Landscape Tree Care (Arboriculture)

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emeritus

Landscape Tree Care Arboriculture

- Identification
- Tree selection (nursery and variety)
- Where to plant your tree
- How to plant your tree
- Tree staking
- Tree training and pruning
- Keeping your trees healthy

Tree Identification

Special Thanks to Scott Oneto for Images in this part of the presentation.

Why Tree Identification?

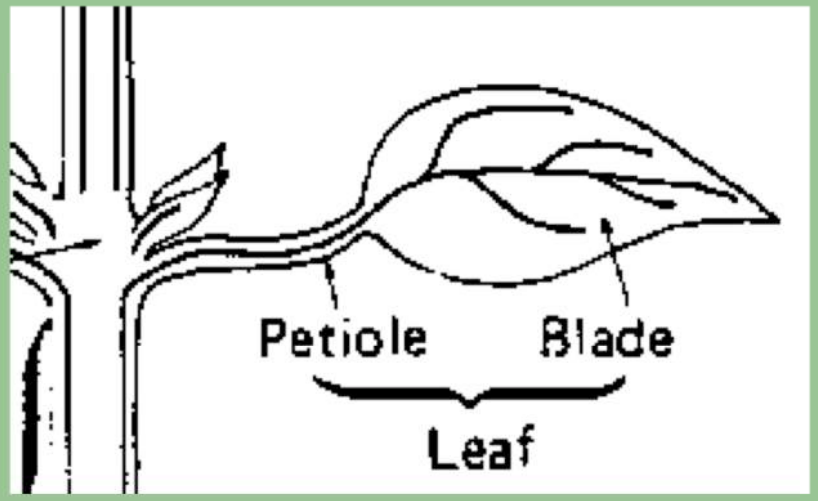
- Properly identify pests and giving pest control recommendations
- Critical for making good planting recommendations
- Identifies you as a person with experience & authority

Using Leaves for ID

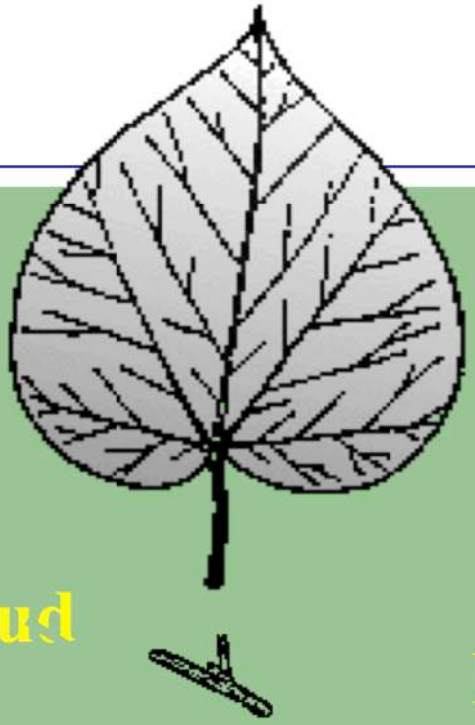
- Leaf Anatomy
- Leaf Types
- Leaf Arrangement
- Leaf Venation
- Identification Exercise

Leaf Anatomy

- Leaves composed of:
  - Blade
  - Petiole
- Types of leaves:
  - Simple
  - Compound
    - Pinnate
    - Palmate



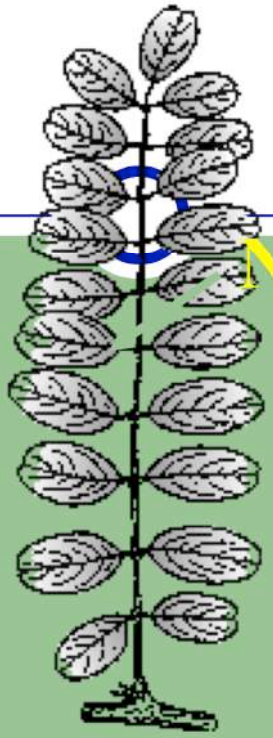
Types of Leaves



Bud

Simple

1 Blade / 1 Petiole

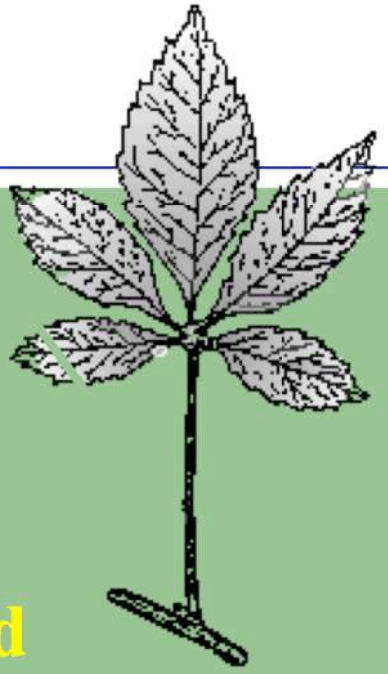


No Bud

Bud

Pinnately & Palmately Compound

1 Petiole / >1 Leaflets



Bud

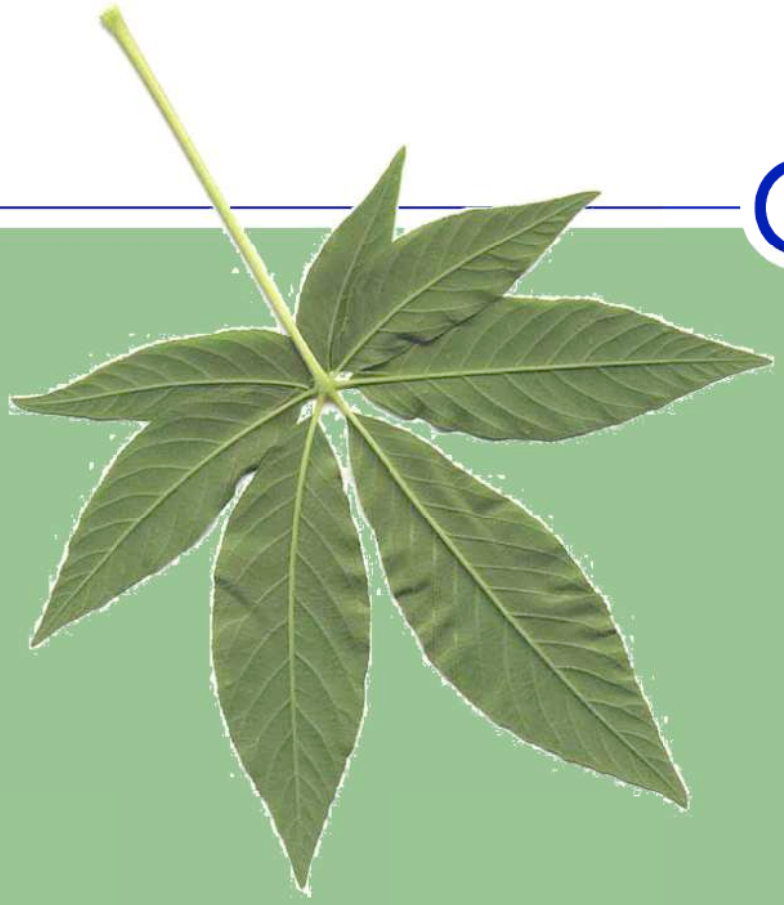
Leaf Type

- Simple Leaf
  - A leaf with a single blade

Leaf Type

- Pinnately Compound leaf
  - A leaf with multiple leaflets
    - Shaped like a feather

Leaf Type

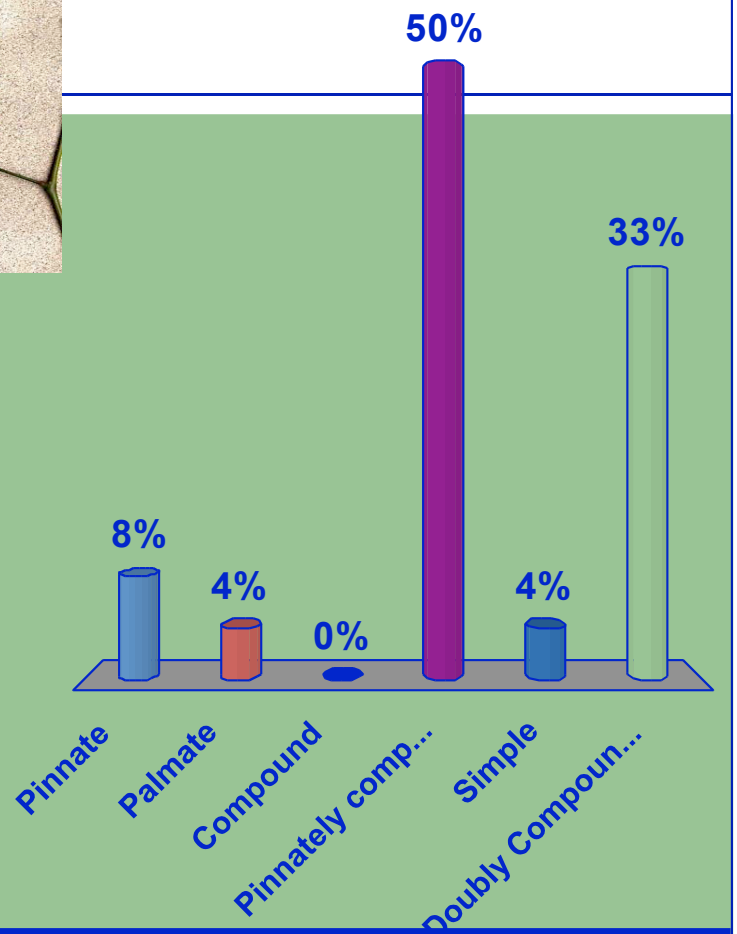


- Palmately Compound
  - A compound leaf with leaflets radiating from a common point of attachment like the fingers of a hand

What term best describes this leaf?

What term best describes this leaf?

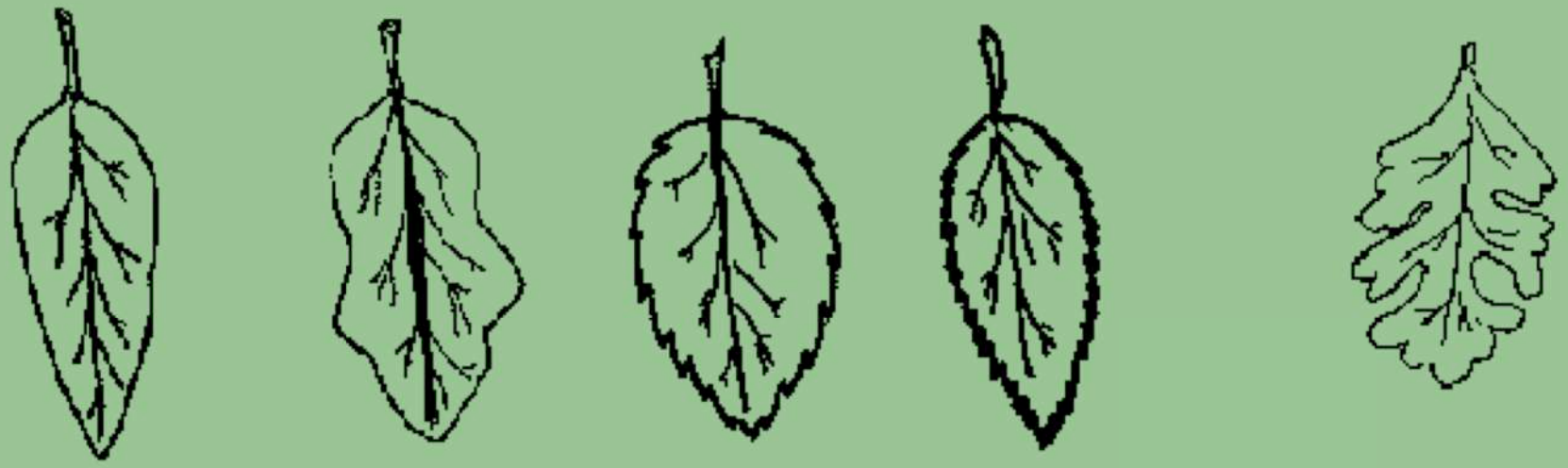
1. Pinnate
2. Palmate
3. Compound
4. Pinnately compound
5. Simple
6. Doubly Compound



