



# Weber Basin Water Conservancy District Tree Selection

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Spring 2025



# The Importance of Trees

- Trees are the largest, most dynamic, and long-lived components of the urban landscape
- Trees can take many years (sometimes 100+) to reach their full potential
- Urban trees face many challenges with soils, limited growing area, improper or no maintenance, irrigation issues, and others



Sycamore- Split, Croatia

# Benefits of Urban Trees

- Form
- Flowers
- Fruits Leaf color
- Bark
- Seasonal variation
- Special forms
- Recreation

*Tilia cordata* Stockholm, Sweden



Girl Scout Tree Climbing- Salt Lake City, Utah

# Practical Benefits of Urban Trees

- Sequester carbon
- Create ecosystems
- Provide oxygen
- Cooling shade
- Filter pollutants from the air
- Create wildlife habitat



Owls in poplar tree- Garden City, Utah

# Additional Benefits of Urban Trees

- Deflect noise and wind
- Block unwanted views
- Protect soil from erosion
- Reduce rain runoff by capturing and holding rainwater on leaves and branches
  - One study found that a typical medium sized tree can intercept as much as 2380 gallons of rainfall per year.



Allée of London Plane Trees- Salt Lake City, Utah

# Matching Tree and Site

- Environmental characteristics of the planting site determine the relative success of trees on the site
- Light, water, soil conditions, growing space, and climate (microclimate)
- By selecting the right tree for the right site, a tree's chances for survival increase and ongoing maintenance: costs of pruning, fertilization, use of pesticides, irrigation needs, and possible replacement are reduced



Street tree- Bogota, Colombia

# Issues with Tree Selection on a Site

- Many of our most attractive and desirable ornamental plants, i.e., those that flower or fruit or are prized for their bark, are naturally found in the understory of the forest. Examples include birch, dogwood, and redbud.
- When these or similar species are positioned in full sun, often competing with turf and garnering limited water, they are perpetually under stress.
- This stress from a poor choice of location also increases susceptibility to native borers or diseases, because they can't mount a vigorous response. PHC treatments often address the symptoms of these poor location choices by controlling the attacking pest. Yet, modern arboricultural standards suggest ameliorating soil and growing conditions to help improve the tree's long-term prospects, thus reducing the impact of peer pressure.
- Rob Gorden *Arborist News* February 2023

# Proper Tree Selection Long Term Benefits



American elm (*Ulmus americana*) Cache County Courthouse. Logan, Utah

# Adaptability

- Species genetic ability to adjust to different environmental conditions
- Some species are more adaptable than others
- Some fairly adaptable species- red maple, London plane tree, Siberian elm, Russian olive, black locust.



Siberian elm and black locust growing at an unirrigated site. West Desert, Utah.

# Tree Selection Websites or Apps

- Virginia Tech Tree ID App
- 969 North American Species

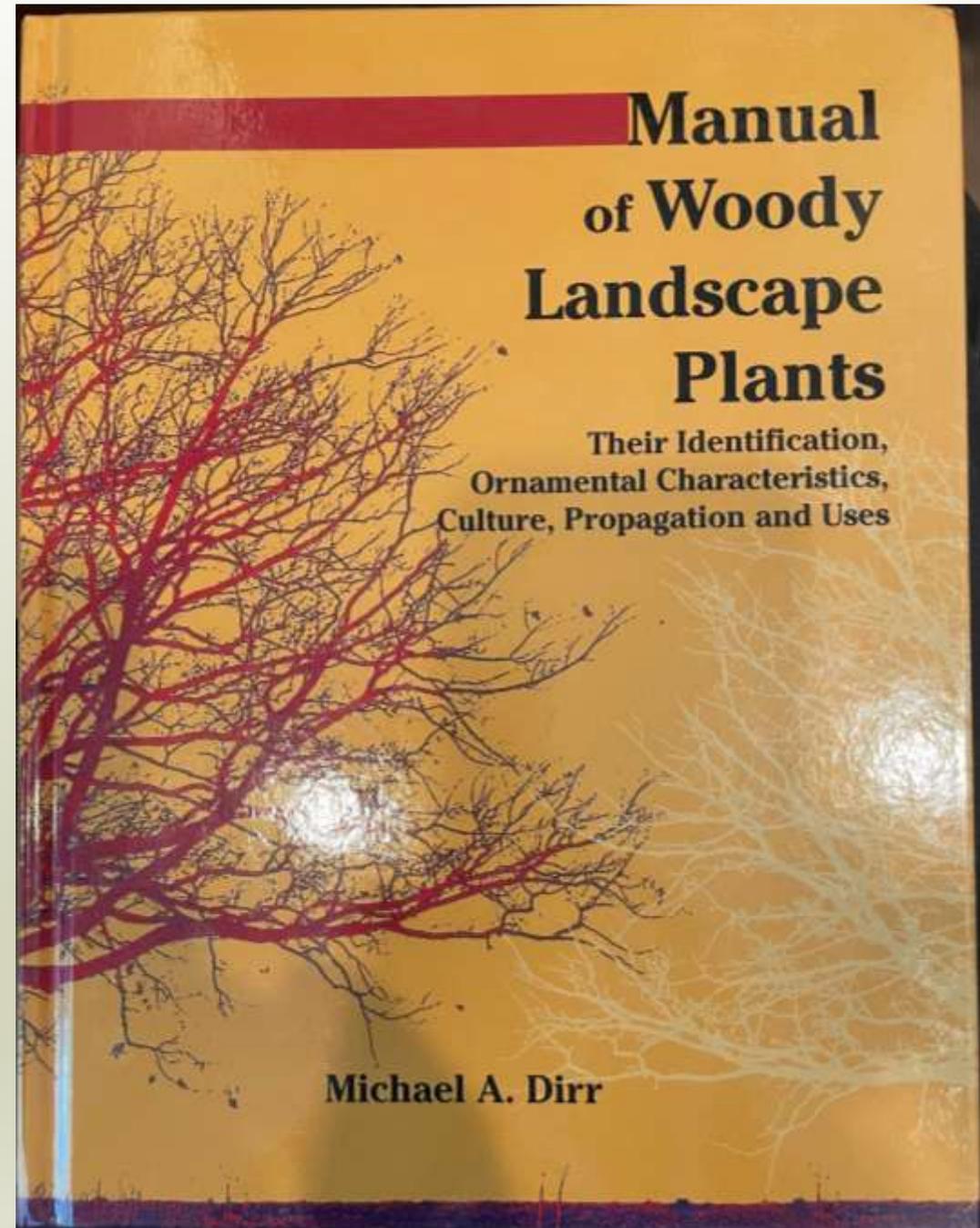


- USU Tree Browser
- <https://treebrowser.org/>
- Data base with photos and descriptions of 245 species found in Utah and the Intermountain West



# Other sources of information

- Consult local Certified Arborists- they have a lot of practical knowledge and understand unique local conditions
- Many good books and online sources
- Local university extension agent
- Local nurseries may or may not be a good source of information



# Site Analysis

- Evaluates pertinent site conditions to determine factors that will affect plant selection
- What are site limiting factors that should be considered?

Tree growing through crack in pavement. Rome, Italy



# Improper Tree Siting Issues



*Cercis canadensis* cultivar- Logan, Utah



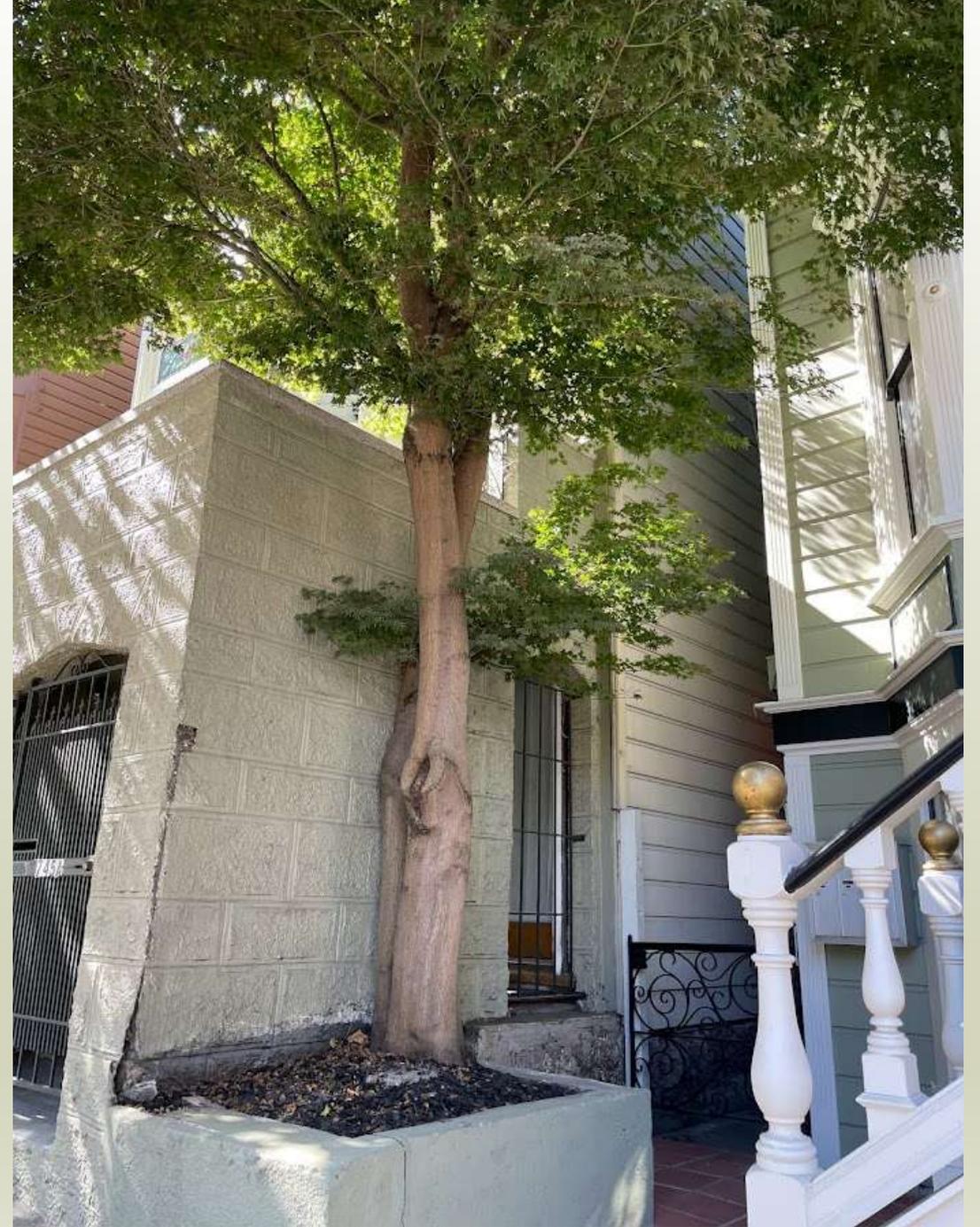
1100 North 1200 East. Logan, Utah

# Scale Issues

- Consider scale in tree selection
- Mature size of tree
- Available growing space above and below ground
- Potentially; large area=large trees

