

# Irrigation Management for Urban Trees

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**Get Ahead or Get Parched: Six Ways to Survive the Drought**

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# A Common Sight in 2014



# Recognize water stress

- Initial
  - Color change to grayish green
- Temporary
  - Flagging, wilting
- Permanent wilting
  - Desiccation, drying
  - Nonrecoverable





# Secondary effects

- Susceptibility to borers
  - Ambrosia beetles
  - Longhorned eucalyptus borers
  - Pacific flatheaded borers
  - Shothole borers



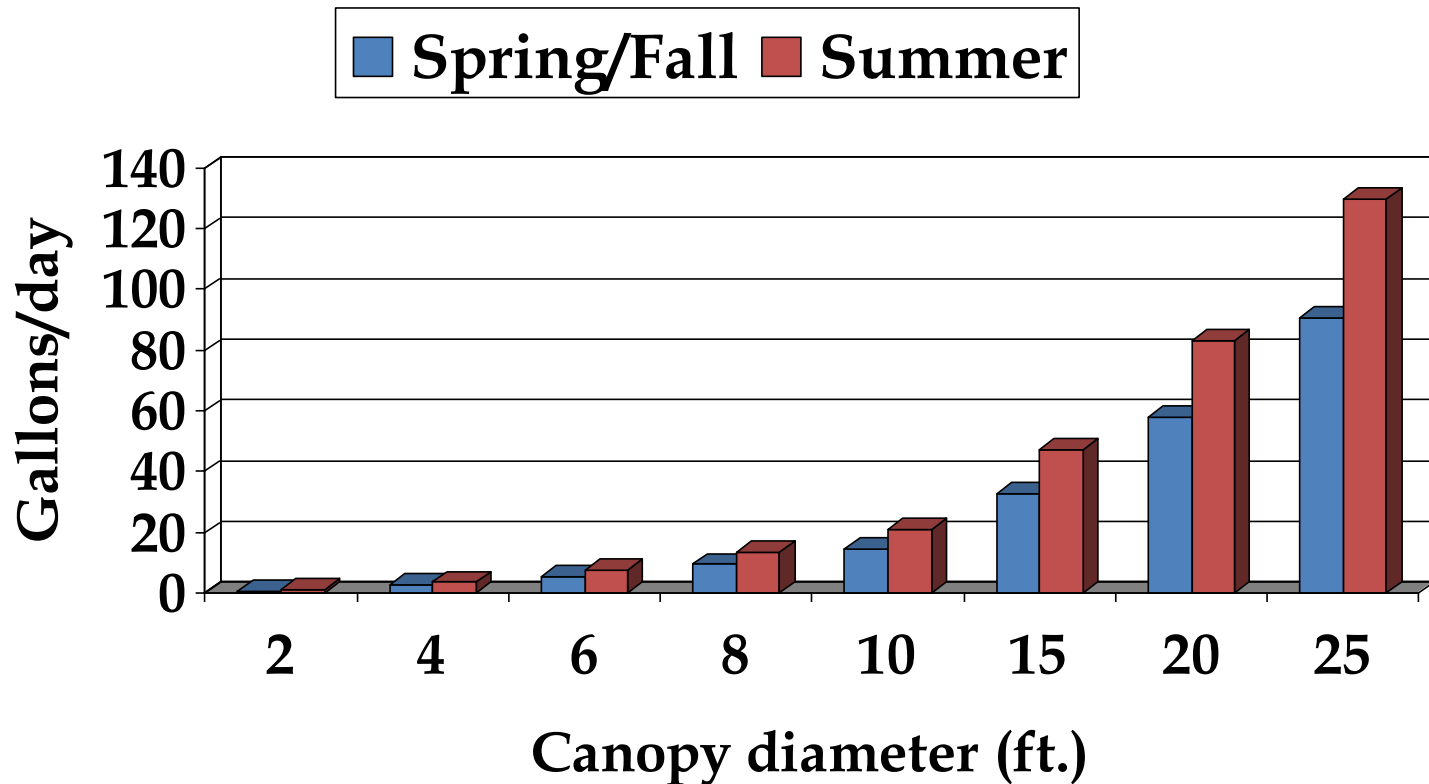
# Things that increase water use

- Heat absorbing surfaces nearby
  - Parking lots
  - Large concrete surfaces
  - West and south facing walls