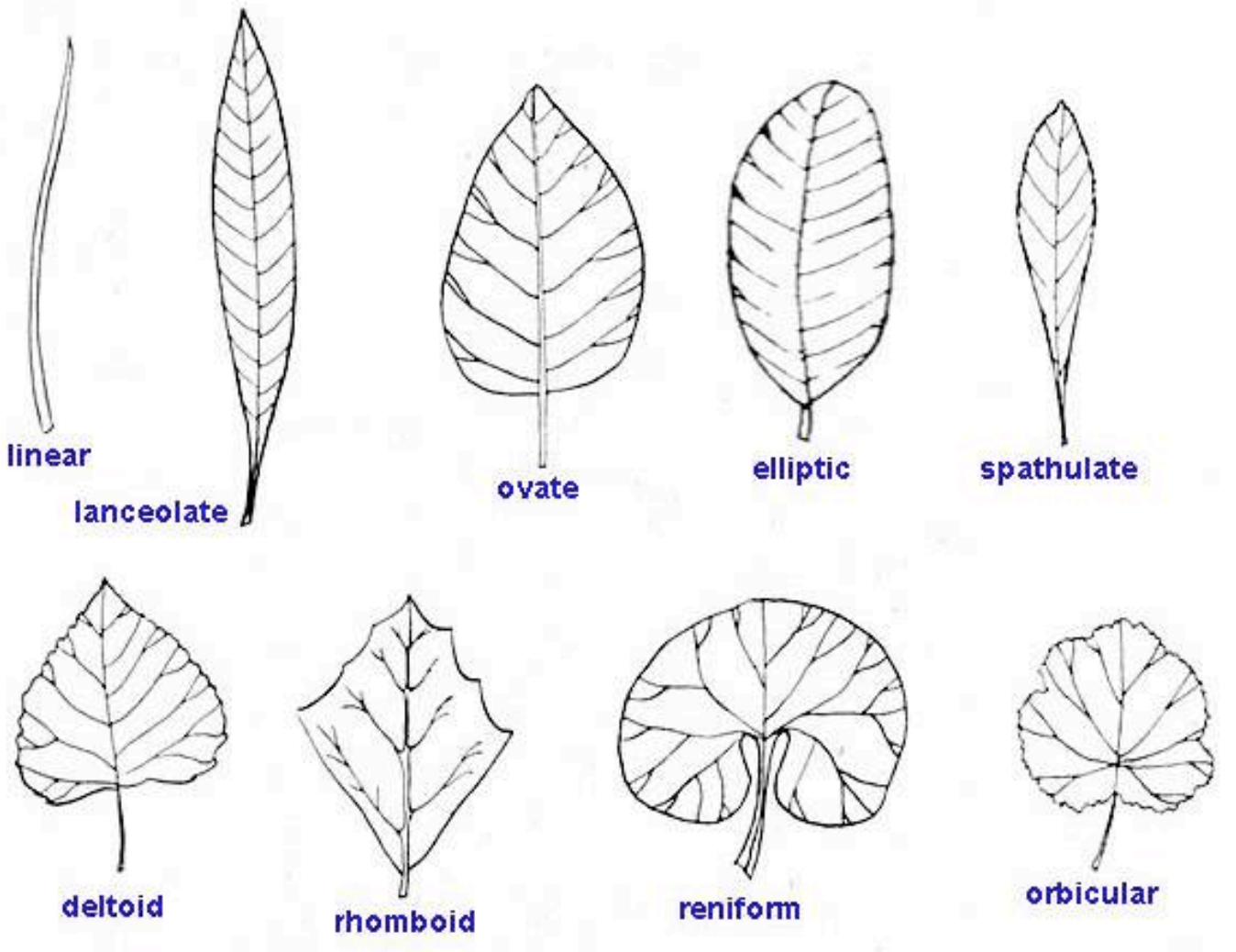
Leaf Margin

Entire

Lobed and/or serrated



Leaf Shape


linear
lanceolate
ovate
elliptic
spathulate
deltoid
rhomboid
reniform
orbicular

Leaf Arrangement

Alternate

- One leaf at each node

Leaf Arrangement

Opposite

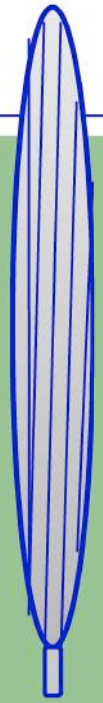
- Two leaves attached at each node
- Borne on opposite sides of the stem

Leaf Arrangement

Whorled

- Three or more leaves symmetrically distributed around the same node

Leaf Venation



Parallel

Palmate

Pinnate

Leaf Venation

Parallel venation

- Pattern of veins in a leaf where several primary veins extend side by side throughout the full length of a leaf
- Characteristic of grasses and most monocots

Leaf Venation

Palmate venation

- Pattern of veins in a leaf in which three or more primary veins diverge from a common point of a leaf blade
- Secondary veins diverge from each primary vein

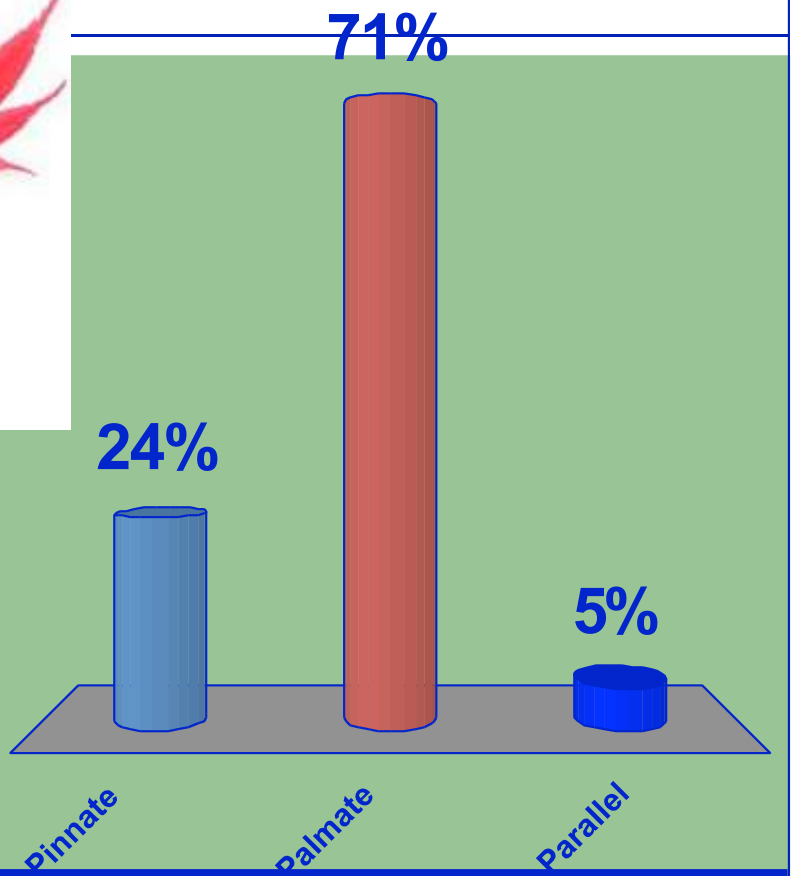
Leaf Venation

Pinnate venation

- Single large mid-vein and secondary veins diverging from it.

What type of venation does this leaf have?

1. Pinnate
2. Palmate
3. Parallel

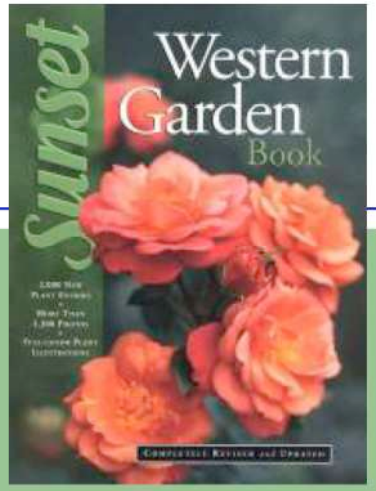


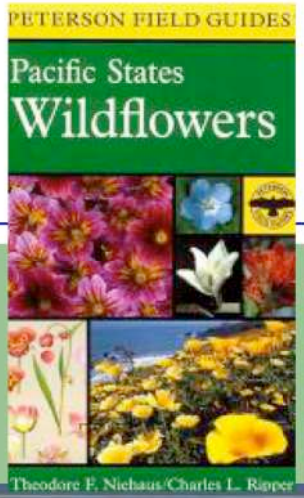
Plant Material & Identification Resources

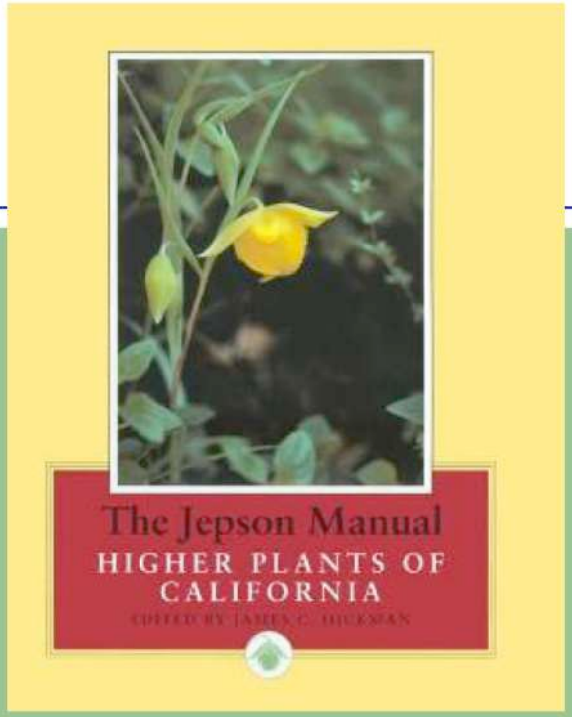
UC Davis Arboretum All-Stars

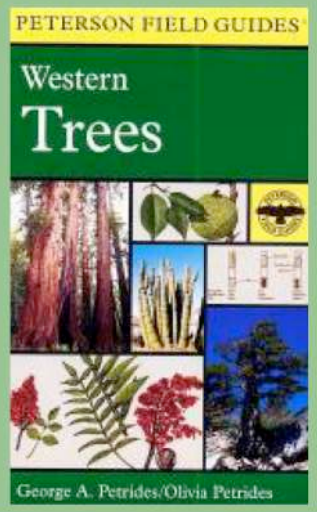
http://arboretum.ucdavis.edu/arboretum_all_stars.aspx

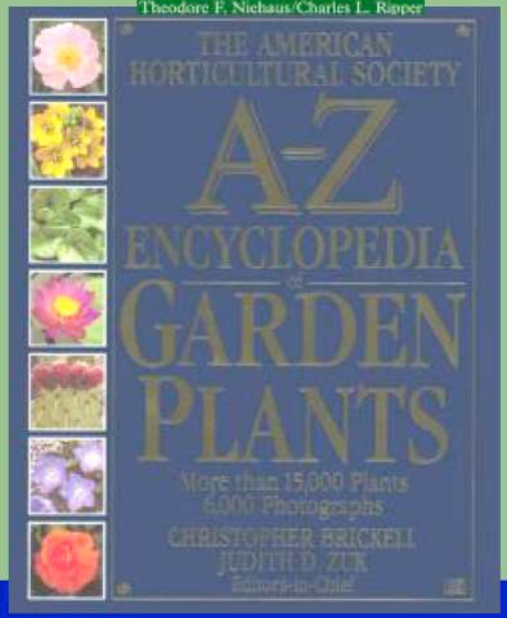
Reference Books











…or ask someone from UCCE:

An Advisor, Master Gardener, Specialist, Program Representative

USDA Natural Resources Conservation Service

PLANTS Links

Educational Plant Links

Please note that PLANTS is not responsible for the content or availability of other websites referenced below.

Contents

- Educational
  - Automated Identification Keys
  - Edible Plants
  - Glossaries & Dictionaries
  - Herbarium Specimen Databases
  - Kids Web Sites
  - Plant Classification
  - Plant Collecting & Herbaria
  - Plant Families
  - Plant Identification
  - Seeds
  - Teacher Resources-Agriculture
  - Teacher Resources-Botany

http://www.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/woodypocketguide.pdf

Search by Name

Search Trees by Characteristics

Search Help

About SelecTree

Right Tree Right Place

Utility Precautions

Browse securely

SelecTree: A Tree Selection Guide

Search for trees Enter a tree name Search

- Tree Characteristics Glossary
- Search Help

> I never knew how soothing trees are - many trees and patches of open sunlight, and tree-presences - it is almost like having another being.
>
> — D.H. Lawrence

Chamaecyparis lawsoniana 'Stewartii'

Useful for extensive landscape areas or as an accent plant. Common in...

Photo by Robert O'Brien

Search by Name

Search Trees by Characteristics

Search Help

About SelecTree

Right Tree Right Place

Utility Precautions

Browse securely

SelecTree: Search Trees by Characteristics

Tree Name

Tree Name Enter a tree name

Planting near power lines? See Utility Precautions.

Tree Characteristics

Max Height (ft)

Growth Rate

Tree Shape

Habit

Bark Color

Bark Texture

Armament

Branch Strength

Litter Type

Leaf, Flower & Fruit Characteristics

Acer capillipes

Young leaves are red...

Photo by W. Mark and J. Reimer

University Herbarium

The University and Jepson Herbaria

University of California, Berkeley

Jepson

Directory | News | Site Map | Home

- About
- University Herbarium
- Jepson Herbarium
- Databases
- News
- People
- Education
- Online Resources
- Publications
- Research
- Libraries, Archives
- Contributing Authors
- Quick Links

Welcome to the Herbaria

The University and Jepson Herbaria of the University of California at Berkeley are two collections of pressed plants housed together along with research labs, libraries, and archives. Together the Herbaria hold about 2,200,000 specimens, one of the largest collections in North America.

- The **University Herbarium**, established in 1895, holds botanical collections from around the world.
- The **Jepson Herbarium**, established in 1950, specializes in the vascular plants of California.

News from the Herbaria

The Jepson Herbarium participates in the 2008 California Wildflower Show at the Oakland Museum
Hundreds of wildflowers from around the state on display; slide lectures on horticulture, California flora, and the history of plant collecting in the state. Link
Saturday, April 19 10 AM - 5 PM
Sunday, April 20 1 PM - 4 PM

More news...

http://ucjeps.berkeley.edu/

Featured Projects

Local

start | Microsoft ActiveSync | Inbox - Microsoft Out... | Plants Links - Microso... | plant identification ke... | University and Jepso...