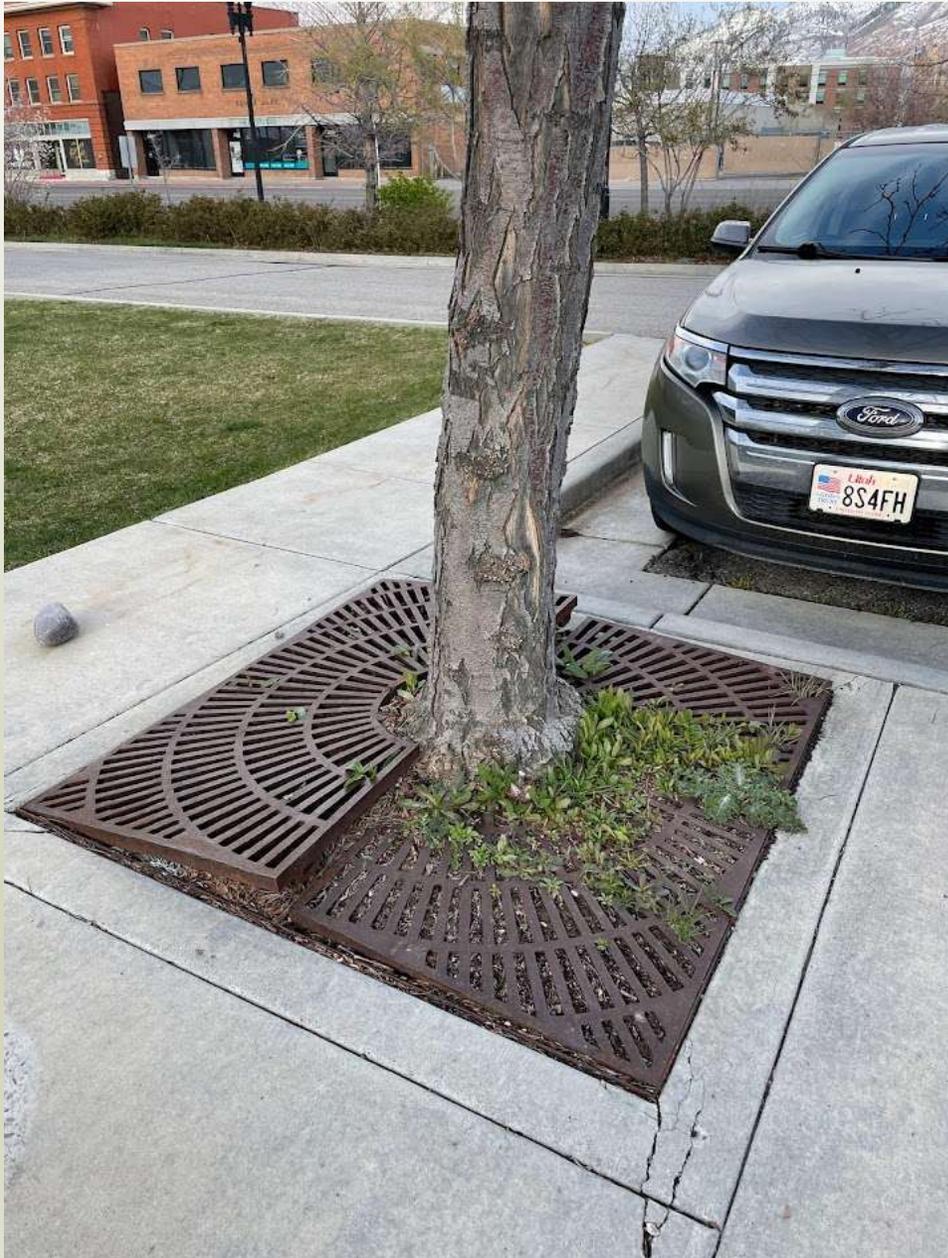
# Growing Space

- Consider the following:
  - Mature height
  - Branch spread
  - Trunk diameter
  - Root volume/soil volume

