

TREE PRODUCTION TECHNIQUES

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COMMERCIAL HORTICULTURE

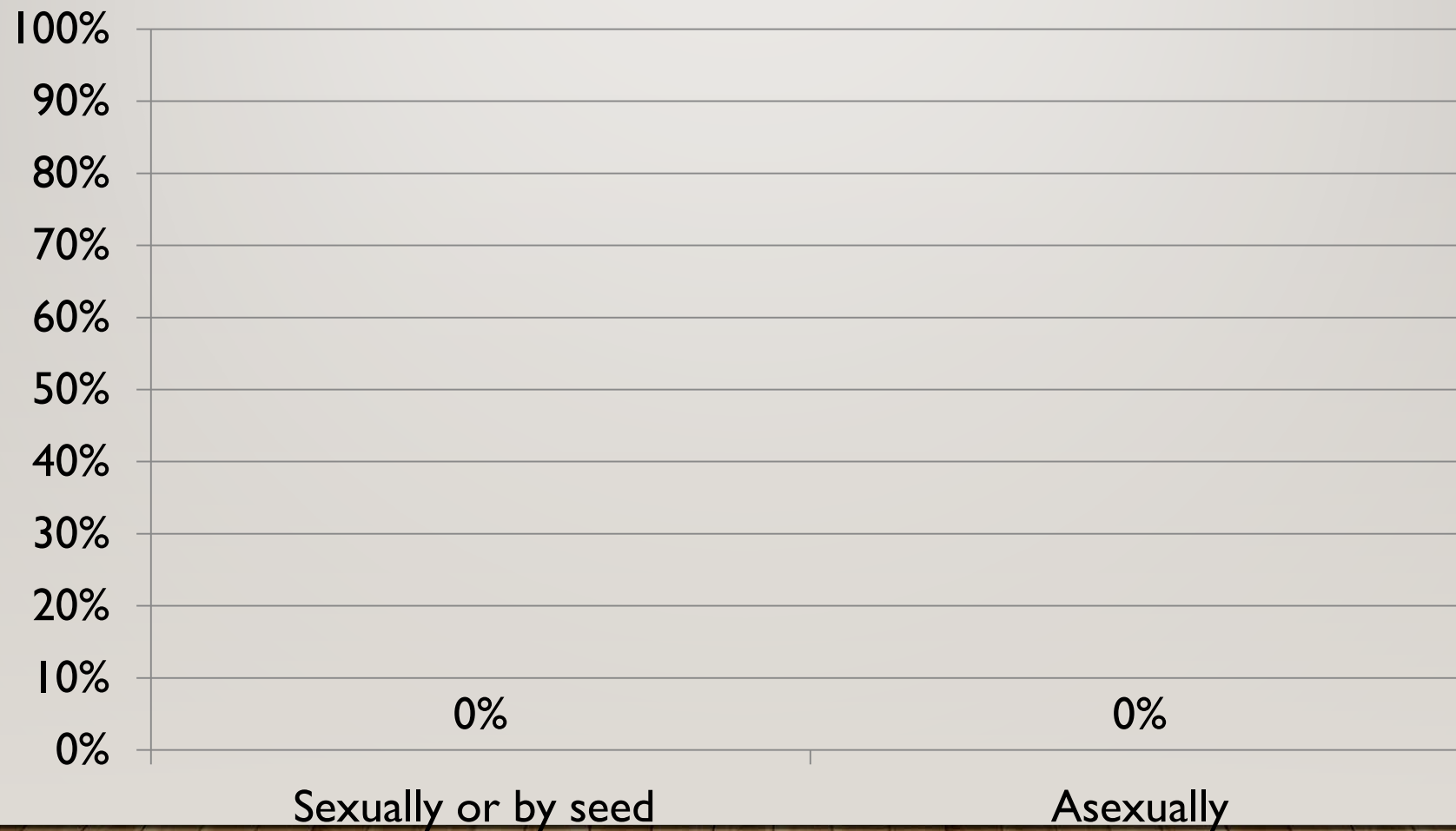
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The logo for Texas A&M Agrilife Extension is displayed within a white rectangular box. It features the text "TEXAS A&M" in a dark red, serif font at the top. Below it, the word "AGRILIFE" is written in a large, grey, serif font, with the letter "A" being significantly larger and overlapping the "T" and "G". At the bottom, the word "EXTENSION" is written in a dark red, bold, sans-serif font.