# Fruit Tree Water Use – Central Valley

## Based on Tree Size



Source: The Home Orchard, UC ANR



# Fruitless Mulberry

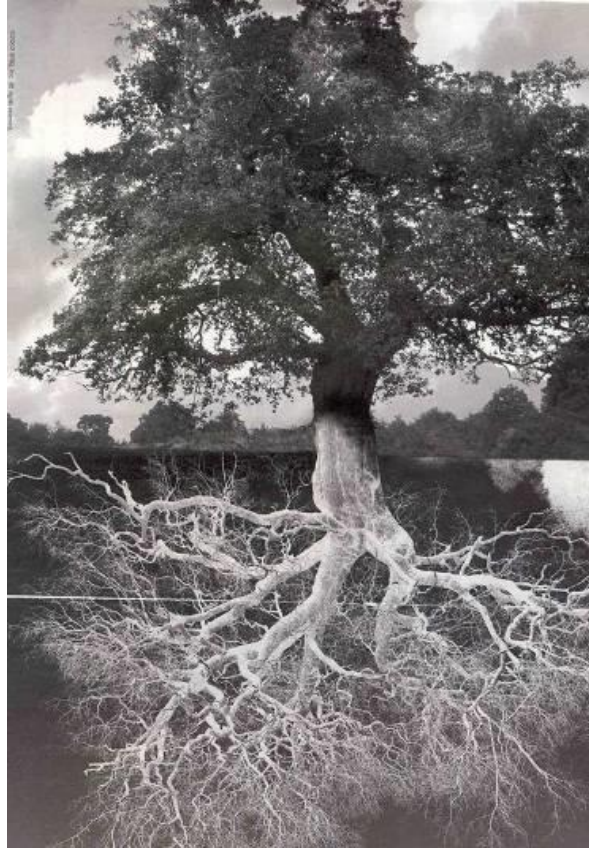
Unheaded  
(Using more water)



Headed Annually  
(Using less water, initially)