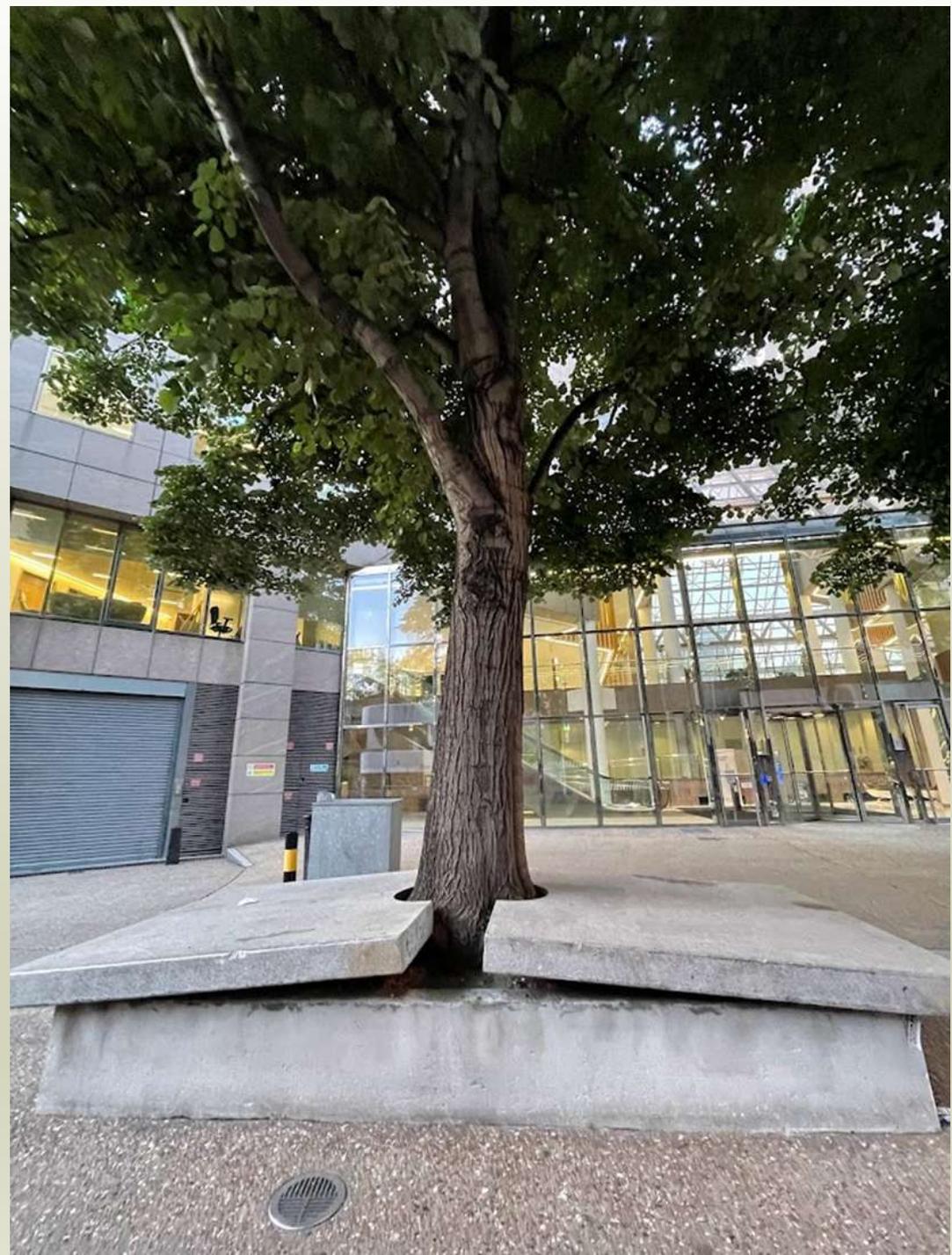


Residential tree. San Francisco, California

# Infrastructure Issues



Ogden, Utah and London,  
England



# Root Conflicts



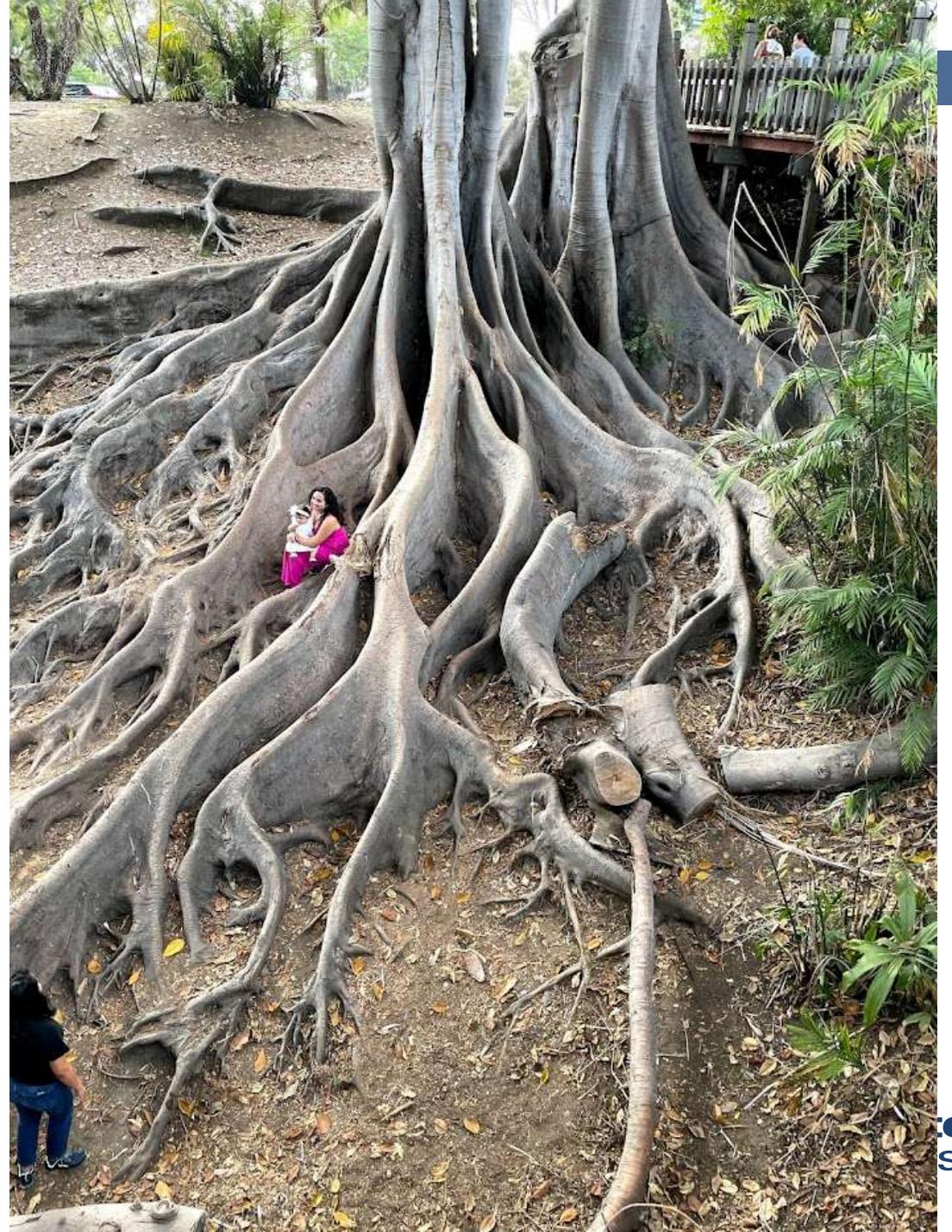
*Zelkova serrata*- Bountiful, Utah



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*Ficus*- Balboa  
Park, San Diego



# Microclimate

- The climate of a very small or restricted area, especially when this differs from the climate of the surrounding area.
- Can be affected by buildings, topography, pavement, and other surroundings
- Can allow trees not hardy to the region to grow in a microclimate
- Example of freeze of October 2020



Japanese maple- The Avenues. Salt Lake City, Utah

# Microclimate Issues

- Low or high light levels
- Reflected heat
- Soil conditions
- Moisture levels
- Twin Falls Temple Beech example
- Oquirrh Mt and Jordan River
  - Plant-fail-repeat
  - Redbud in parking lot

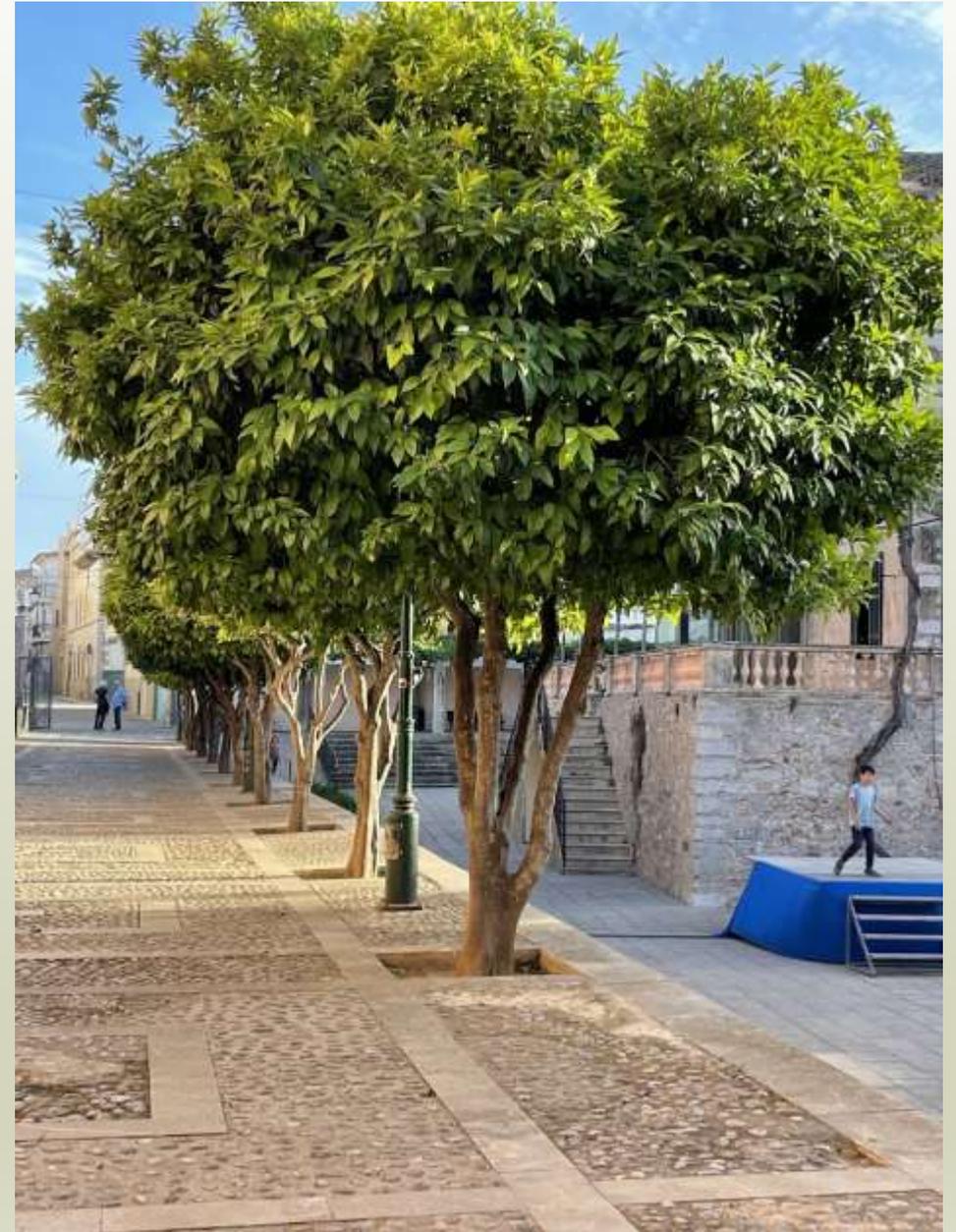


Church parking lot- Logan, Utah

# Site Characteristics to Consider

- Climate
- Soil (texture and pH)
- Planting site
- Other plantings
- Maintenance to be provided
- Aspect
- Sun exposure

One decimal point on the pH scale can mean success or failure for the tree.