Practical Exercises

Exercise 1

For each tree specimen identify

- venation
- leaf/leaflet structure
- Identify key characteristics based what you can observe with each specimen

Practical Exercises

Second Exercise

- Please list a tree for each of the following
  - Dry climate
  - Large park like tree
  - Tree with few pest problems
  - A Native Californian

I. Tree Selection

1. NURSERY STOCK
2. CONSIDER LOCAL CLIMATE/SITE
3. SELECT LARGE TREES IF POSSIBLE
4. EDIBLE LANDSCAPE
5. AVOID INVASIVE SPECIES

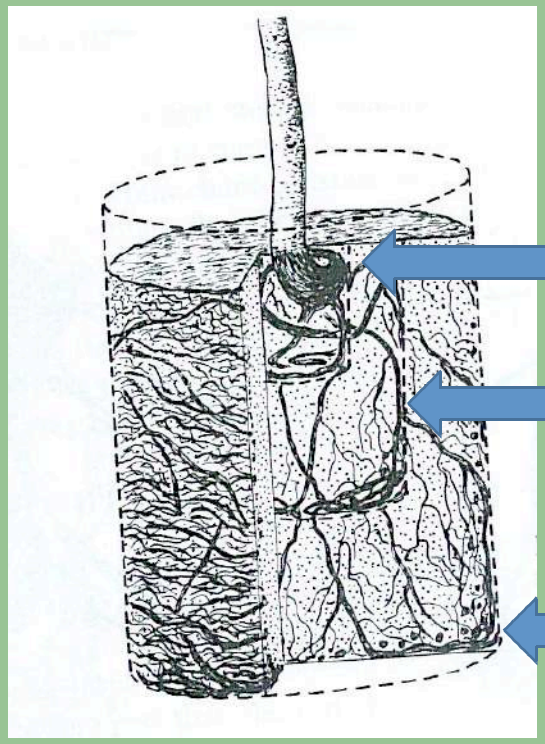
Tree Selection: Properly Identified

- Labeled individually by species and variety
- Be free of insect pests and diseases
- Be free of mechanical injuries

Selecting Quality Nursery Stock

- Root Structure: Circling and/or kinked roots
- Exposure of root collar
- Rootball size relative to top and trunk size
- Root health

Tree Selection: Quality Nursery Stock



Trunk/crown surface root zone

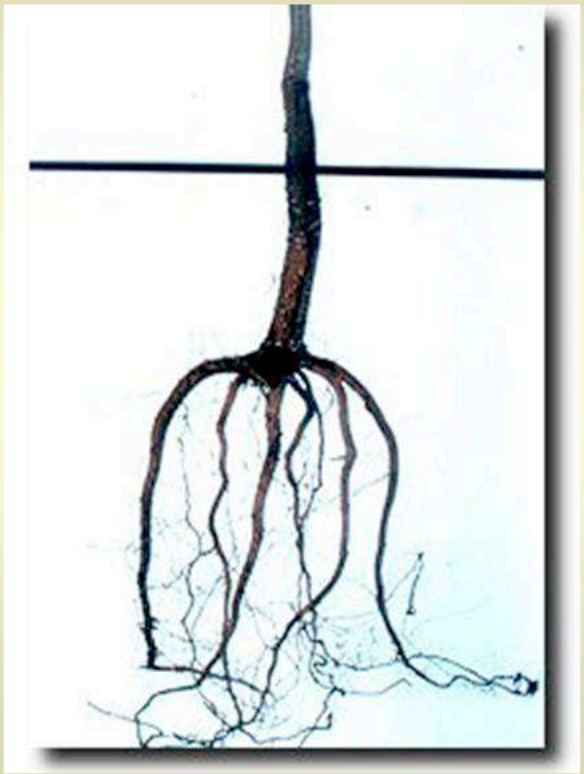
Center root zone

Peripheral root zone

Tree Selection: quality nursery stock

Tree Selection: Quality Nursery Stock

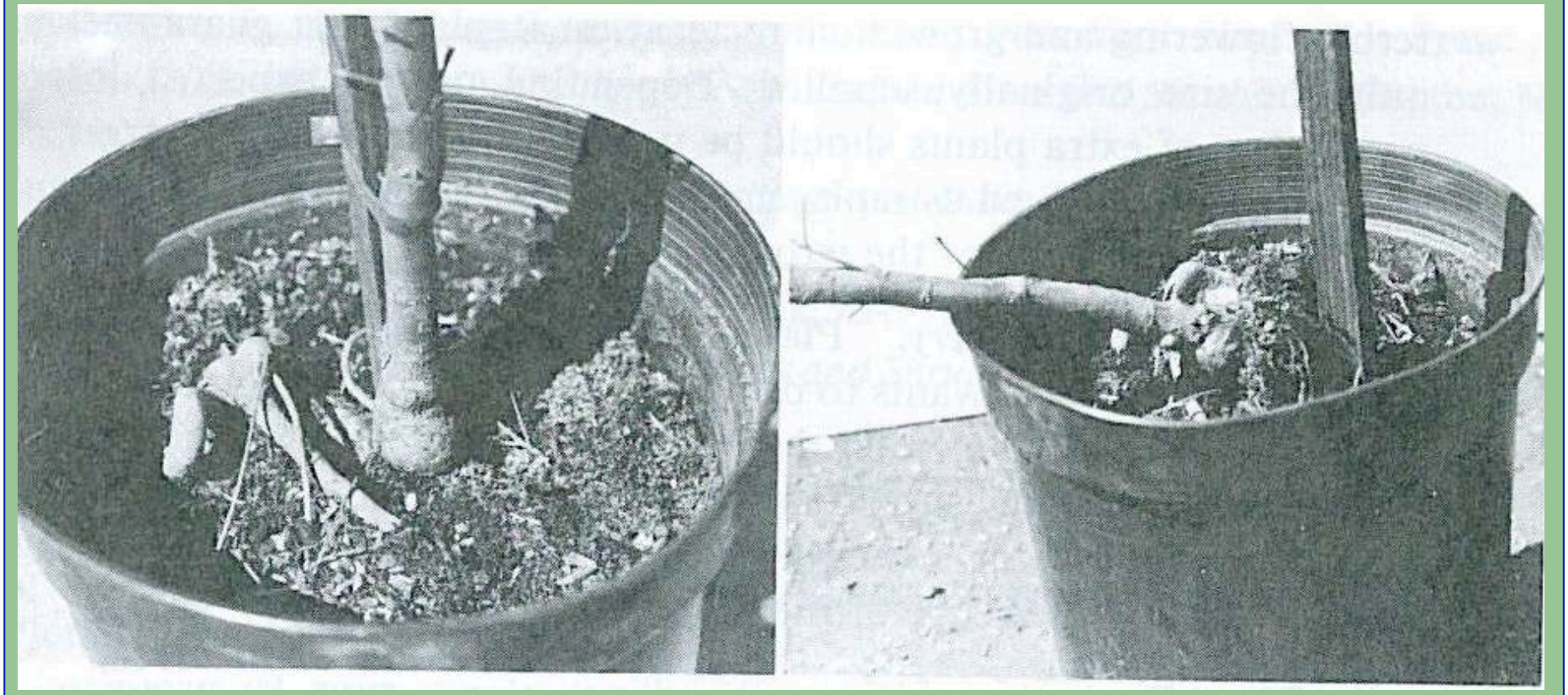
Preferred root structure



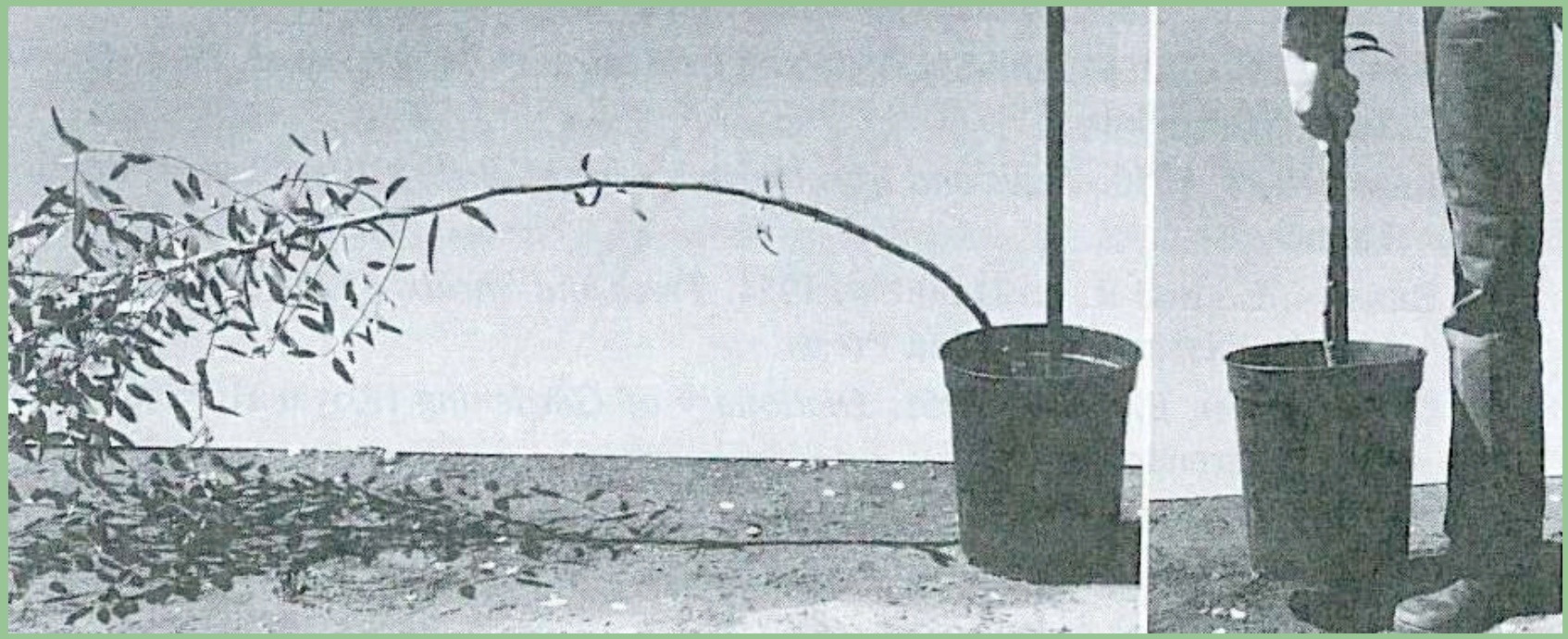
Avoid roots like these

Tree Selection: Quality Nursery Stock

Tree Selection: Quality Nursery Stock



Tree Selection: Quality Nursery Stock



Tree Selection: Root Collar

- The uppermost roots or Root Collar should be within 1” above or below soil surface

Tree Selection: Rootball

Tree Selection: Rootball

When lifted, both the trunk and root system move as one.

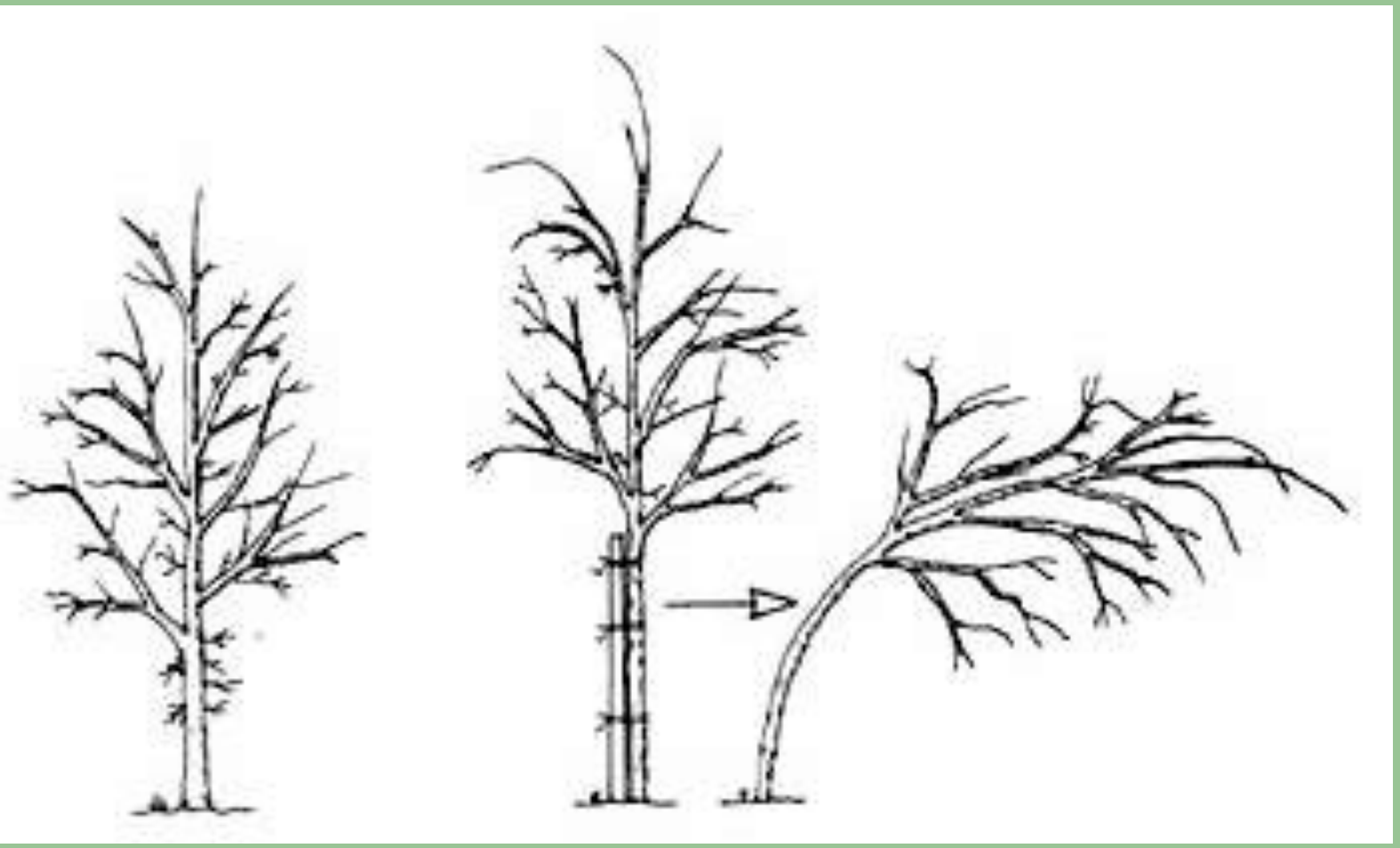
Tree Selection: Rootball

Tree Selection:

Trunk and Crown Characteristics for Nursery stock

- Trunk diameter and container size
- Trunk taper
- Central leader
- Radial distribution of main scaffolds
- Branch diameter relative to trunk
- Angle of attachment
- Distribution of temporary branches

Tree Selection: Trunk Diameter, Taper and Size

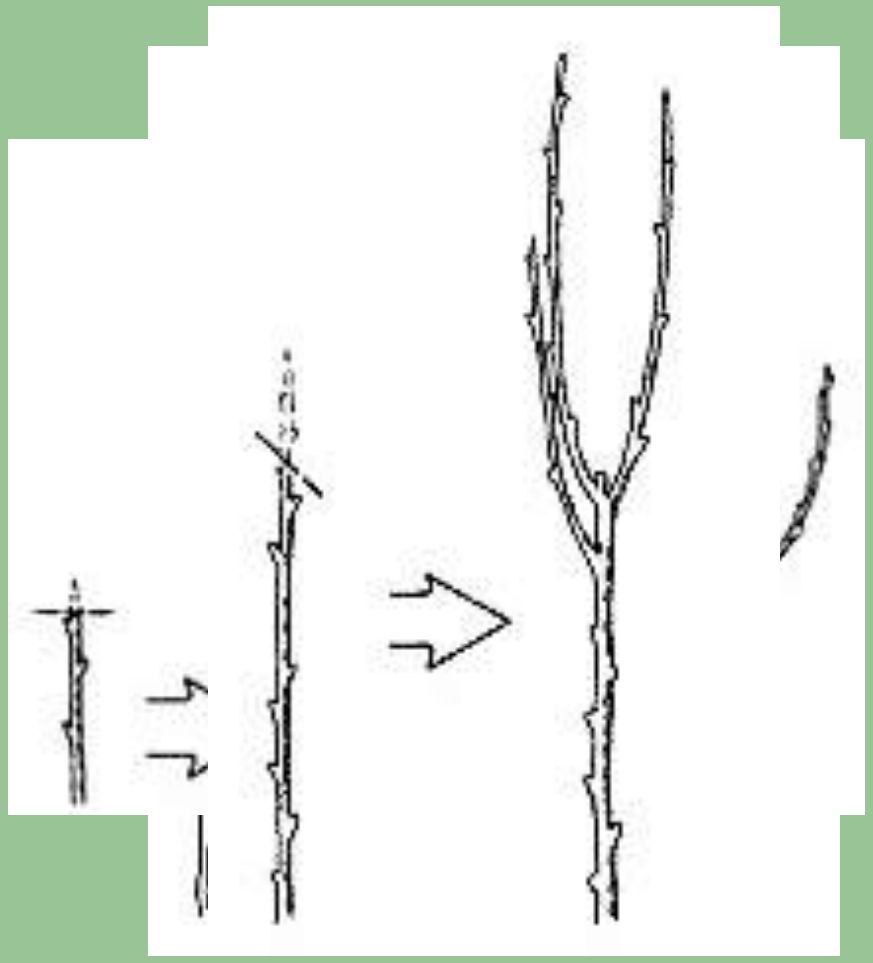


Tree Selection: Trunk Diameter, Taper and Size

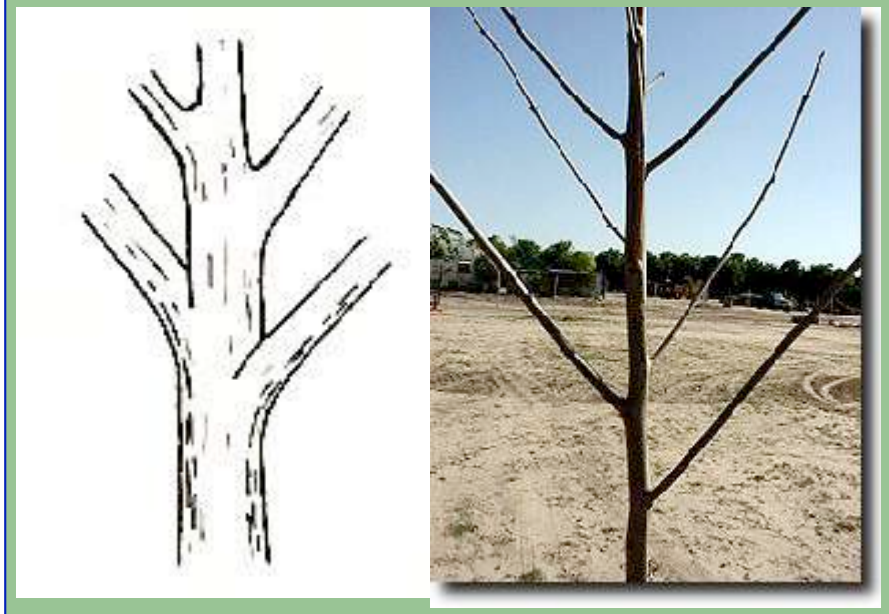
Trunk diameter at 6" (six inches) above the soil surface:

Container Size Trunk Diameter (inches)
5 ..... 0.5" to 0.75"
15 ..... 0.75" to 1.5"
24 inch box ..... 1.5" to 2.5"

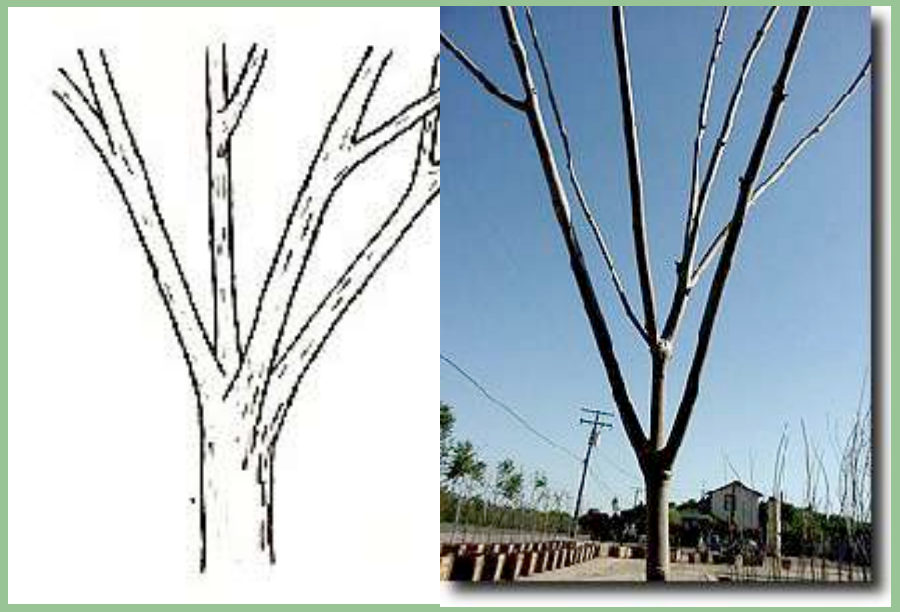
Tree Selection: Central Leader



Tree Selection: Main Branches



Good



Not Good

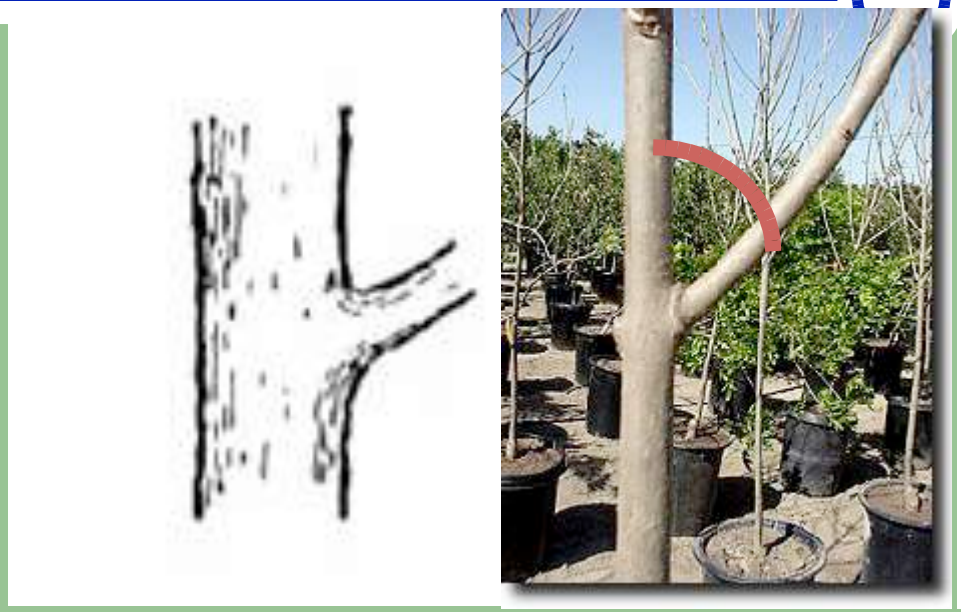
Tree Selection: Main Branches

Tree Selection: Branch Diameter

Good

Not Good

Tree Selection: Angle of Attachment

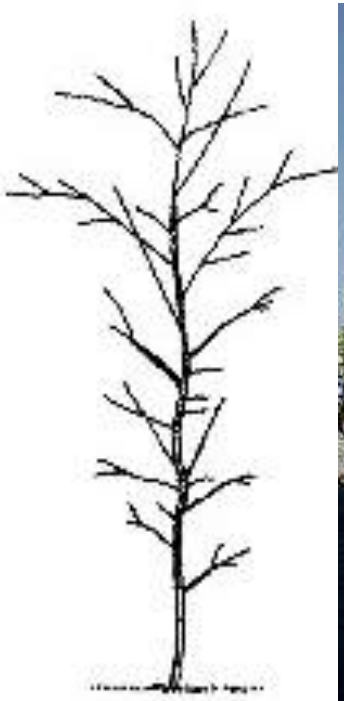


Good

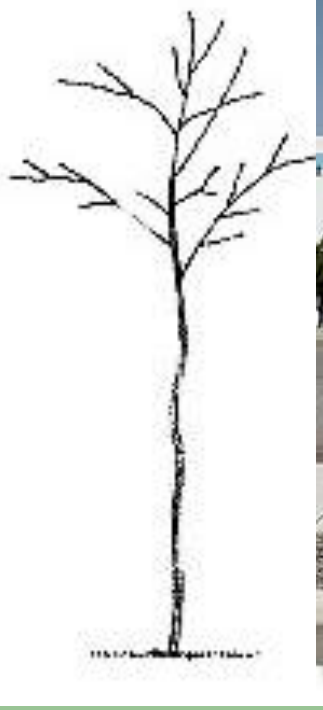
Not Good

Narrow angles of attachment lead to tree failures

Tree Selection: Temporary Branches



Good



Not Good

Select Trees For Local Climate And Site

- Use landscape adapted natives, or climate appropriate trees.
- Select trees with resistance to key local pests.
- Consider characteristics: shape, bark patterns, leaf and flower color.
- Consider leaf and flower litter.
- Consider longevity
- Select for your personal taste and landscape needs.

UC Davis Arboretum All-Stars

http://arboretum.ucdavis.edu/arboretum_all_stars.aspx

Local Botanic Gardens, Arboreta etc.

Trees *not* appropriate fo
local climate and
site…

Jacaranda in Northern California?

Tree Selection: Avoid Key Pests

Common name	ELB	DED
English elm	HS	HS
Scotch elm	HS	HS
American elm	S	HS
'Homestead'	S	R
'Liberty' group	S[1]	MR
'New Horizon' and 'Valley Forge"	S[1]	R
'Pioneer'	S	R
Siberian elm	S	MR
'Frontier'	MR[3]	R
Chinese elm	R[4]	MR
'Prospector'	R	R
zelkova	R	MR
hackberry	NS	NS
hornbeam	NS	NS

Trees are listed in order by susceptibility.

Tree Selection: Characteristics and Litter

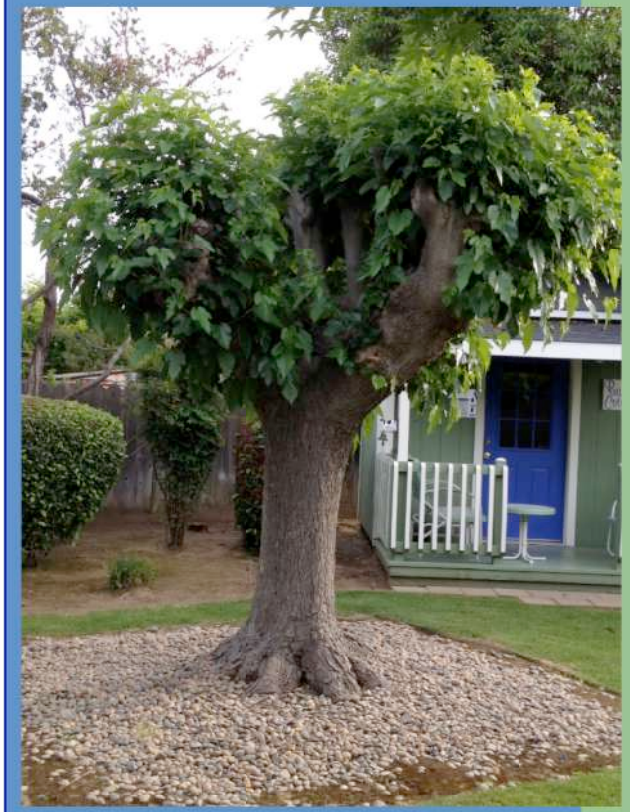
Plant Large Trees That Have Longevity

- Trees moderate temperature thereby reducing fossil fuel usage for heating and cooling.
- Larger trees can seize more CO2 and cast more shade.
- Trees remove greenhouse gases from the atmosphere and store it until they decompose- The longer they live the better.