TEXAS A&M
AGRILIFE
EXTENSION

How are most tree species propagated?

1. Sexually or by seed
2. Asexually



PROPAGATION

SEED

- Common in tree production
 - Oaks
 - Bur
 - Chinquapin
 - Post
 - Black Jack
 - Live
 - Red
 - Legumes
 - Eve's Necklace
 - Redbud

VEGETATIVE

- Grafting
 - Pecans
 - Stone Fruits
 - Japanese Maples
- Cuttings
 - Cultivars of
 - Hollies
 - Magnolias
 - Oaks
 - Maples
 - Crape Myrtle

GENUS SPECIES 'CULTIVAR'

Ginkgo biloba



Ginkgo biloba 'Beijing Gold'

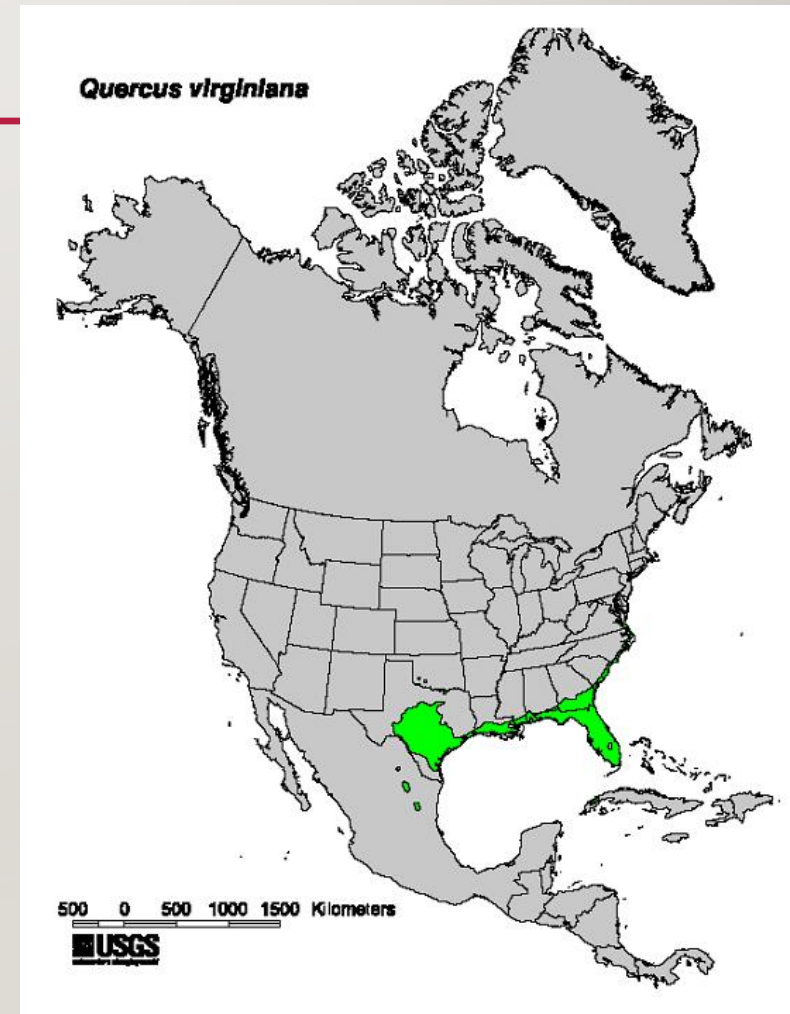


DIOECIOUS SPECIES

- Chinese pistache
- Ginkgo
- Holly



WHAT ABOUT PROVENANCE?