Artà, Spain

# Tree Characteristics to Consider

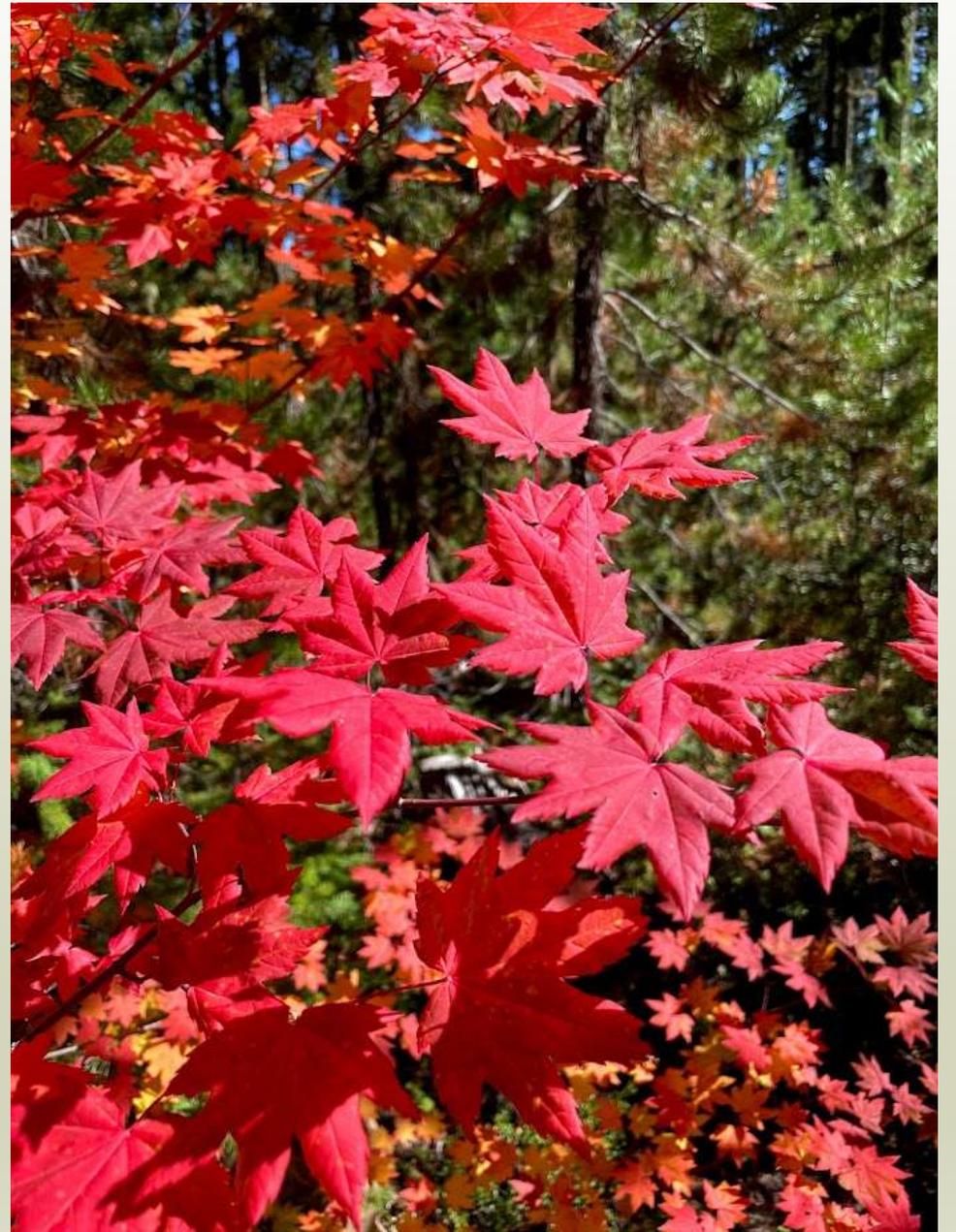
- Hardiness
- Growth habit/form
- Mature Size
- Attributes
- Disease and insect resistance
- Drought tolerance
- Tolerance to drainage problems
- pH requirements
- Salt tolerance
- Light requirements
- Known problems of species
- Maintenance requirements



# Foliage



Tri-colored Beech- Bountiful, Utah



Vine Maple- Oregon



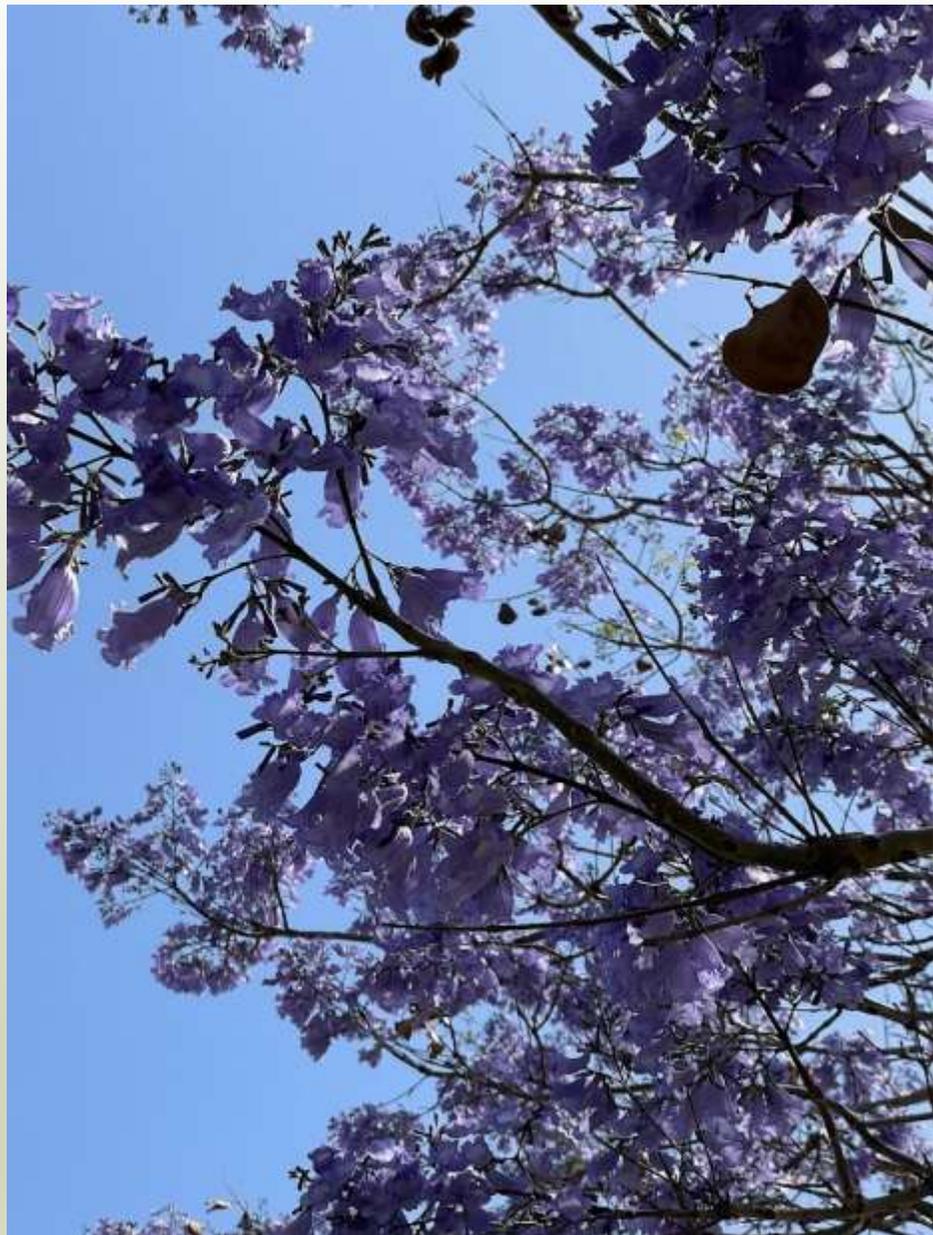
*Acer grandidentatum*- River Heights, Utah left



*Acer negundo* 'Variegatum' Vatican Gardens.  
Rome, Italy right



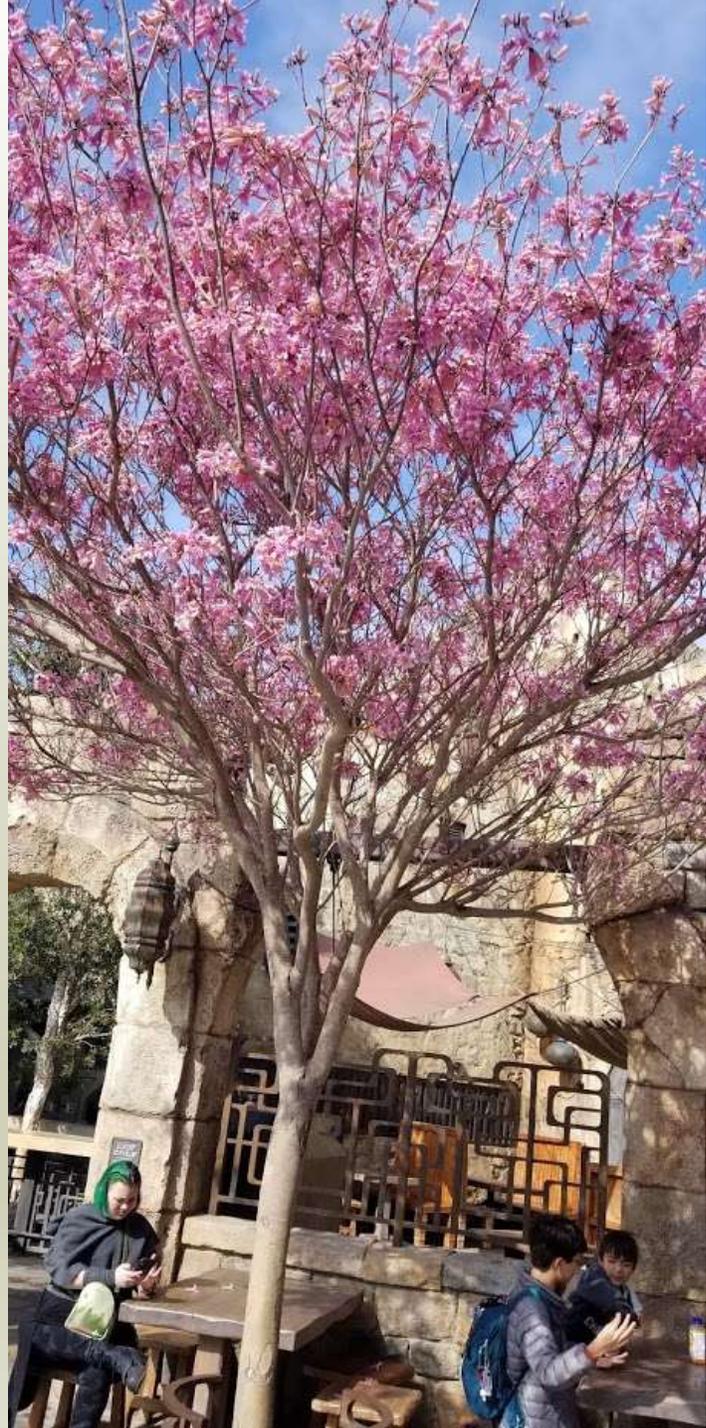
# Flowers



Jacaranda- Palma, Spain



Freeway Park Seattle, Washington





# Attractive Fruit



Maple samaras and crabapples



Douglas-fir and ponderosa pine cones



# Attractive Bark







Eucalyptus  
bark





# Undesirable Foliage?

- Does the tree hold leaves through the winter? Oak, sycamore, beech.
- Are the leaves so large that fall cleanup is challenging? Norway maple, poplar
- Is the growth so dense that other vegetation suffers such as turf?
- Consider if this will be a problem for the client.