Fire Safe Landscapes

http://ucanr.edu/sites/SAFELandscapes/

Select trees for less to the landfill…



- Plant to match the space, to avoid constant pruning to maintain a certain size.
- Compost/mulch/leaves on site
- Reduced water/fertilizer applied.
- Salvage and recycle

Plant to match the space: Avoid constant pruning and the creation of green waste.

Xylosmas don't stay small for long!

Carolina Cherries can grow up to 40'+ surface roots + fruit = disaster

Compost on Site or Mulch Waste

But don't make it too much of a good thing!

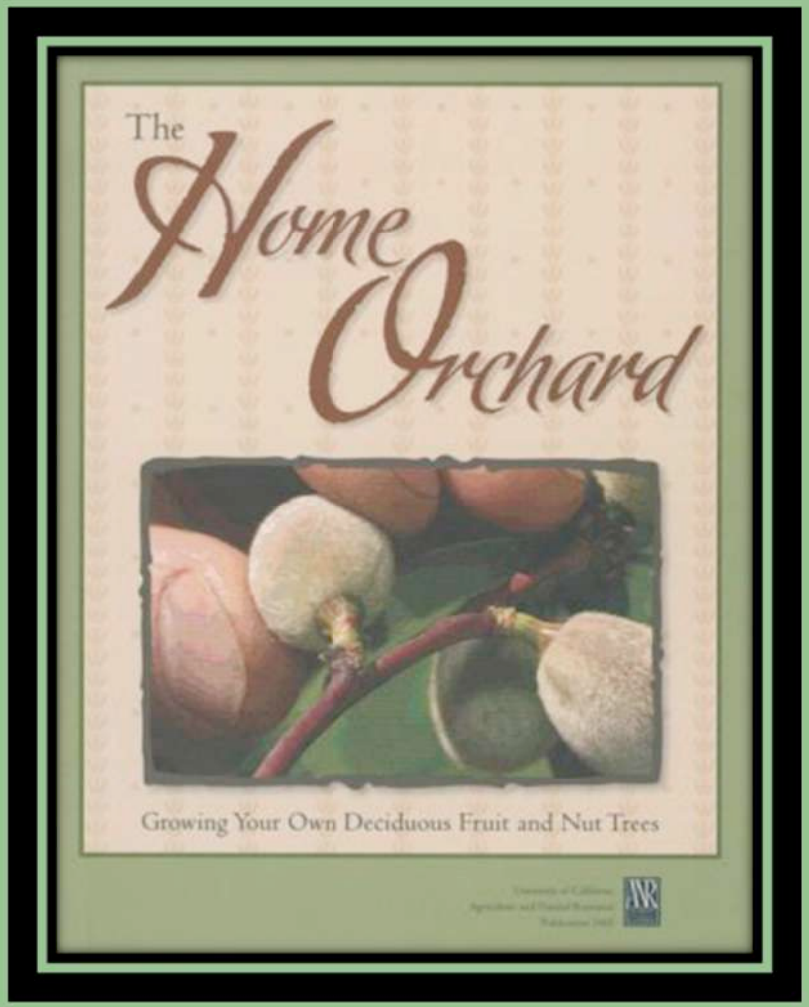
Salvage & Recycle

Find long term uses for dead or dying trees

Tree Selection …Edible Landscapes

Grow food in your garden for yourself, your family and your neighborhood

- Edible landscapes
- Trees with edible fruit
- Support over the fence sharing
- Personal orchards or container fruit trees



Avoid Planting Invasive Species

- Tamarix (Salt Cedar)
- Siberian Elm
- Tree of Heaven
- Chinese Tallow tree

- CA Invasive Plant Council www.cal-ipc.org/
- www.plantright.org

PLANT RIGHT
KEEP INVASIVE PLANTS IN CHECK

- What are invasive plants?
- Regional invasive and alternative plants
- What you can do
- Benefits of Planting Right
- FAQ
- Testimonials
- Water gardens
- Research
- Library
- News
- About us

SPREAD THE WORD

RECOMMENDED ALTERNATIVE PLANT DETAILS

Have a gorgeous garden and a successful business — all with non-invasive plants! Below are recommended alternatives to the invaders in your region that are beautiful, vigorous, and appropriate for your climate. Grow them with pride, and the confidence that you're protecting California from invasive plants!

If you are a home gardener, ask your nursery professional for even more ideas.

GUIDE TO PLANT CARE

FULL SUN · PARTIAL SUN · SHADE

Plant Care Key

HIGH WATER · MEDIUM WATER · LOW WATER · DROUGHT TOLERANT

Pistacia chinensis

Common name: Chinese Pistache

Sun needs: Water needs:

This plant grows well in the following regions:

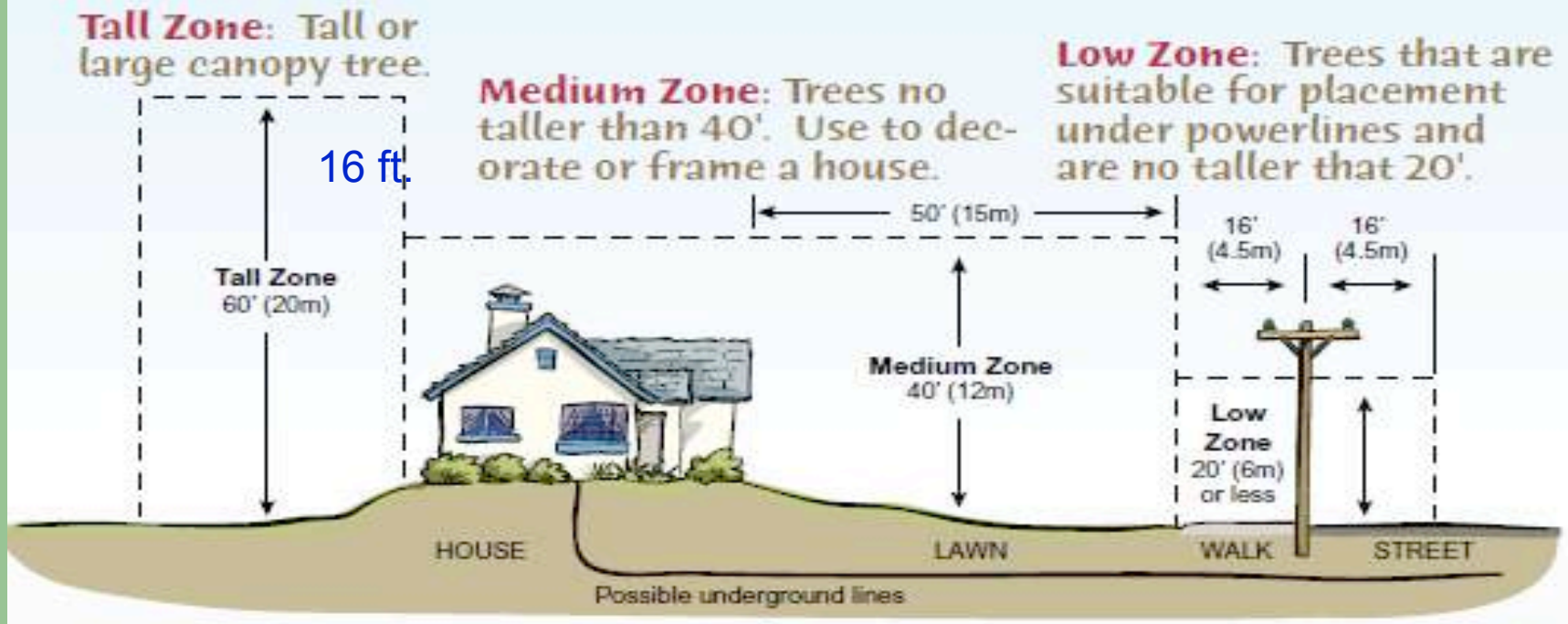
- North and Central Coast
- Desert
- Central Valley

II. WHERE TO PLANT YOUR TREE

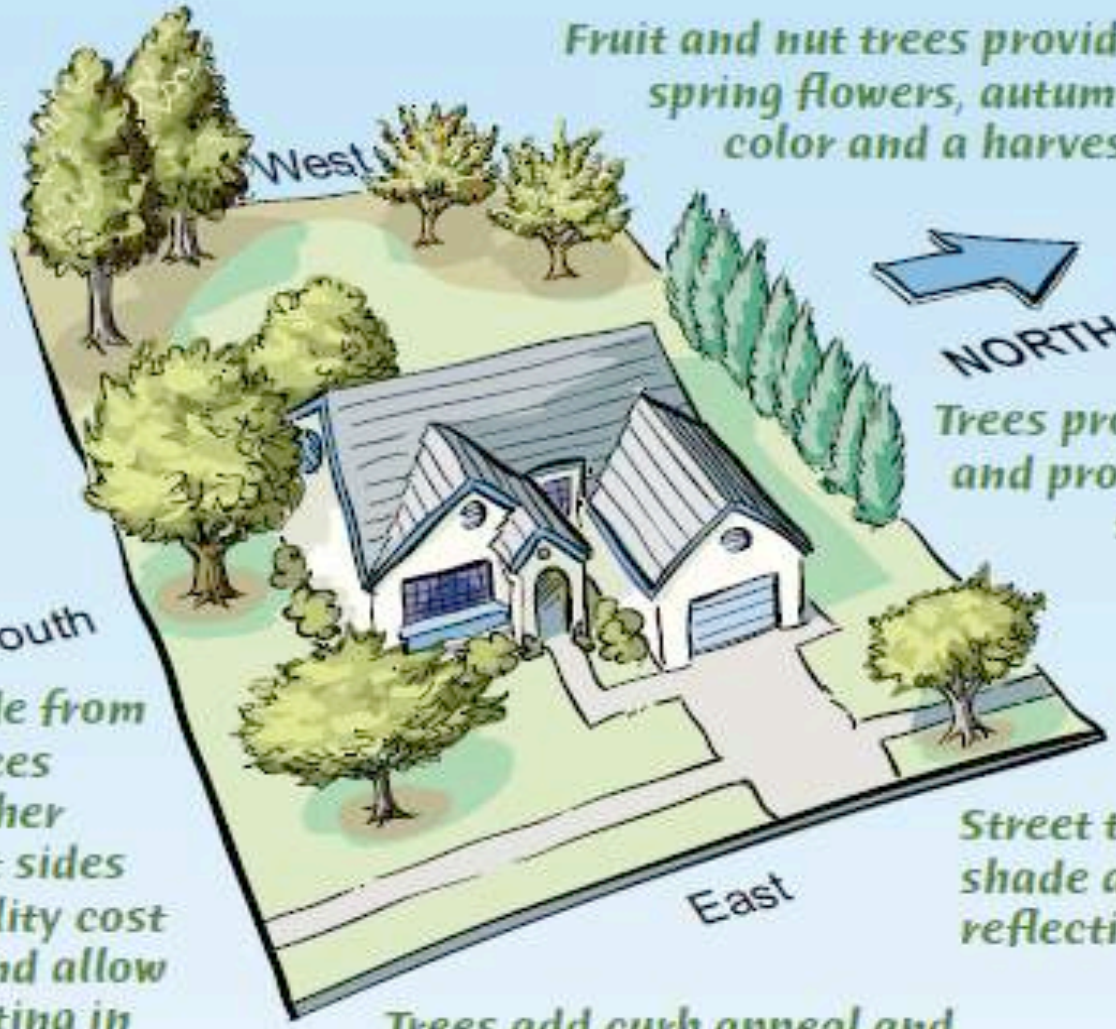
1. Consider tree size at maturity
2. Consider powerlines
3. Consider soil
4. Consider root structures

Tree Selection and Site

- Avoid planting in close proximity to underground utilities.
- Plant 15' away from permanent structures.