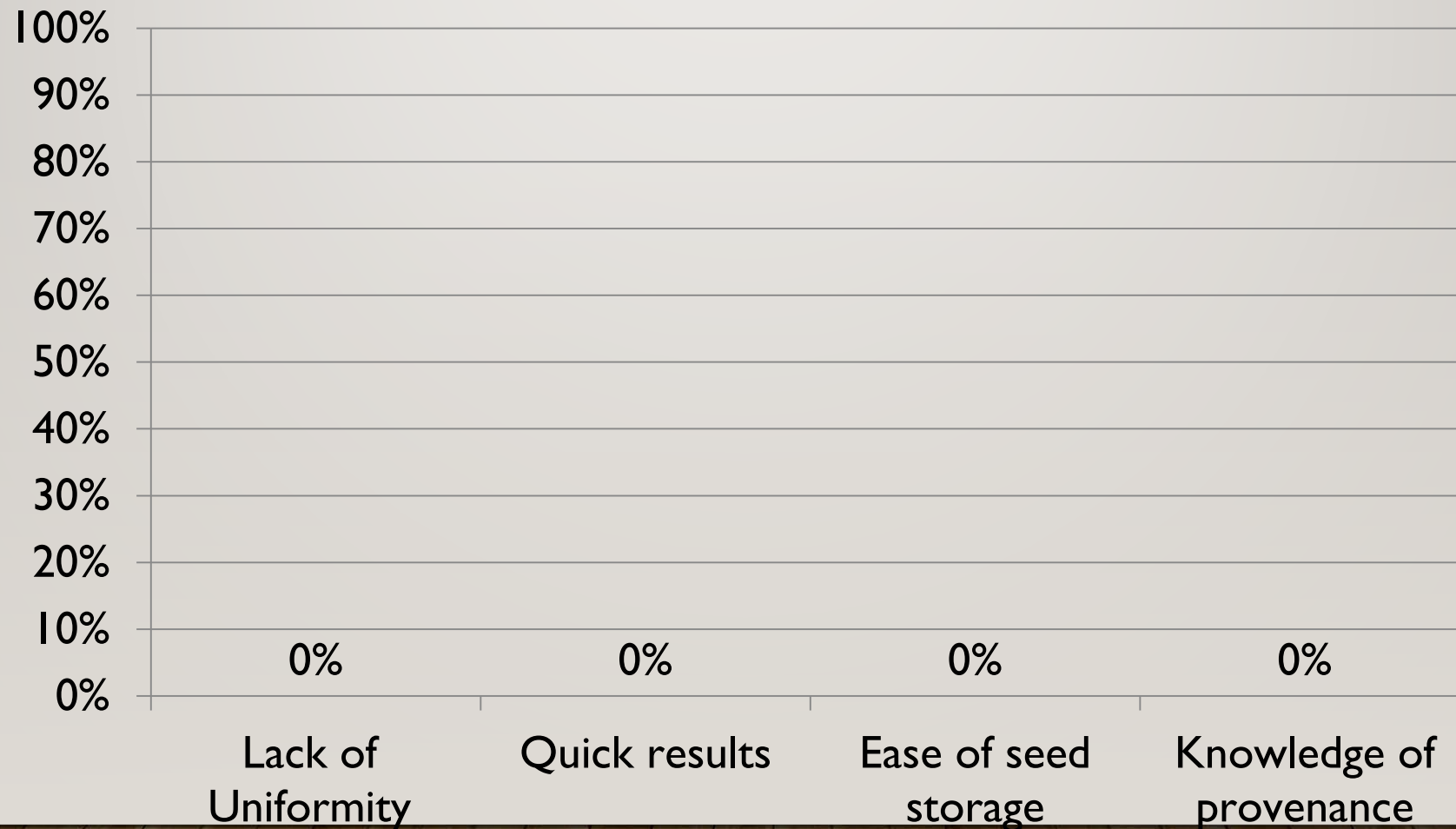




**SEED OR
PROPAGULE
SOURCE
PROVENANCE**

What is one disadvantage of seed propagation?