# Undesirable Fruit?



Female Ginkgo and Horse-chestnut fruit/seeds

# Messy Bark?



# Flower/Fruit Problems

- Linden flower bracts, ash seeds, maple samaras, honeylocust seed pods, Japanese pagoda tree, flowering plum, sweet gum, horse-chestnut, walnut, crabapples, catalpa, acorns, pine cones, etc.
- Consider if the tree is on the street, over sidewalk, turf, or planting bed to understand ramifications of planting certain trees



Linden flower bracts

# Thorns



Honeylocust and hawthorn thorns

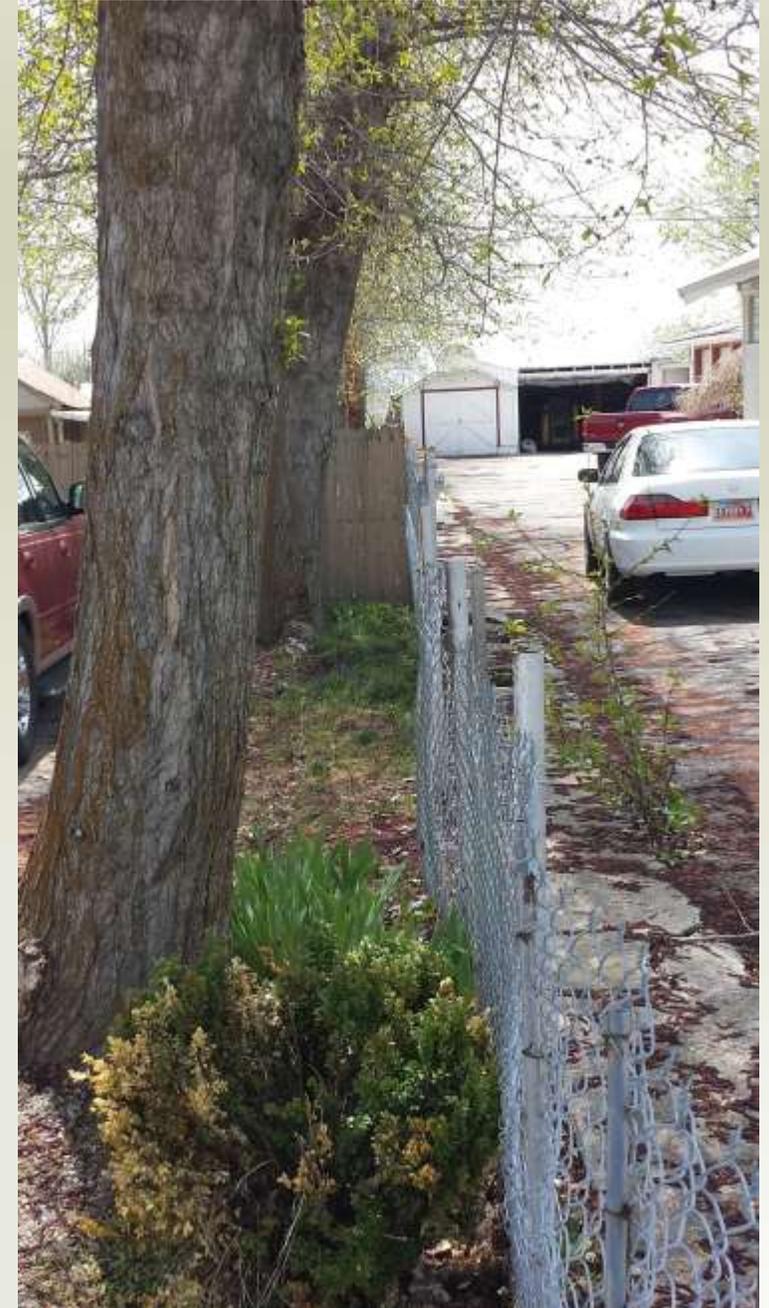


**Floss Silk Tree**  
*Chorisia speciosa*  
Bombacaceae  
Brazil; Argentina



# Fast Growing Trees

- Can often tolerate poor growing conditions and neglect
- Often provide the quick shade that is desired
- Have the ability to destroy infrastructure
- Tend to be somewhat messy
- Can be expensive to remove

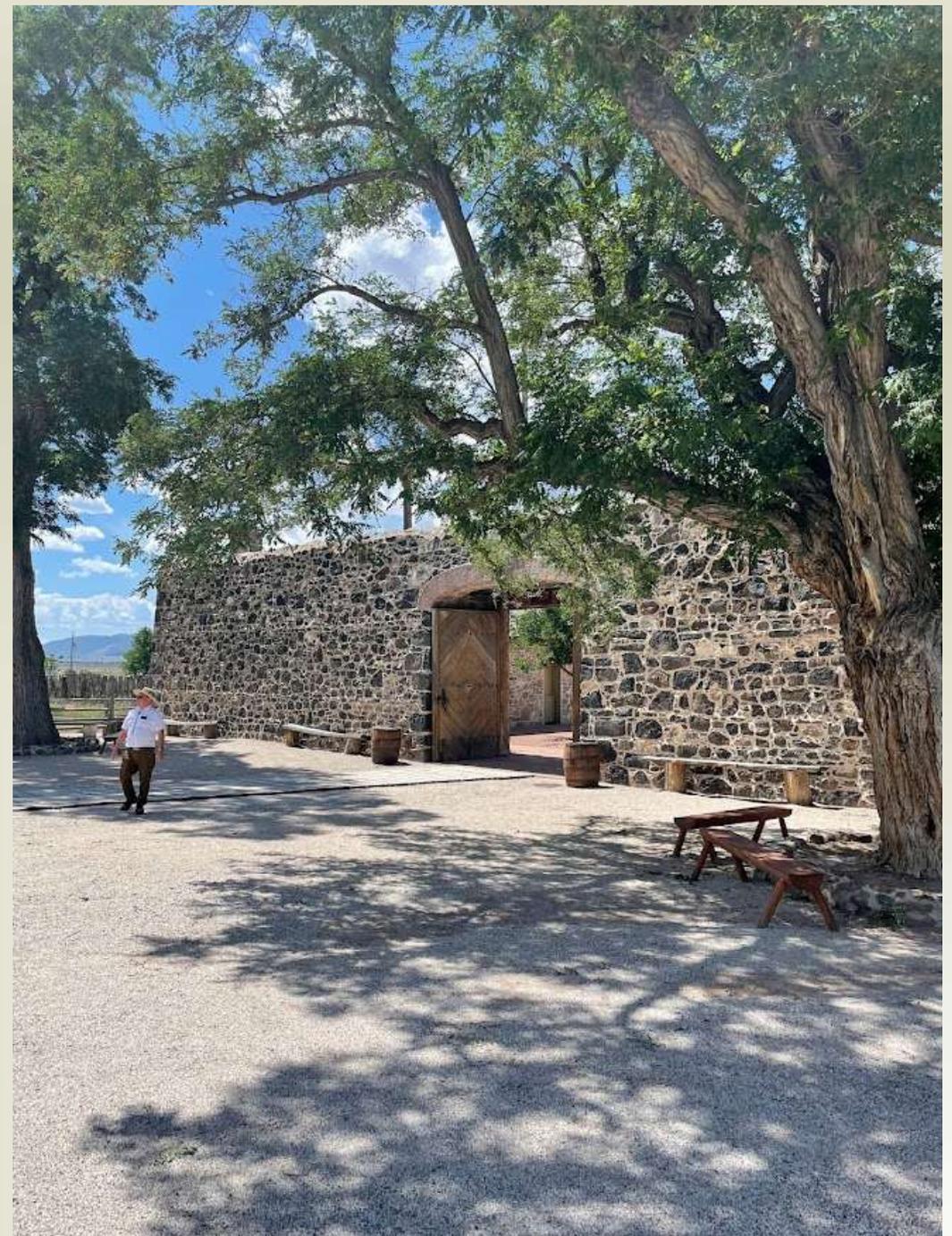






# Hardiness

- Trees should be hardy to the site considering aspect, climate, high and low temperatures, microclimate, precipitation or available irrigation, wind, exposure, humidity, elevation
- Examples are: white bark birches, aspen in the valleys