Tree placement:



Trees provide habitat for wildlife

Fruit and nut trees provide spring flowers, autumn color and a harvest

Trees provide privacy and protection from strong winds

Summer shade from deciduous trees placed on either south or west sides can lower utility cost by 10- 15% and allow for solar heating in winter months

Street trees provide shade and reduce reflective heat

Trees add curb appeal and increase property values

Soil

- Protect soil/tree roots from compaction
- Prevent erosion
- Mulch

III. HOW TO PLANT YOUR TREE

1. **PLANTING**
2. **WEEDS**
3. **FERTILIZATION**

PLANTING LANDSCAPE TREES

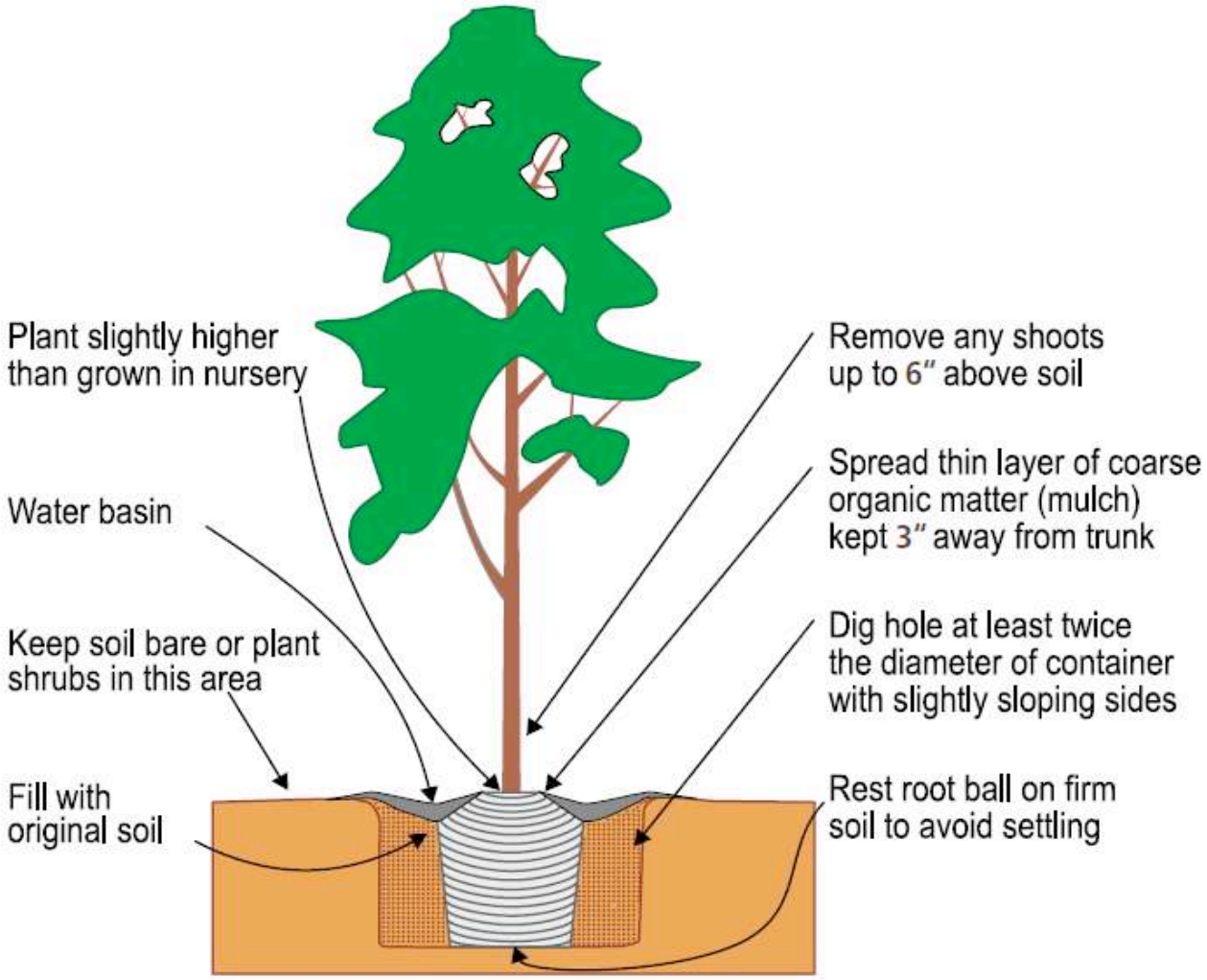


Figure 1. Proper planting of a container-grown tree.

Fertilizing New Trees

- Adding fertilizer, soil amendments, or root stimulants to the planting hole or backfill soils is not recommended. Most nursery grown trees are well fertilized during production and seldom respond to fertilizing at planting, except in the most infertile soils.

IV. TREE STAKING

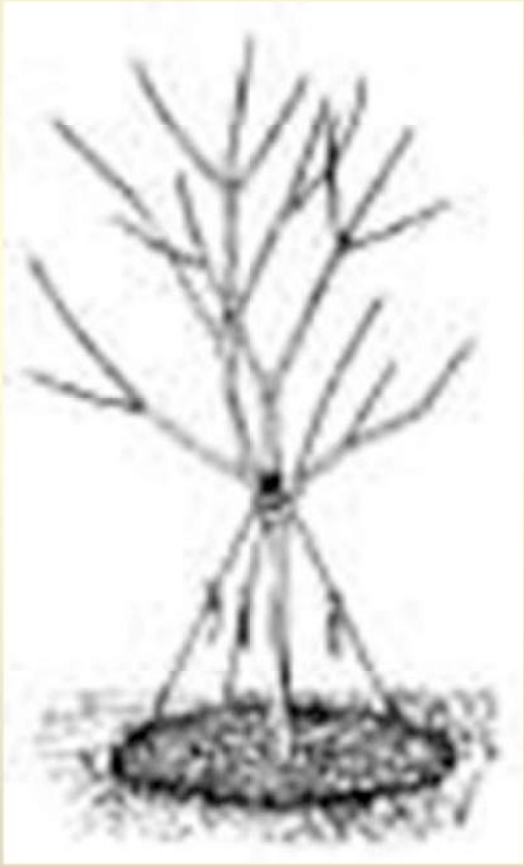
- Remove stakes within 1 year
- The more freedom to move the better.
- Most conifers, trees with upright growth habits, and trees planted bare-root usually do not need support.

Staking Landscape Trees

- When, why and how long
  - Purpose of staking
    - To anchor
    - To protect
    - To support

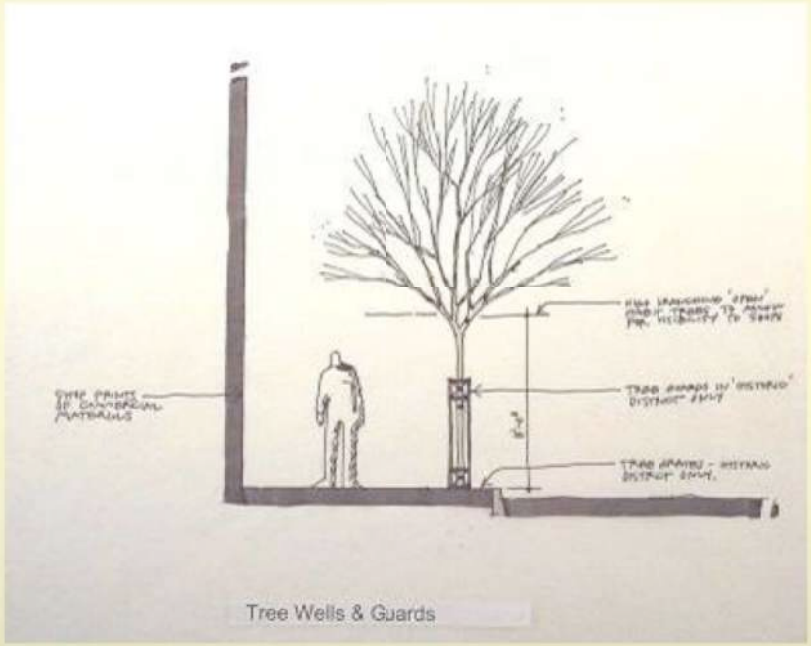
To Anchor

- Anchor staking is appropriate when rootball is small and canopy is large
- When soil is very heavy, wet clay



To protect

- Appropriate for street trees and to prevent vandalism



To Support

- Allows tree to stay upright when trunk has little trunk taper
- Best when done for only short period of time
- Remove stakes as early as possible

Steps in Staking

- Remove nursery stake
- Place two stakes in the ground outside the rootball.
- Determine the height of supporting tie
- Cut off excess stake 2-3 inches above the tie

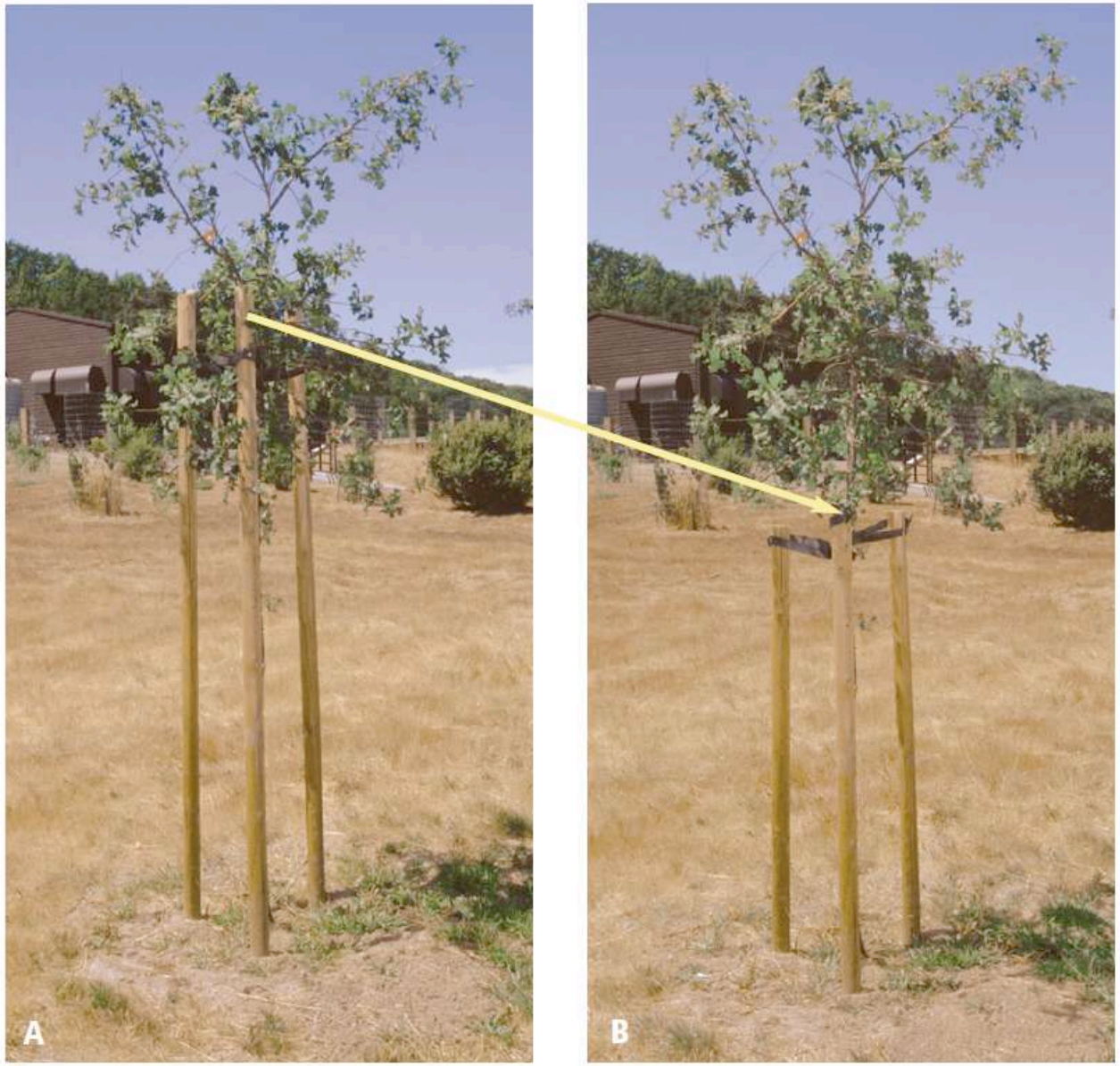


Figure 2. (A) Valley oak tied and staked too high. (B) Stakes and ties properly adjusted.

V. TREE TRAINING

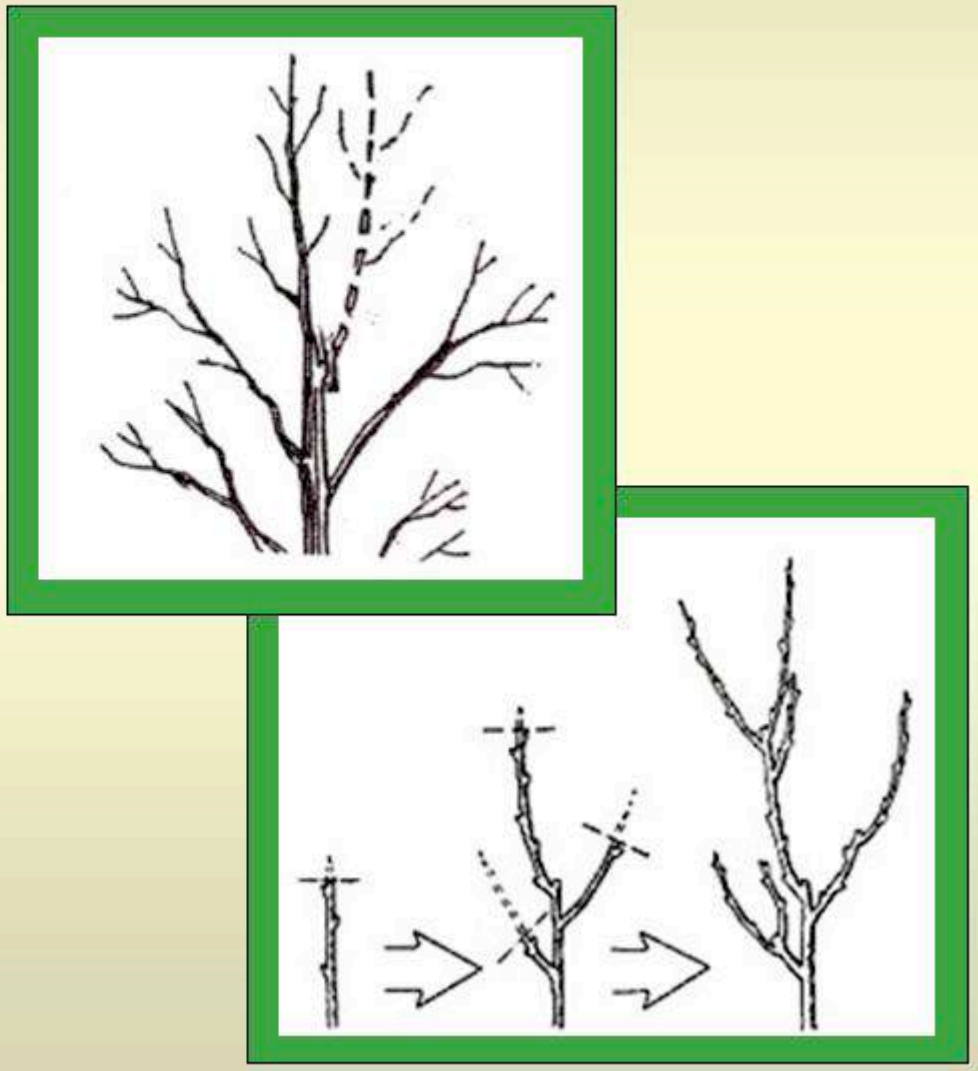
1. **AT PLANTING**
2. **YOUNG TREES**
3. **THINNING VS. HEADING CUTS**

Pruning at planting???