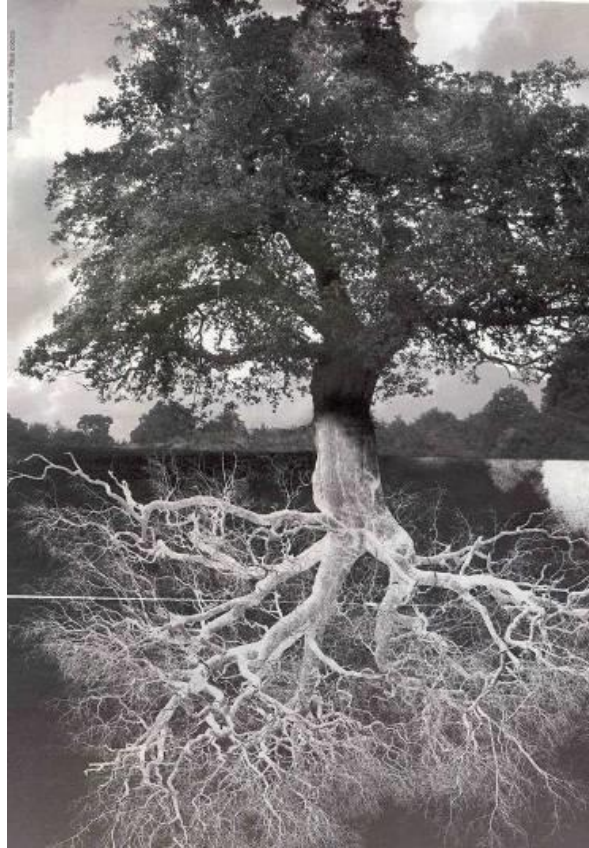
# Tree Root Growth



Mimics Top  
Growth



# Tree Root Growth



Mimics Top  
Growth

**NO!!**

# Depth of Rooting

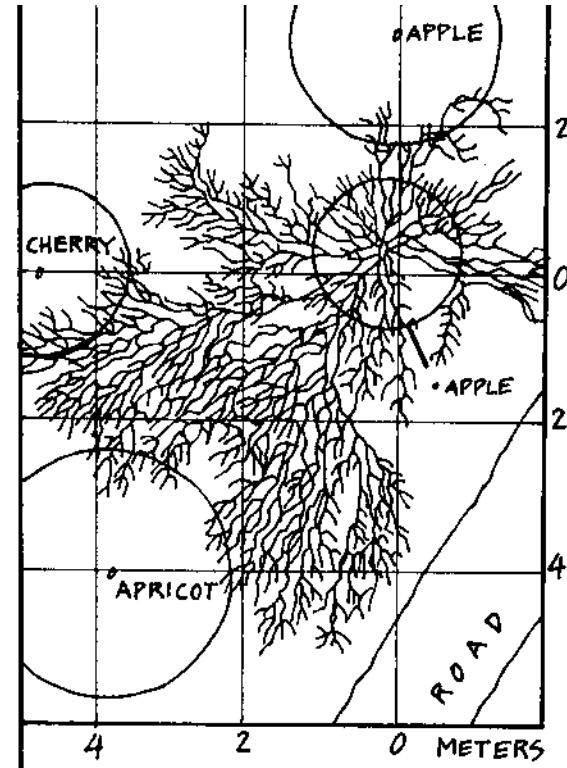
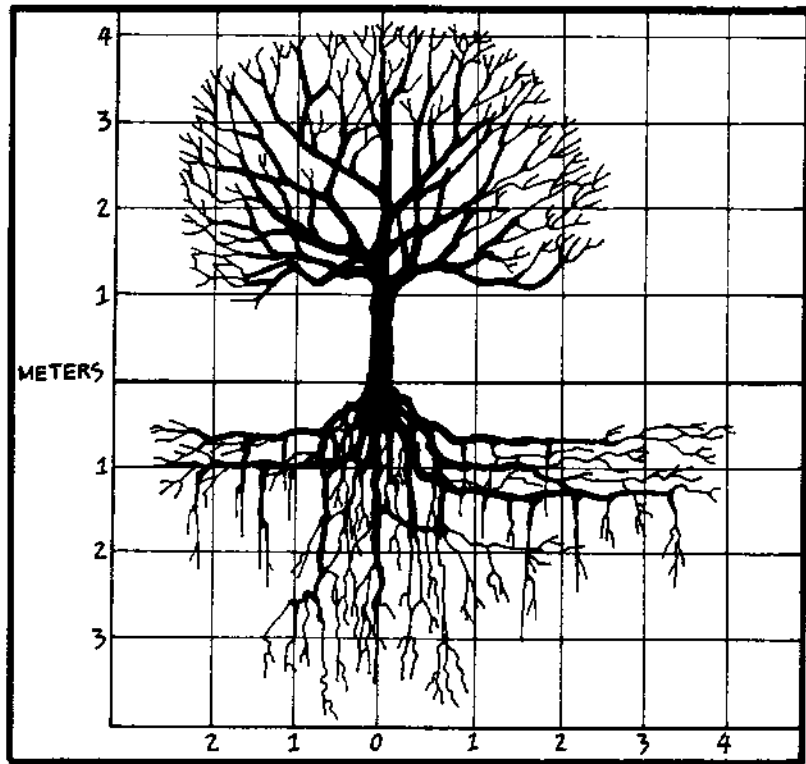
(Majority of Roots)

Turf - 8 to 12 in.

Shrubs - Small – 1 ft.  
- Large – 2 ft.

Trees - Small – 2 ft.  
- Large – 3 ft.