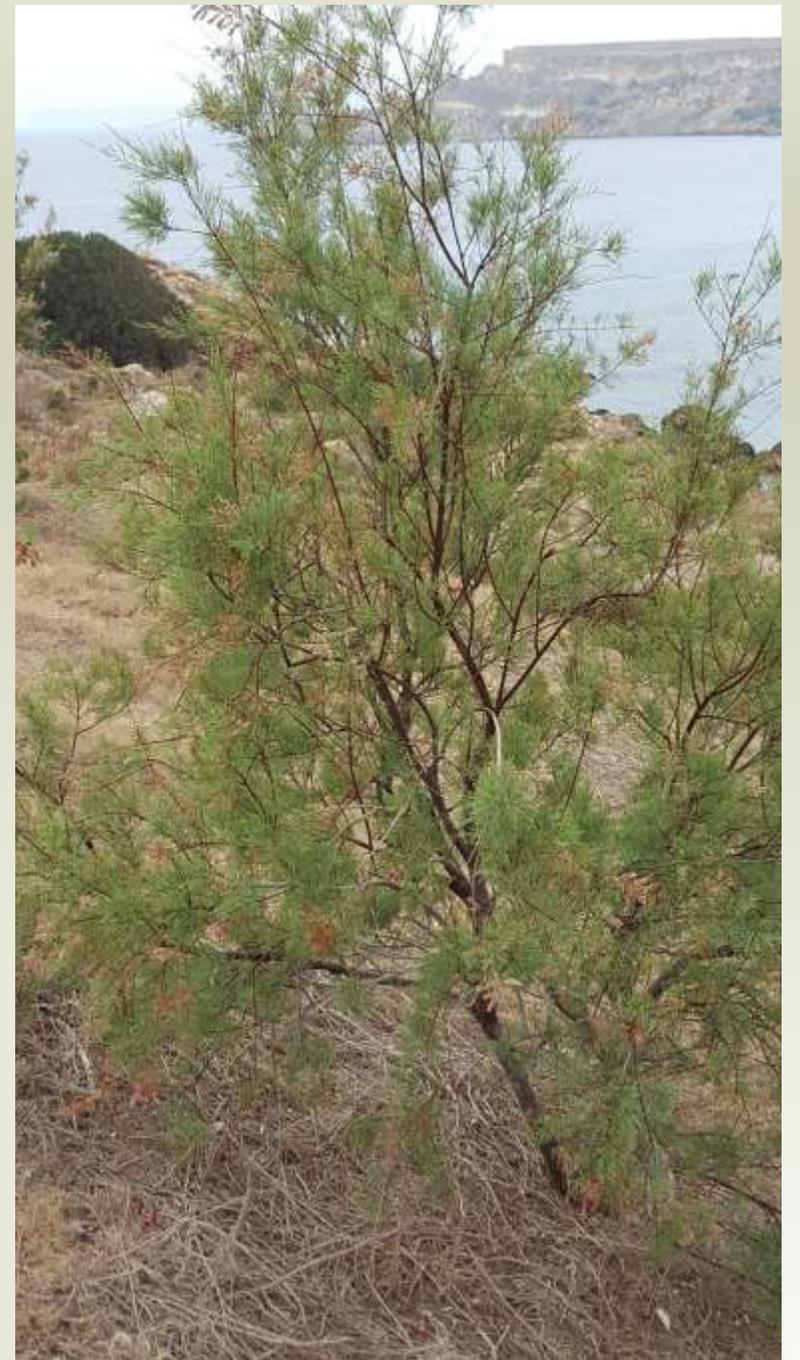


Black locust- Cove Fort, Utah

# Native vs Introduced vs Naturalized vs Invasive

- Are native plants the answer?
- Problems with availability
- Are there ethical issues using naturalized trees? Ailanthus, Russian olive, Norway maple, tamarisk.

Tamarisk- Malta



# *Pyrus calleryana*- Flowering Pear

## (the dark side)

- January 2018 placed on the Ohio invasive species list- outlawed in 2023
- One of the most popular decorative trees in the United States
- When they naturalize, they crowd out native plants
- Branches tend to become structurally unsound and potentially dangerous after about 15 years
- Susceptible to fire blight
- [Flowering pear](#)
- White flowers stink and after the fruit falls it leaves a slippery mess on sidewalks and roads
- Lebanon Ohio is planning to cut down all city owned Callery pears
- “All versions should be banned. All nurseries should be ordered to cease and desist the sale of any form of these pears. Public should be educated about the collateral damage caused by these highly prolific and invasive trees.”







Naturalized flowering pears. South Carolina

# Twisty Baby Locust/Purple Robe Locust

- Is anyone growing the Twisty Baby Locust along the Wasatch Front? I just bought one today...couldn't resist how unique it looks.
- I am wondering what the growth rate is and how well it does in this area? The spot I am thinking about planting it in is part sun but I am wondering if I should plant it in full sun. Would love to see pictures of yours if you have them. Mine is only about 4 feet tall right now and I assume it will grow to about 15 feet. Is that right?
- Linda



I know this response is late but I'll post anyway. I have not grown the 'Twisty Baby' variety but I have had a 'Purple Robe' locust- same family. In my experience, they are rapid growers with lovely, scented flowers. They are also drought tolerant- a huge bonus.

Downside- branches are brittle. Make sure you check for included bark on the branches. I did not do this which is why I am now a 'past' owner of a 'Purple Robe' Locust. The first major side branch had an included bark issue on top of the branch I didn't see. A little cavity developed which caused rot and mold inside the tree. Big wind storm came- lost 1/2 the tree. Lost the rest of it in the next storm.

I wish I still had the tree because I loved it but not sure I'll take a chance on one again. If you planted your 'Twisty Baby' where it had a bit of shelter from wind and watch for included bark, you should be able to love the tree for a long time.



# Twisty Baby Locust/Purple Robe Locust

- Black locust (Not recommended)
- Black locust has fragrant white flowers in spring.
- Black locusts have invasive traits that enable them to spread aggressively. While these trees have demonstrated invasive traits, there is insufficient supporting research to declare them so pervasive that they cannot be recommended for any planting sites. Review of risks should be undertaken before selecting these trees for planting sites. Black locust produces hanging clusters of very fragrant white flowers in spring. This fast-growing native tree can form colonies and has brittle wood. Sharp spines may be present, especially on sucker growth. They are also susceptible to locust borers.
- Planting Considerations: Aggressive, Excessive sucker growth, Highly susceptible to ice damage, Messy fruit/plant parts, Weak wood and branch structure
- Locust borer is a serious pest of black locust.
- The wood is weak and brittle, subject to storm damage.
- This tree can sucker to the point of forming colonies.

# Locust Borer



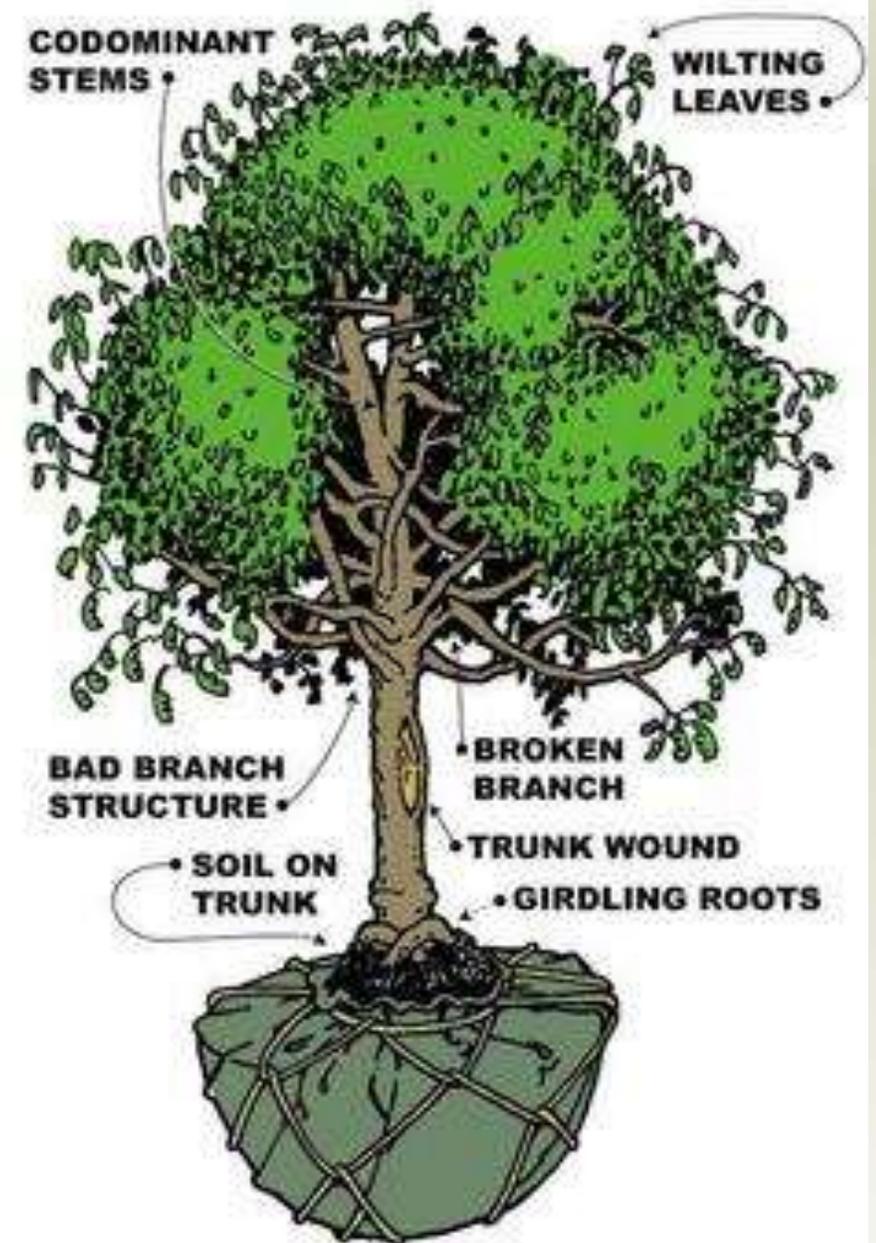
# Selecting Trees in the Nursery

- Why is it important to select quality nursery stock?
- Look for vigorous growth, healthy foliage, absence of disease and insect problems
- Good vertical and radial branch structure
- Good trunk taper
- Absence of structural defects
- Central leader (excurrent) growth usually ideal
- Scaffold branches less than half the diameter of parent stem
- Absence of mechanical damage