Restrict pruning to the removal of damaged, dead or branches that compete with the central leader.

Structural Issues for Young Trees

- Maintaining the **central leader** to avoid co-dominant stems.
- May require restructuring on young trees with strong apical dominance and no lateral branches.

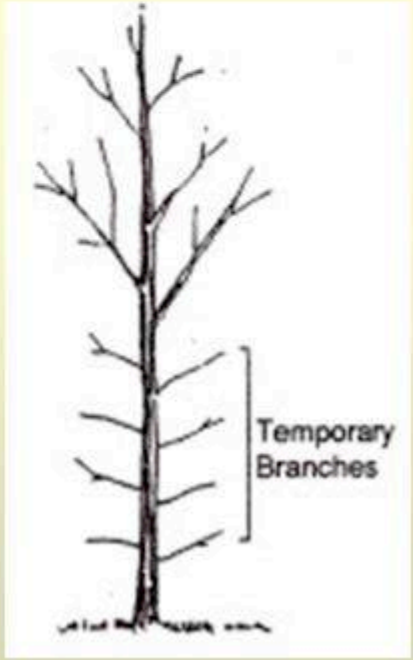


Impact From Multiple Leaders

Photos courtesy of Urban Tree Foundation Nursery Specifications

Structural Issues for Young Trees

- **Temporary branches**
  - Protect against vandalism
  - Protect against sunburn
  - Strengthen and increase trunk taper
  - Increase total tree growth
- **Height of lowest permanent branch** should be determined by function.



Function of lower branches

Protects trunk from sunburn

There is less to landscape!

Is visibility a concern?

Fire danger?

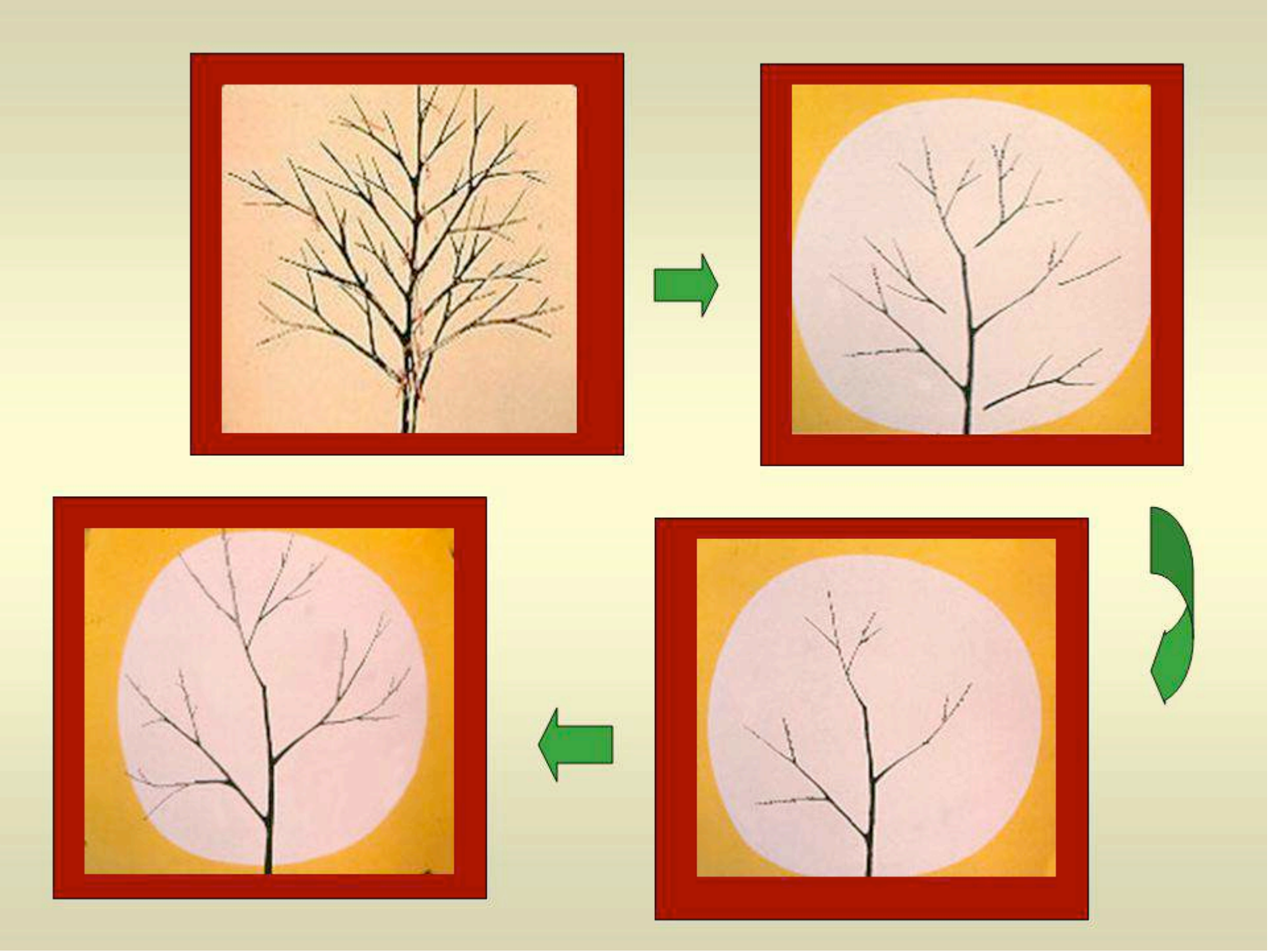
Reduce over a 2-3 year period, removing the largest ones first.

Two Types Of Pruning Cuts:

- **Thinning Cut:**
- removes a branch at its point of origin, or to a lateral branch strong enough to assume the terminal role.
- Trees pruned w/ thinning cuts are more open, retain natural shape and allow more light penetration into the canopy.

Responses to Thinning Cuts

- Invigoration of growth is spread throughout plant.
- Plants become more open and retain natural form.
- More light/ air penetrates canopy

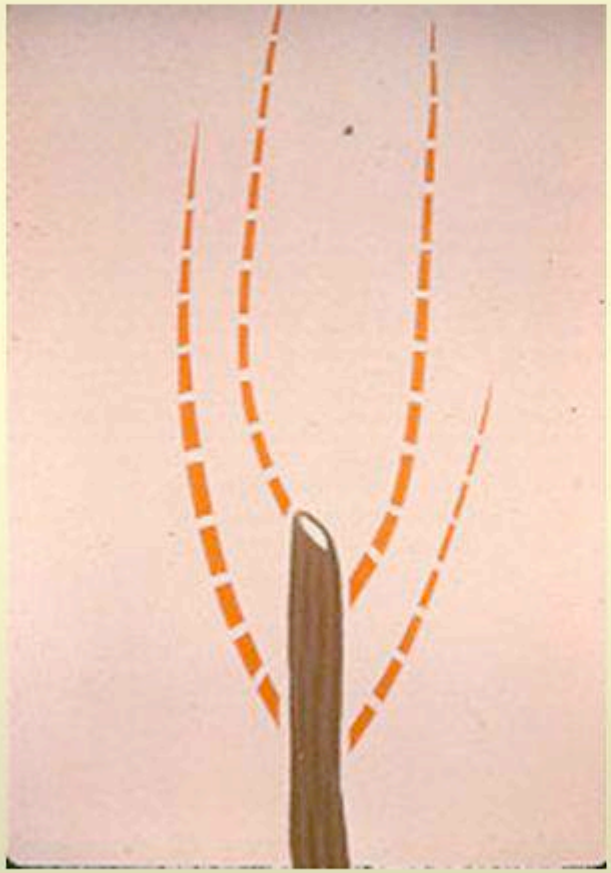


Second Type of Pruning Cut:

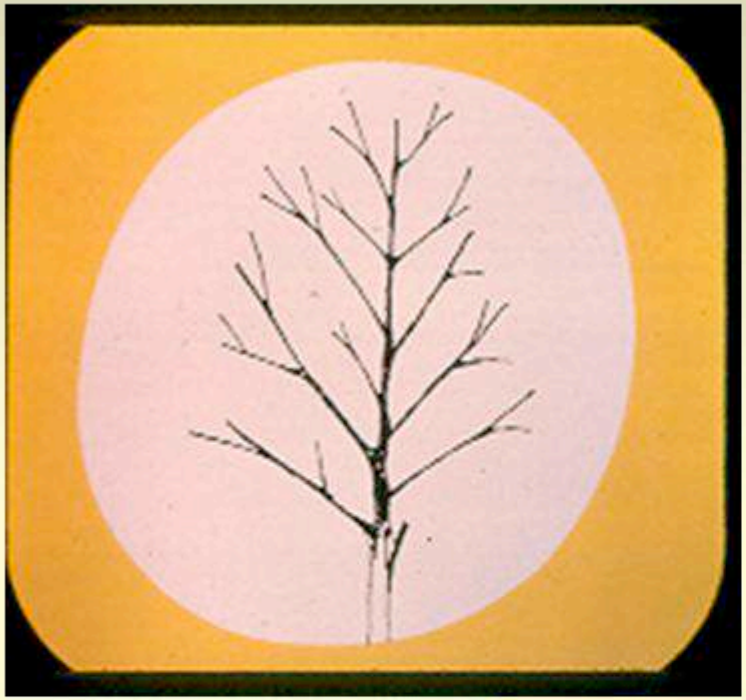
Heading Cut:

- Removes a growing branch back to a bud or a lateral back to a stub.
- Results in vigorous, upright shoots just below the cut.
- New shoots can be weakly attached.

Responses to Heading Cuts

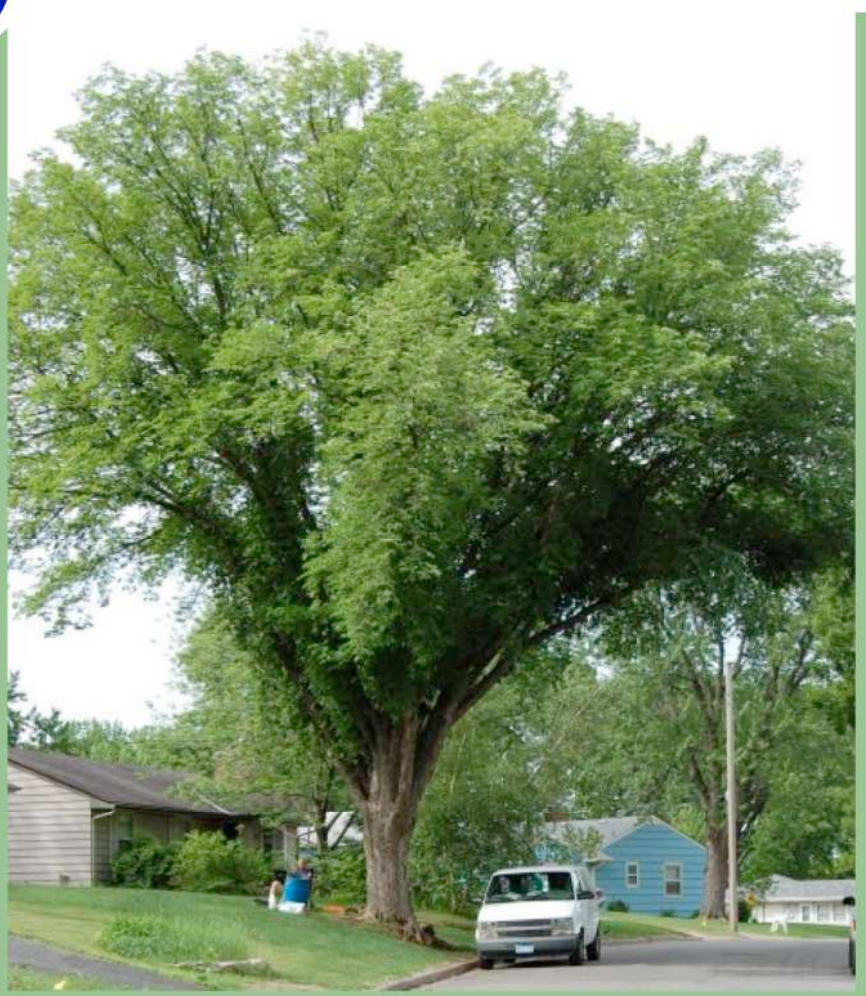


- Stimulates buds directly below cut and usually results in vigorous, upright growth.
- Lower buds do not usually grow unless severely pruned. (epicormic shoots)