# Actual Root Growth of Mature Fruit Trees



Source: Roots Demystified, R. Kourik



# Root System of Mature Ginkgo Tree

Considered Deep Rooted



# Trees in lawns

## What's the problem?

- Improper tree selection
- Poor irrigation management
- Shallow roots





# Dry and Compacted Soil



Shallow soil & watering  
reduce drought tolerance  
and anchorage





# Know Your Soil

## Determines how often to water



Sandy

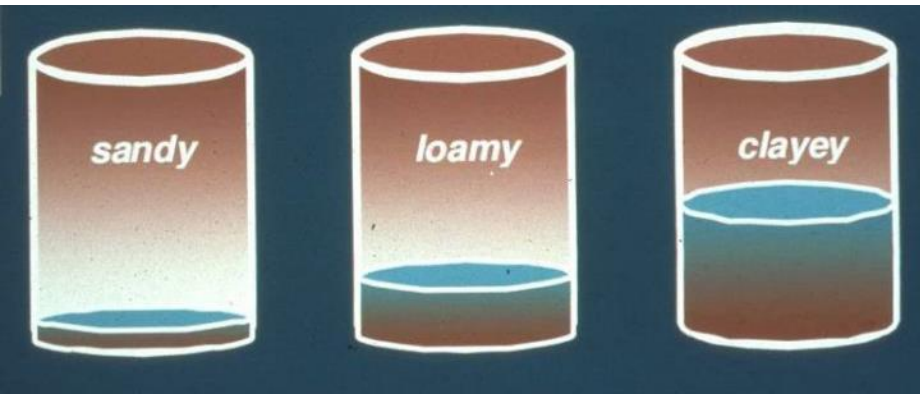


Clayey



# Soil Texture Affects Soil Moisture

## Water Holding Capacity

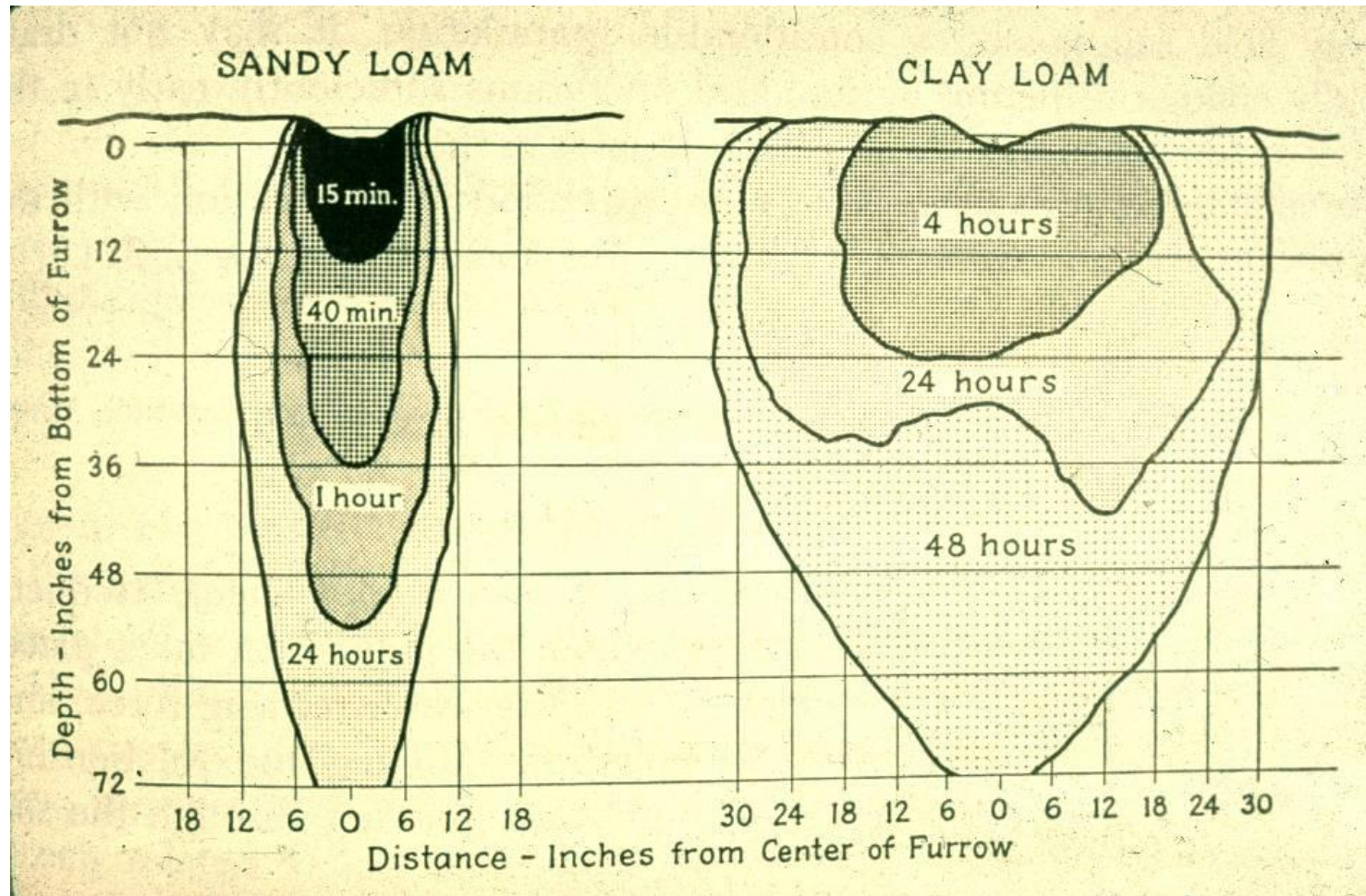


## Permeability





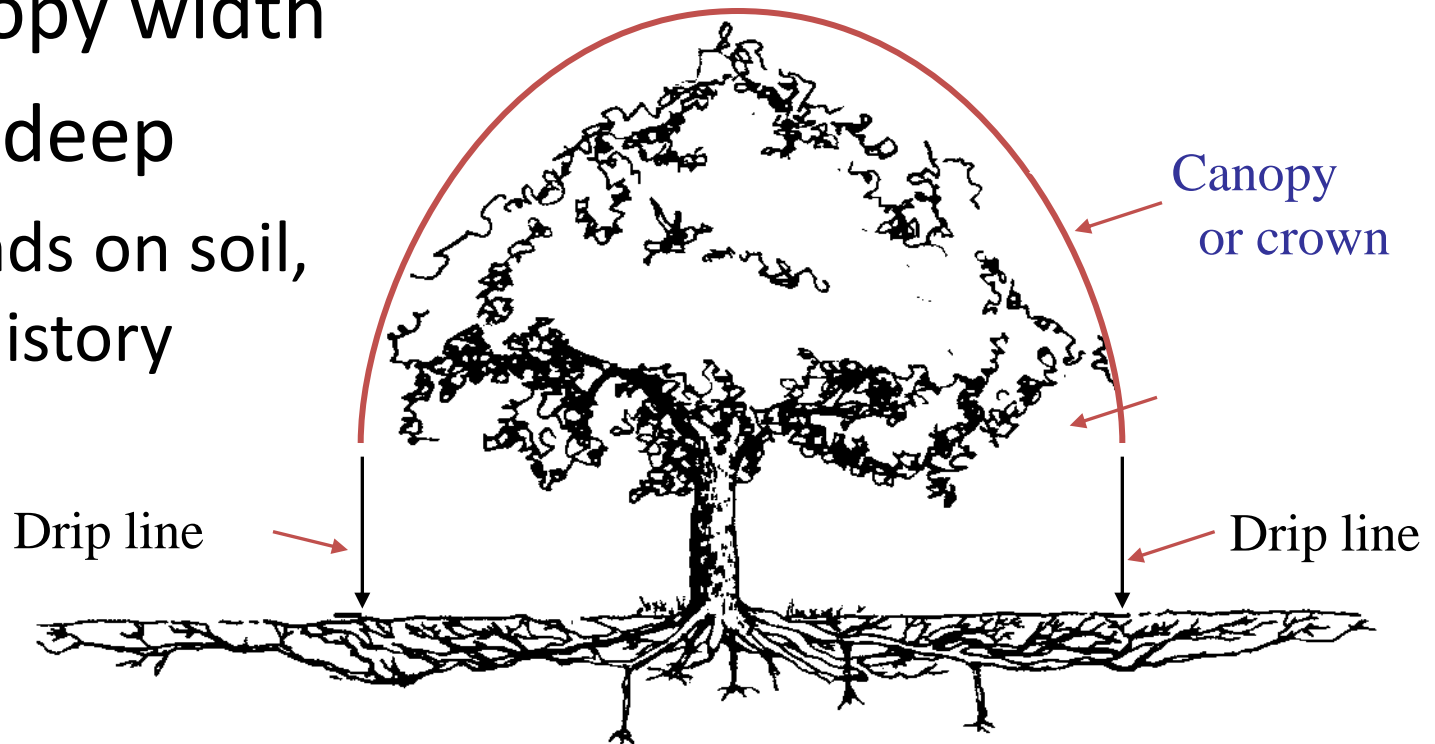