# Selecting high quality plants

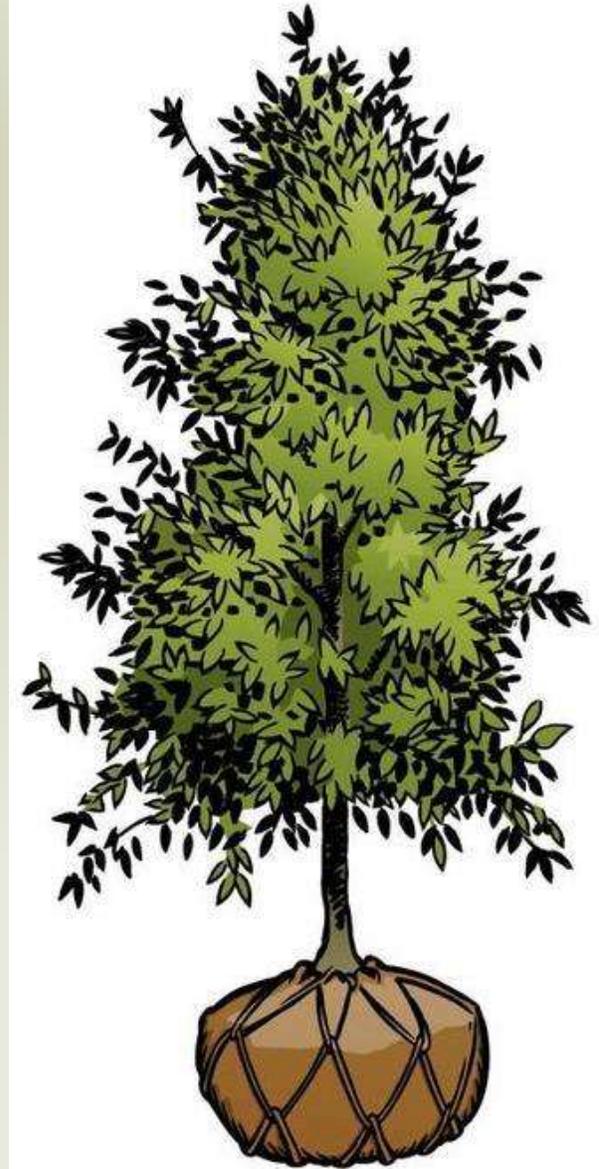
- American Standard for Nursery Stock Z-60.1
- [American Standard for Nursery Stock](#)
- Root quality
  - Containers
    - No circling or girdling roots
    - Full root ball established
    - Not overgrown
- Bareroot and B&B
  - Fibrous roots
  - Previously root-pruned



# Quality Planting Stock

Solid root ball, good trunk taper, proper radial spacing, dominant central leader, healthy foliage.

Take home: Make the effort to choose trees that are well matched to the conditions, site, and future management. Trees should not be a temporary or rotating feature of a landscape. **CHOOSE WISELY!**



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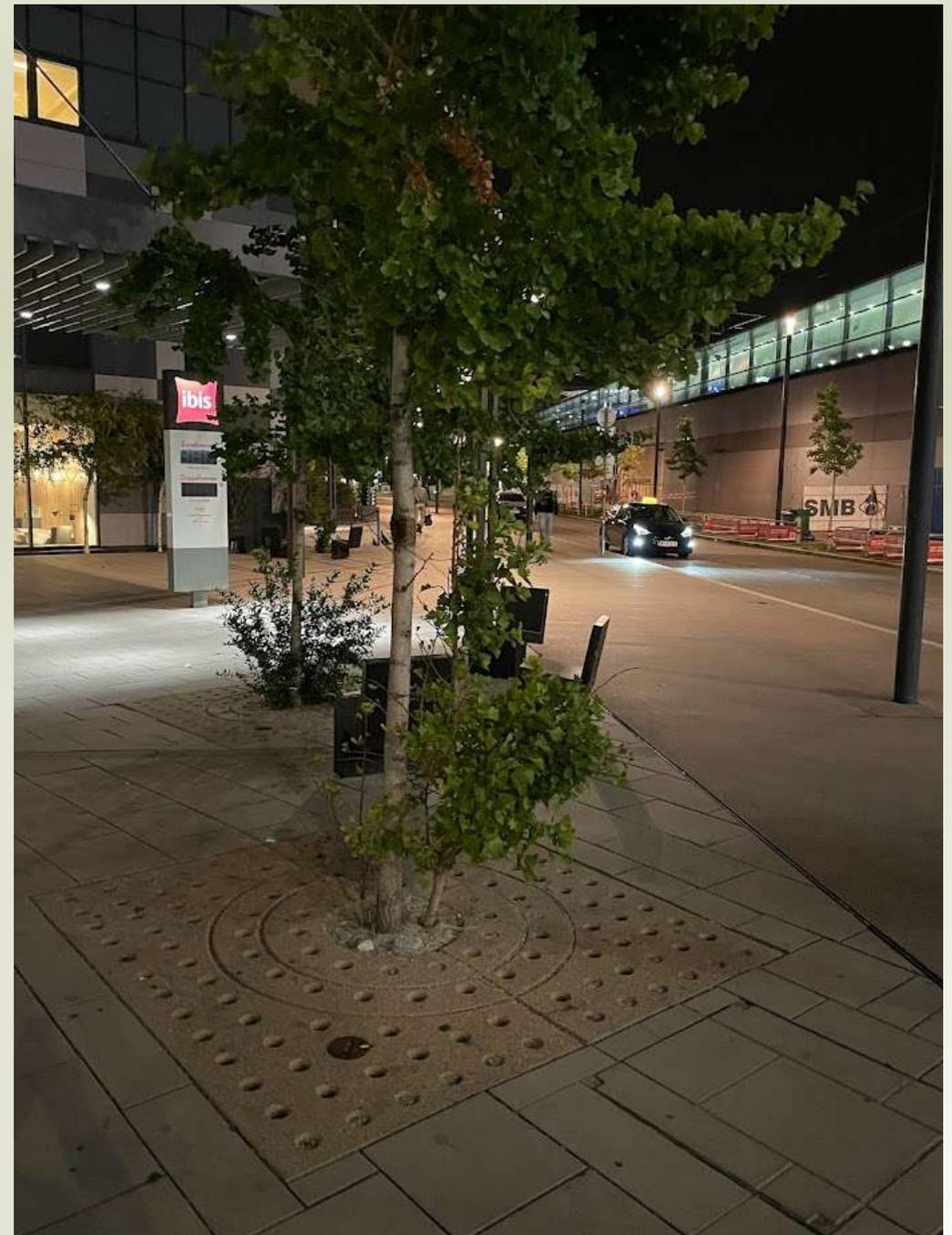
# Plant Selection

- Avoid monocultures. Why?
- 10-20-30 rule
- 30% family (Fagaceae)
- 20% genus (*Quercus*)
- 10% species (*muehlenbergii*)
- Chinquapin Oak
- In other words, no more than 30% of trees should be in the Fagaceae family. No more than 20% oaks and no more than 10% chinquapin oak.
- Species diversity is important and can reduce issues like we have had with Dutch elm disease and emerald ash borer.

# Genus with small numbers

- A tree from a genus with relatively few species has less risk of being attacked by an introduced pest than a tree from a genus with many species.
- Kentucky coffee-tree- *Gymnocladus*, *Ginkgo* for example vs. *Acer* or *Fraxinus*

Ginkgo- Vienna, Austria



# Available Soil Space

- Need adequate soil volume to accommodate anticipated root needs of trees.
- Different formulas:  $A = \pi(\text{radius})^2$

Let's say you have a tree with an expected mature canopy diameter of 20 feet.

1. **Canopy Area:**  $A = \pi * (10 \text{ ft})^2 = \pi * 100 \text{ sq ft} \approx 314 \text{ sq ft}$ .
2. **Soil Volume:**  $314 \text{ sq ft} * 2 \text{ ft} = 628 \text{ cubic feet}$ .

- **Tree Species:**
  - Different species have different root systems and water needs, so the soil volume requirement can vary.
- **Soil Quality:**
  - Well-drained, fertile soil will require less volume than compacted or poor-quality soil.
  - In general, the more soil volume you can provide the better.

# Adequate Soil Space for Trees?



Street trees- Vienna, Austria



# Recommended Trees for the Wasatch Front

- We want to select trees that are adapted to the climate and soils in our area.
- Our soils are generally alkaline and trees that do best in acidic soils often struggle, die, or need to have expensive recurring treatments to survive.
  - Red maple- Autumn Blaze
  - Amur maple
  - Silver maple
  - Pin oak
  - Red oak
- No tree is perfect and realize that even with an appropriate tree matching the site there still may be issues with leaves, fruit (pods or cones), slow or fast growth, or other maintenance needs- pruning, irrigation, cleanup.
- Make sure that the tree you select will not outgrow above and below ground space.

