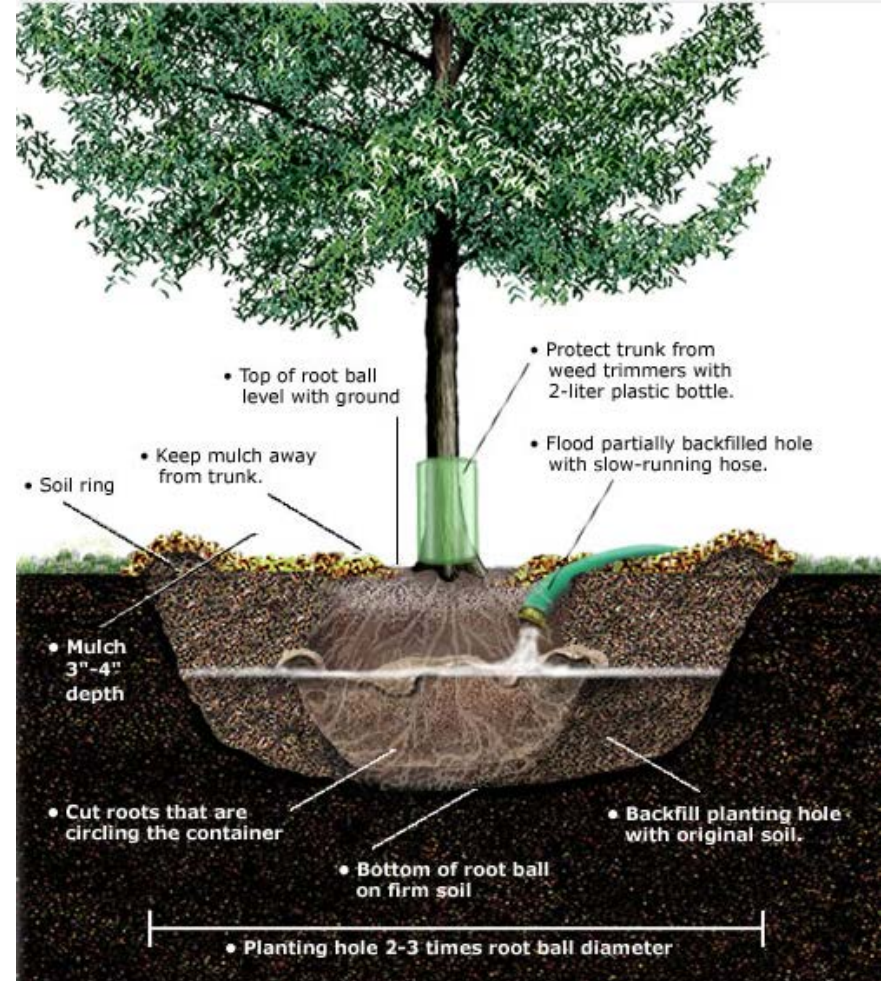
Placing the Tree (B&B)

- Set the B&B in the hole, using the basket to support the weight
- Go slowly to prevent root damage
- Recheck depth
- Check tree is straight and faced appropriately
- Remove as much of the basket, burlap and strap/twine as possible without disturbing placement of tree or breaking apart root ball
- Check that the root flare is exposed (before placing in hole is better, but tricky at best)
- Circling roots



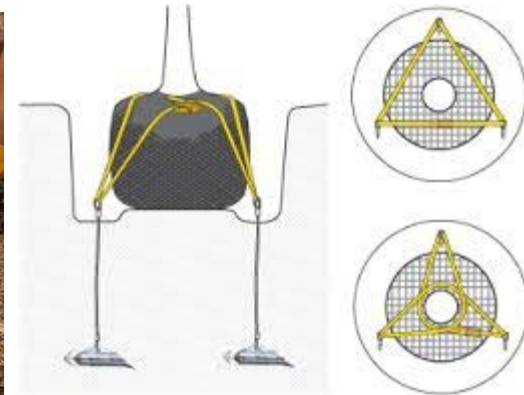
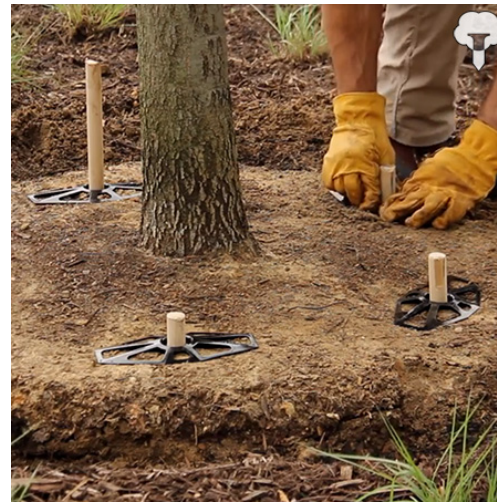
Backfilling

- Use the existing soil
- Place partial backfill and tamp or apply water
- Place more backfill and tamp or apply water
- Place even more backfill and tamp or apply water
- Keep root flare exposed
- Keep tree straight throughout
- Use any excess soil to create a soil ring around edge of planting hole
- Amendments?



Staking

- Only stake if truly necessary
- Multiple methods available
- Staking is temporary, not a fixture
- Must protect trunk and limbs from damage
- Must stake loosely to allow trunk movement
- Can be hazards unto themselves



Watering

- After planting, water root ball thoroughly
- Big bubbles mean big air pockets
- Opportunity to move soil into large voids
- Continue watering regime until tree is established
- More watering products available than even stakes



Mulching

- A 2"-4" thick layer of mulch, evenly spread across the root zone is sufficient
- Keep mulch off the trunk (by several inches)
- Include the soil ring when mulching newly planted trees



Bare Root / MGB Trees

- Mound or berm needs to be constructed in bottom of planting hole to support roots
- Root pruning is easy to perform (and may be necessary to fit the hole)
- Soaking or hydrogels are often used to prevent desiccation during planting



After Planting

- Watering
- Pruning
 - Only broken, dead, crossing for first year or two after planting
- Fertilizing
 - Probably isn't necessary, at planting or other, when using native/adapted trees in native soil
- Weeding
- Stakes/Wraps/Other



Beware of Bad Information



Tuesday, October 16, 2018

THIS IS MY GARDEN

About Privacy Policy Blog Landscaping Pests Weeds Vegetable Garden Join

Blog Trees

September 8, 2018

4 Big Keys To Planting Trees Successfully This Fall!

Posted By: TIMG / 321 Views / fall planting, how to plant trees, planting fruit trees, planting shade trees, planting trees, planting trees in the fall, trees

There is simply no better time to plant trees than in the cool, crisp air of autumn.

Our Most Recent Posts

- Growing Huge Pumpkins – Top Tips Methods For Big Success! October 13, 2018
- Overwintering Herbs – Bringing Herbs Inside For Winter Use October 10, 2018

Accelerating next
Hewlett Packard Enterprise
Gartner
HPE named a Leader by Gartner in 2018 MQ for