# Soil Texture Affects Soil Wetting





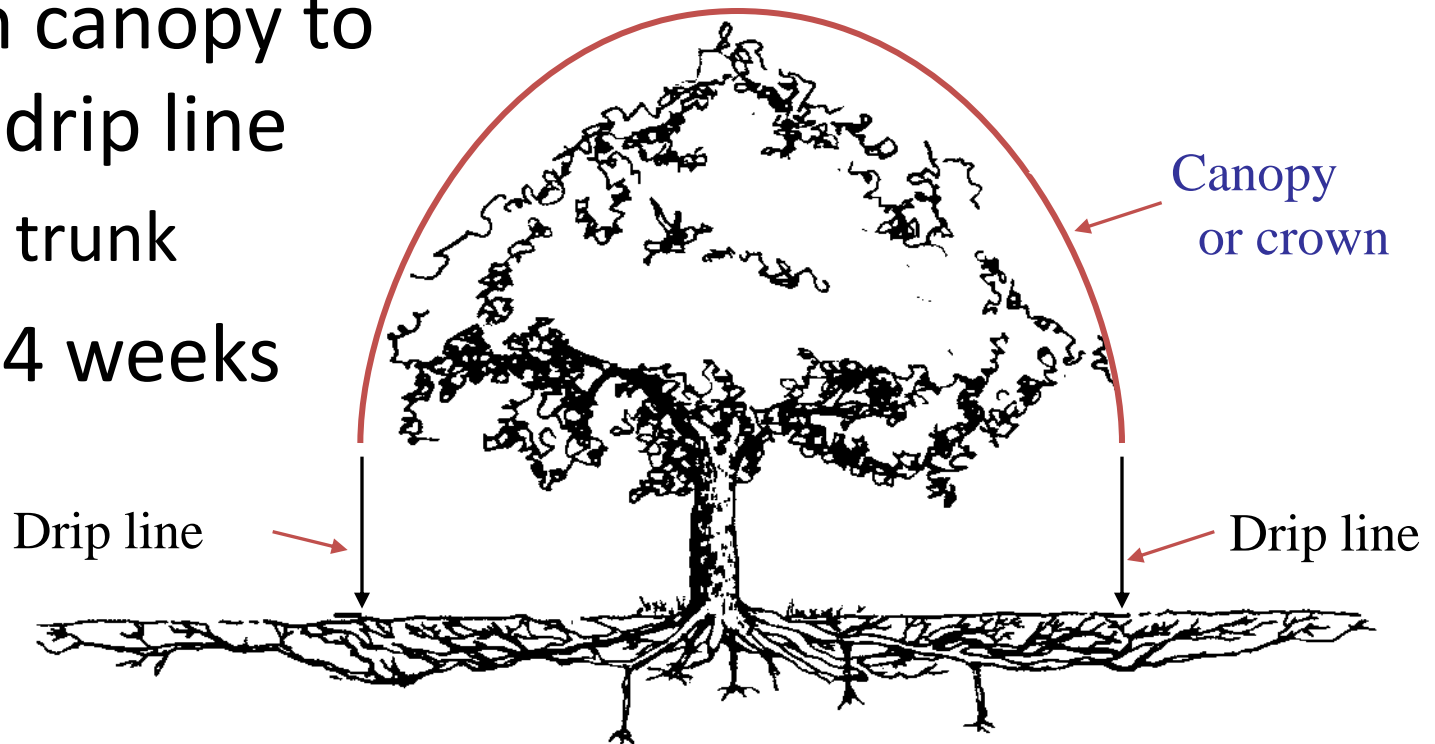
# Mature Tree Roots

- Often extend 2-3 times the canopy width
- May be deep
  - Depends on soil, irrig. history



# Where & When to Irrigate

- Deep to 2 -3 feet
- Beneath canopy to beyond drip line
  - Not at trunk
- Every 2-4 weeks