# Bur Oak- *Quercus macrocarpa*

- Adapted to our high pH (alkaline) soils
- Tolerant of heat, drought, and cold winters
- Medium growth rate- faster with adequate water
- Affected by few pests
- Favorite tree at Cache County Fairgrounds



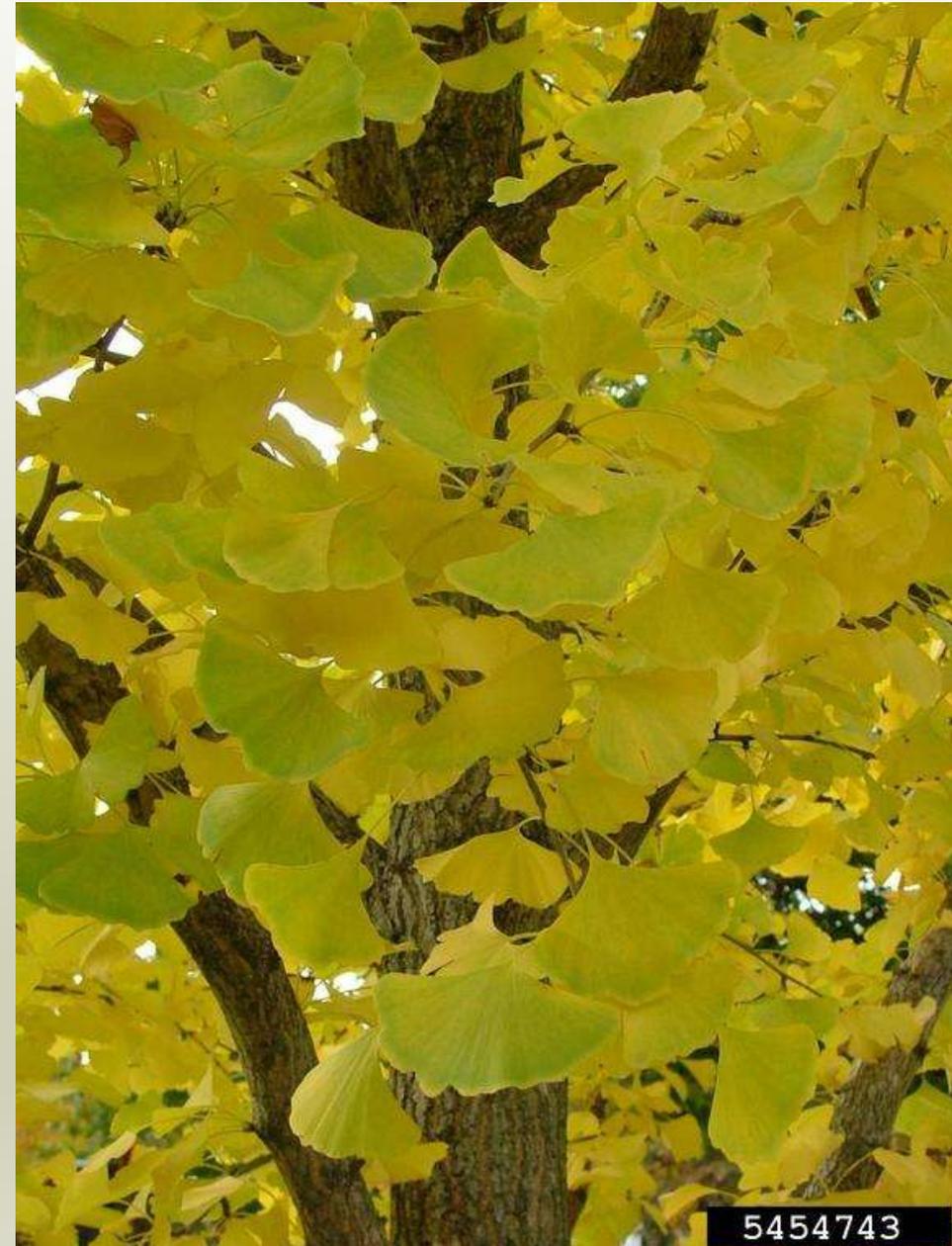
# Kentucky Coffeetree *Gymnocladus dioica*

- This genus has only two species in the world
- Excellent landscape tree
- Can have slow growth when young
- Pods can be messy
- Tolerant of drought, cold, and heat
- Does well in our alkaline soils



# Ginkgo- *Ginkgo biloba*

- Only one species in this family
- Very few pest are a problem with this species
- Tolerates a wide range of soil and environmental conditions
- Beautiful fan shaped leaf and yellow fall color
- Can be slow growing

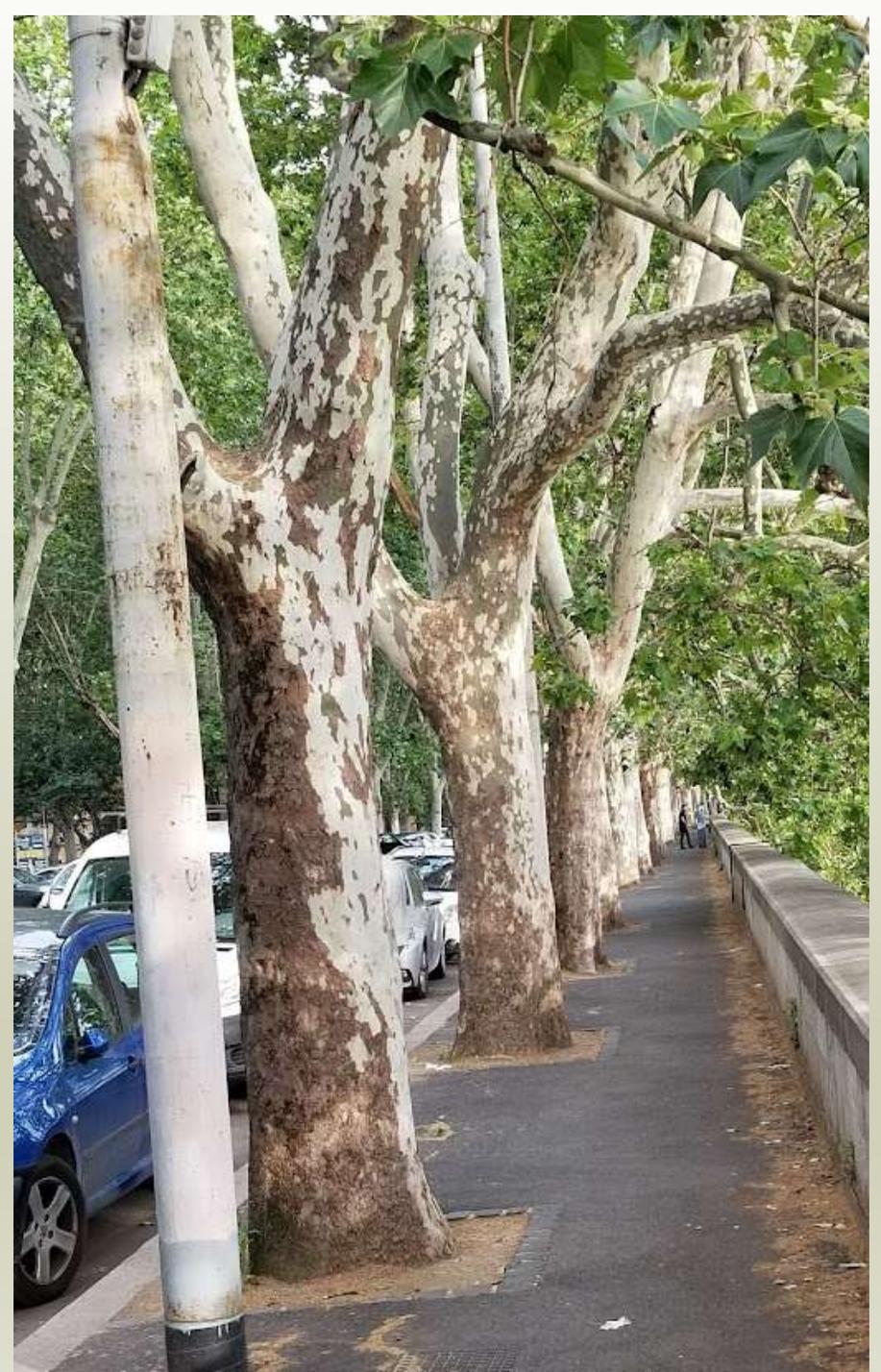


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# London Plane Tree

## *Platanus x acerifolia*

- Suitable for large spaces
- Rapid growth rate
- Susceptible to anthracnose- a fungal disease
- Attractive exfoliating bark- can be a bit messy
- Holds leaves through winter
- Tree that lines main street in Brigham City
- Tolerant of urban conditions



# Colorado Pinyon Pine

## *Pinus edulis*

- Native throughout most of southern, central, and eastern Utah
- Tolerant of drought and alkaline soils
- Produces edible pine nut
- Medium size at maturity- will not outgrow space like blue spruce



Dave Powell, USDA Forest Service (retired), Bugwood.org

# Additional Trees for Consideration

## Good Choices

- Canyon Maple- *Acer grandidentatum*
- Persian ironwood- *Parrotia persica*
- Black Hills Spruce *Picea glauca densata*
- Gambels oak *Quercus gambelii*
- White oak *Quercus alba*
- Turkish filbert *Corylus corluna*
- Japanese zelkova *Zelkova serrata*

## Avoid

- Autumn blaze maple *Acer x fremanii*
- Flowering pear *Pyrus calleryana*
- Globe willow *Salix matsudana*  
'Umbraulifera'
- Purple robe locust *Robinia pseudoacacia*  
'Purple Robe'
- Others- Norway maple, blue spruce, Amur maple

# Take Home Message

- Using a narrow or overused plant palette shows lack of knowledge, creativity, and effort.
- Consider the longevity of your project and choose appropriate vegetation.
- Are you considering available space both above and below ground?
- Are the soil characteristics compatible with the tree selection? pH, organic matter, sand, silt, or clay?
- Gravel and weed barrier do not make a good environment for tree growth and success. They are not used for the benefit of the tree
- Planting failure or success is a combination of many factors- selection, soils, planting, aftercare, quality of nursery stock, mulch, irrigation, etc.



Street tree planting- San Francisco





QUIET

TREES AT WORK

# Tree Design Thoughts

- “It appears to be the American way to arrive ignorant into a new landscape, to denude it and replace it with a hodgepodge from other climates and even other countries, and then to squander energy to artificially maintain the vegetation.” Lorrie Otto
- “...the more I know the flora, the better I can express myself.” Burle Marx
- “Natural ecosystems like a forest or a prairie, do not require external management because the organisms are adapted to the physical and chemical conditions of the site, and the circulation of nutrients between the living and nonliving is fairly complete. These ecosystems are self powered , self regulating, and self fertilizing.” from *Redesigning the American Lawn*

# Thank you for your time and participation!

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