Topped Trees

- Vigorous/weak limbs
- Unnatural appearance of tree
- Prone to limb failure



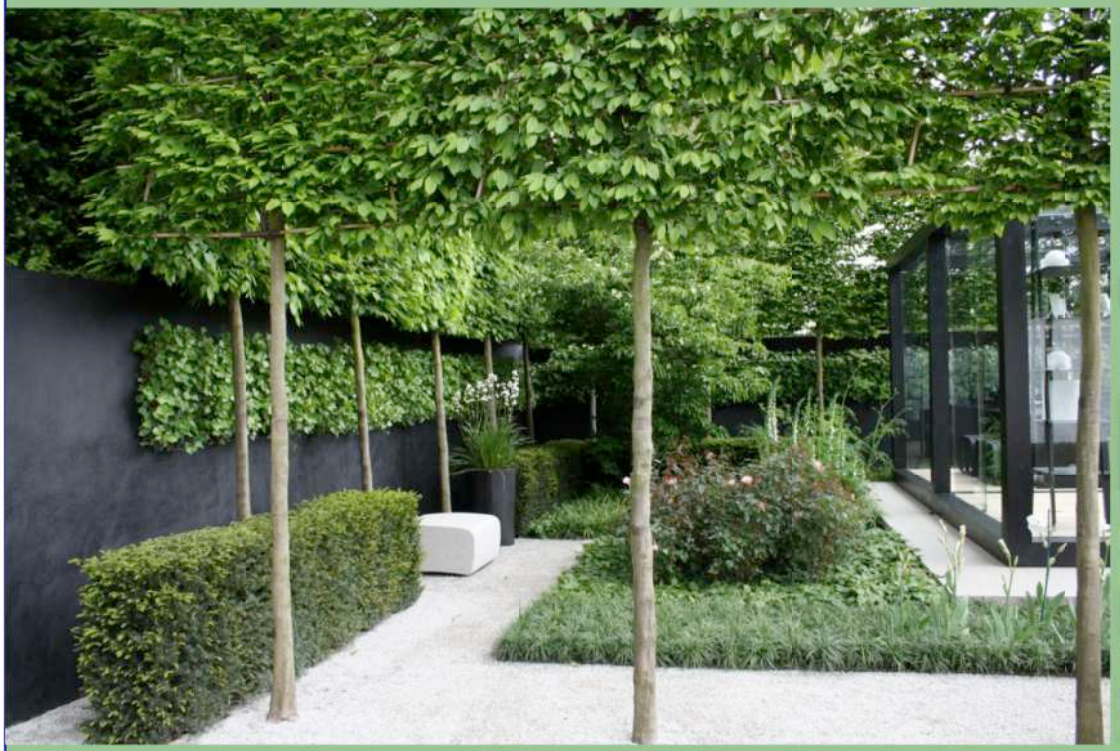
Location of Pruning Cuts

- **"Natural Target Pruning"** appears to be most satisfactory with cuts made only up to the branch bark collar.
- **Avoid flush cuts or "Conventional Pruning"**
- Decay of pruning cuts is less likely the higher in the canopy the cuts are made.

Branch Collar

- The layers of wood behind the branch collar is a decay-resistant structure called the branch core.
- The branch core resists the spread of decay organisms into the parent branch or trunk during the time it takes for the callus, to seal over the wound.

Pollarding and Pleaching

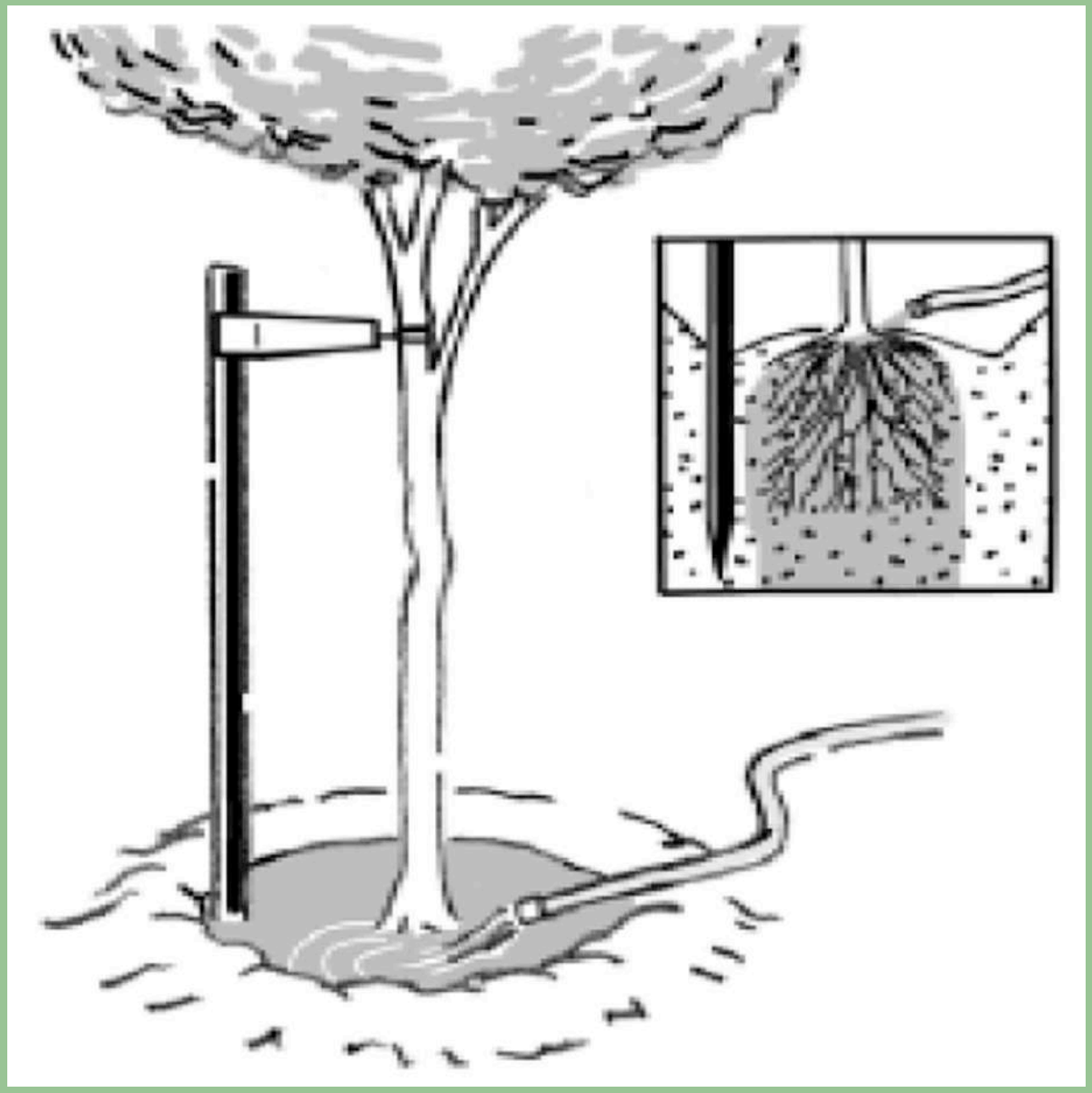


YOUR TREES HEALTHY

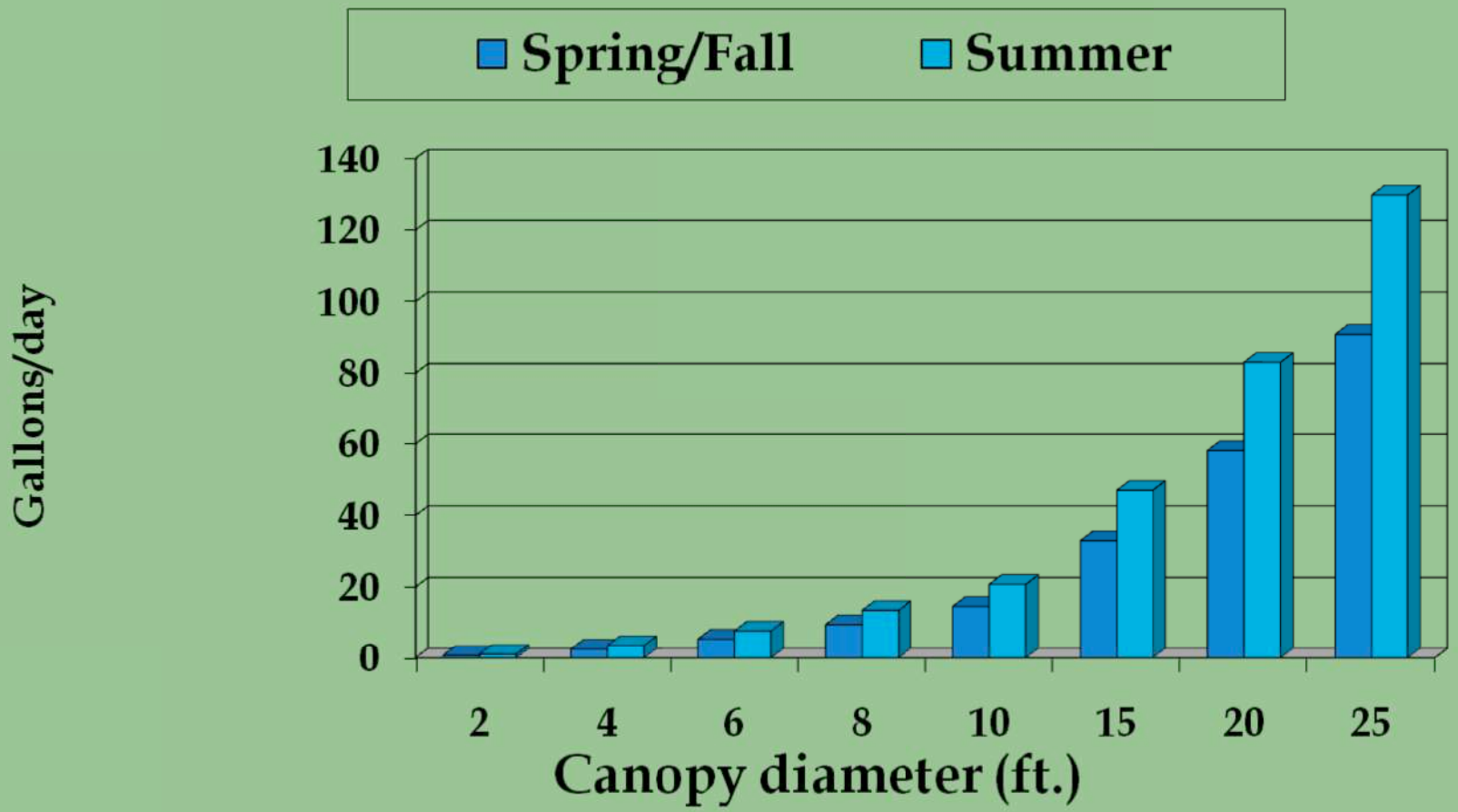
1. WATER
2. MULCH
3. AVOID DAMAGE

Irrigating

- After planting, regular watering is important
- Water where the tree roots are – expand this area as the tree grows
- Irrigate infrequently and deeply
- Tree species, soil type and weather all affect water needs

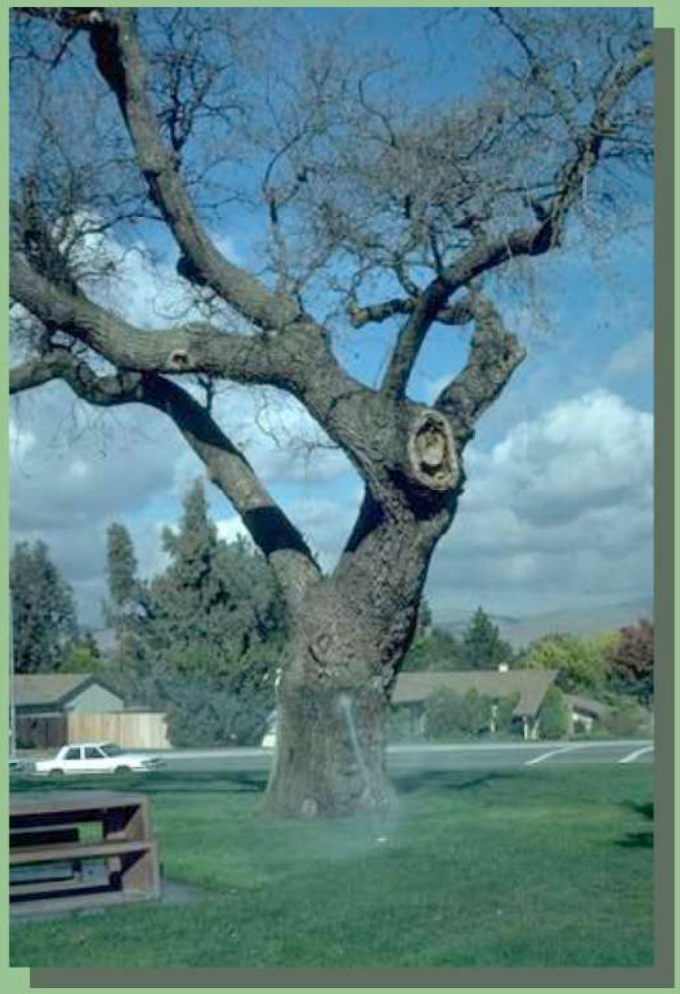


Fruit Tree Water Requirements are Determined by Canopy Size



Water Conservation

- Mulch
- Plant selection
- Hydrozone
- Minimize turf
- Efficient, tree friendly irrigation systems
- Audit your irrigation system
- Manage irrigation to avoid run-off



String Trimmers = Bad

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