# Keeping Trees Irrigated in Lawn Conversions







# “Tree Ring Irrigation Contraption”

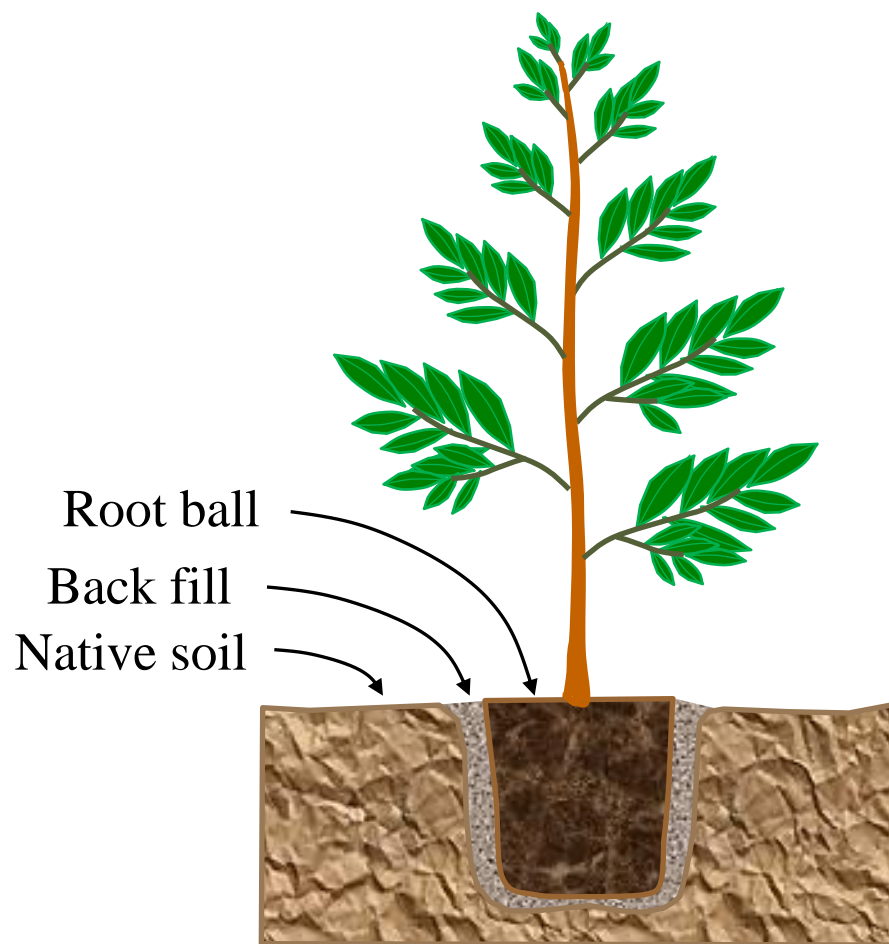
Loren Oki and Dave Fujino

- Calculates irrig. run time to wet a tree to 36” deep
- Input info for 1’ spacing:
  - Canopy radius, soil type, no. of 100’ drip lengths (Netafim)
- <http://ccuh.ucdavis.edu/>



# Watering New Trees

- Roots are mostly within container soil ball
- Roots may be just entering native soil
- Takes several years to fully establish



Graphic by L. Oki

# Key Elements for Landscape Water Conservation

- Plant selection and design
- Composting and mulching
- Fertilization
- Maintenance
- Irrigation management
- Choosing which plants get water



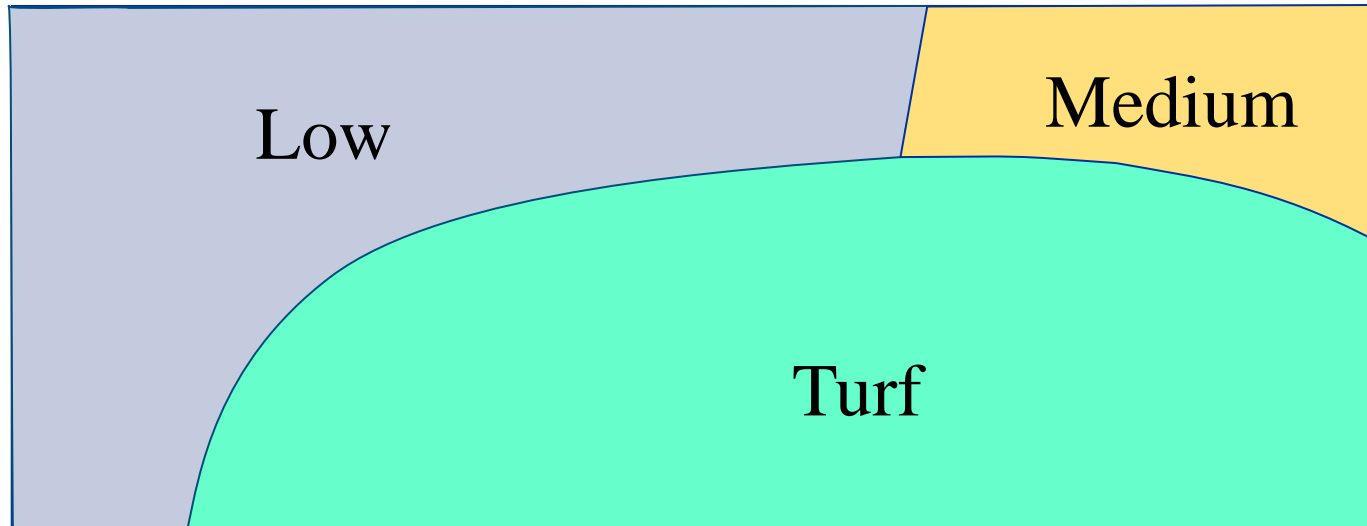
# Plant selection & design

- Hydrozones
  - Plants with similar water use are grouped within an irrigation zone
  - Obtain information on plant water use
    - WUCOLS-  
Water Use Classification of Landscape Species

[www.ucanr/sites/WUCOLS](http://www.ucanr/sites/WUCOLS)

# Plant selection & design

- Hydrozones
  - Group plants with similar water within an irrigation zone



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# WUCOLS IV

## Water Use Classification of Landscape Species

**Home Page**

- User Manual
- Plant Search Instructions
- Plant Search Database
- Download WUCOLS IV Plant List
- Download WUCOLS IV User Manual
- Water Requirements for Turfgrasses
- Partners
- Acknowledgements


### Home Page

**GETTING STARTED**

If you are using the WUCOLS list for the first time, it is essential that you read the *User Manual*. The manual contains very important information regarding the evaluation process, categories of water needs, plant types, and climatic regions. It is necessary to know this information to use WUCOLS evaluations and the plant search tool appropriately. To access the *User Manual*, click on the tab (on left) and view specific topics.

Water conservation is an essential consideration in the design and management of California landscapes. Effective strategies that increase water use efficiency must be identified and implemented. One key strategy to increase efficiency is matching water supply to plant needs. By supplying only the amount of water needed to maintain landscape health and appearance, unnecessary applications that exceed plant needs can be avoided. Doing so, however, requires some knowledge of plant water needs.

WUCOLS IV provides evaluations of the Irrigation water needs for over 3,500 taxa (taxonomic plant groups) used in California landscapes. It is based on the observations and extensive field experience of thirty-six landscape horticulturists (see the section "Regional Committees") and provides guidance in the selection and care of landscape plants relative to their water needs.



WUCOLS IV provides an assessment of irrigation water needs for over 3,500 taxa. Photo by Ellen Zagory.

#### Project Background

The WUCOLS project was initiated and funded by the Water Use Efficiency Office of the California Department of Water Resources (DWR). Work was directed by the University of California Cooperative Extension, San Francisco and San Mateo County office. The first edition of the guide was completed in 1992. A second edition was published in 1994, and a third edition in 1999. In each new edition, additional species were evaluated and included.

#### Current Update: The 4th Edition (2014)

The 4th edition represents a substantial expansion in the number of plant evaluations. Over 1,500

[www.ucanr.sites/WUCOLS](http://www.ucanr.sites/WUCOLS)



# Choose Low Water-Using Tree Species

## Examples:

Plant Name	Common name	WUCOLS
		rating
<i>Cercis occidentalis</i>	western redbud	VL
<i>Chilopsis linearis</i>	desert willow	VL
<i>Prunus ilicifolia</i>	holly leaf cherry	L
<i>Quercus chrysolepis</i>	golden cup oak	VL
<i>Quercus douglasii</i>	blue oak	VL
<i>Quillaja saponaria</i>	soapbark tree	L
<i>Vitex agnus-castus</i>	chaste tree	L

# Mulching

- Reduces direct evaporation, soil temperatures
- Acts like a blanket over the soil
- 2-4 inch layer



# Fertilization

- Reduce
  - Limit plant growth
  - Maintain plant health





# Prioritizing Plants to Irrigate

## Considerations:

- Cost of replacement
- Beneficial use
  - Example: City of Folsom
    1. Top Priority: Maintain trees
    2. Active sports fields
    3. Ornamental plantings
    4. Non-active or ornamental turfgrass

# Reduce tree water requirements

- Light pruning to reduce leaf area
  - DO NOT prune heavily
- Change irrigation schedule SLOWLY
  - Example:
    - 3x per week original schedule
    - 2x per week for 2 weeks
    - 1x per week for 2 weeks
    - Finally, 1x per month
- Watch for drought symptoms
  - Adjust as needed

# Summary

- Water use depends on tree size
- Know your soil
- Proper plant selection and design
- Prioritize plants to water
- Use compost and mulch, reduce fertilizer
- Water deeply, but not too often
- Avoid runoff, apply water slowly
- Keep water away from tree trunks