1. Lack of Uniformity
2. Quick results
3. Ease of seed storage
4. Knowledge of provenance



VARIABILITY WITHIN OFFSPRING



CONDITIONS FOR PROPAGATION

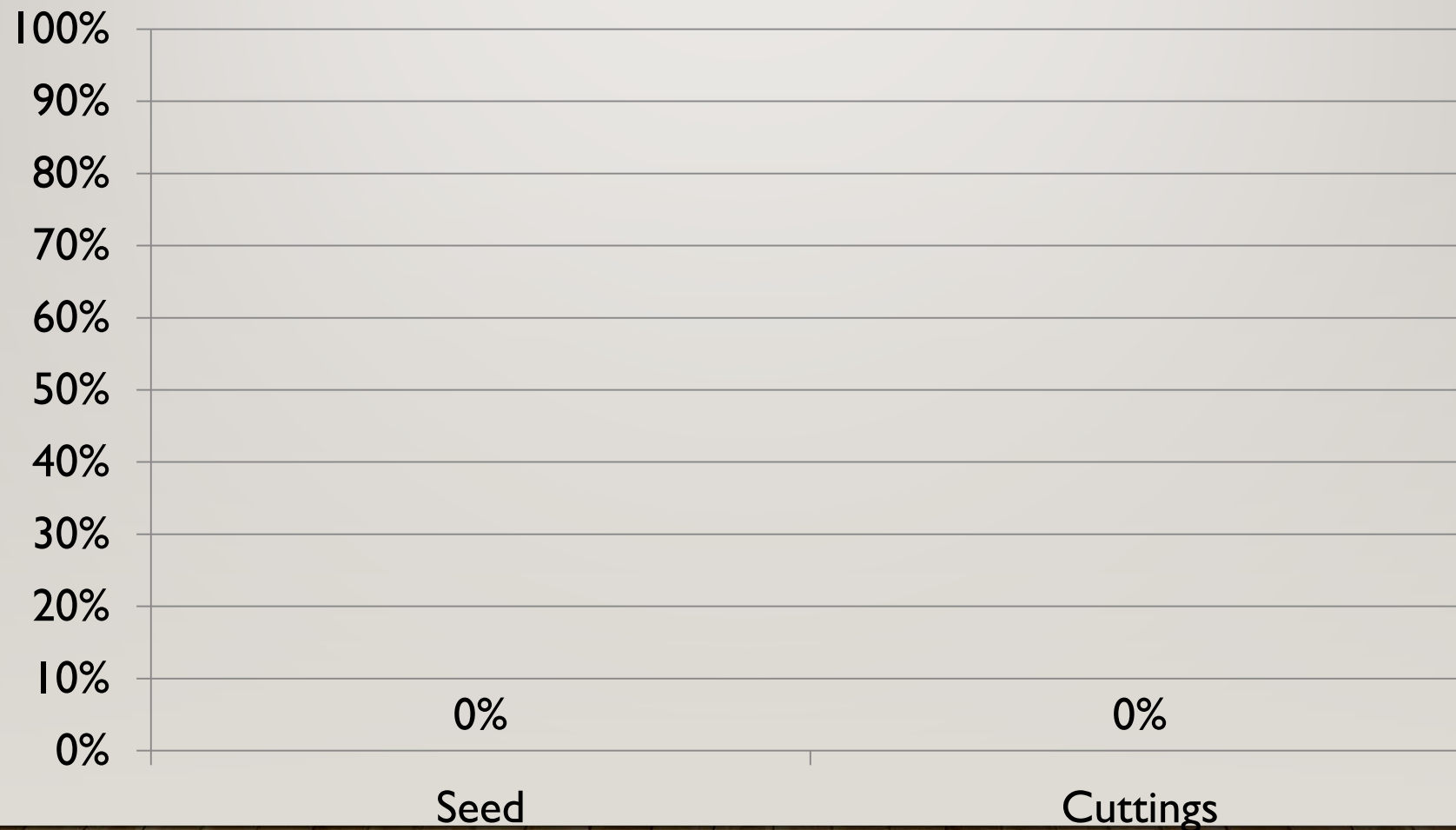


CONDITIONS FOR PROPAGATION



Which propagation method requires more irrigation?

1. Seed
2. Cuttings



TREE PRODUCTION OBJECTIVES

GOOD ROOTS



STRUCTURAL QUALITY





IMAGINE THE PERFECT TREE




POOR VS. GOOD QUALITY





ADVANTAGES TO QUALITY TREES

- Higher survival post-planting
 - Greater longevity in the landscape
 - Reduces period of time needed for establishment
 - Reduces likelihood of failure from structural defects during a storm
- 

IMPORTANT CONSIDERATIONS

- **Production method**
- Maximum size at planting
- Root ball dimensions
- Root collar location
- Root defects
- Root ball: caliper:
height relationship
- Trunk and branch structure
- Other



TREE PRODUCTION METHODS

- Container

- above ground
- pot in pot
- fabric

- Bare root



- Balled in burlap (B&B)

- root pruned prior to transplanting
- not root pruned



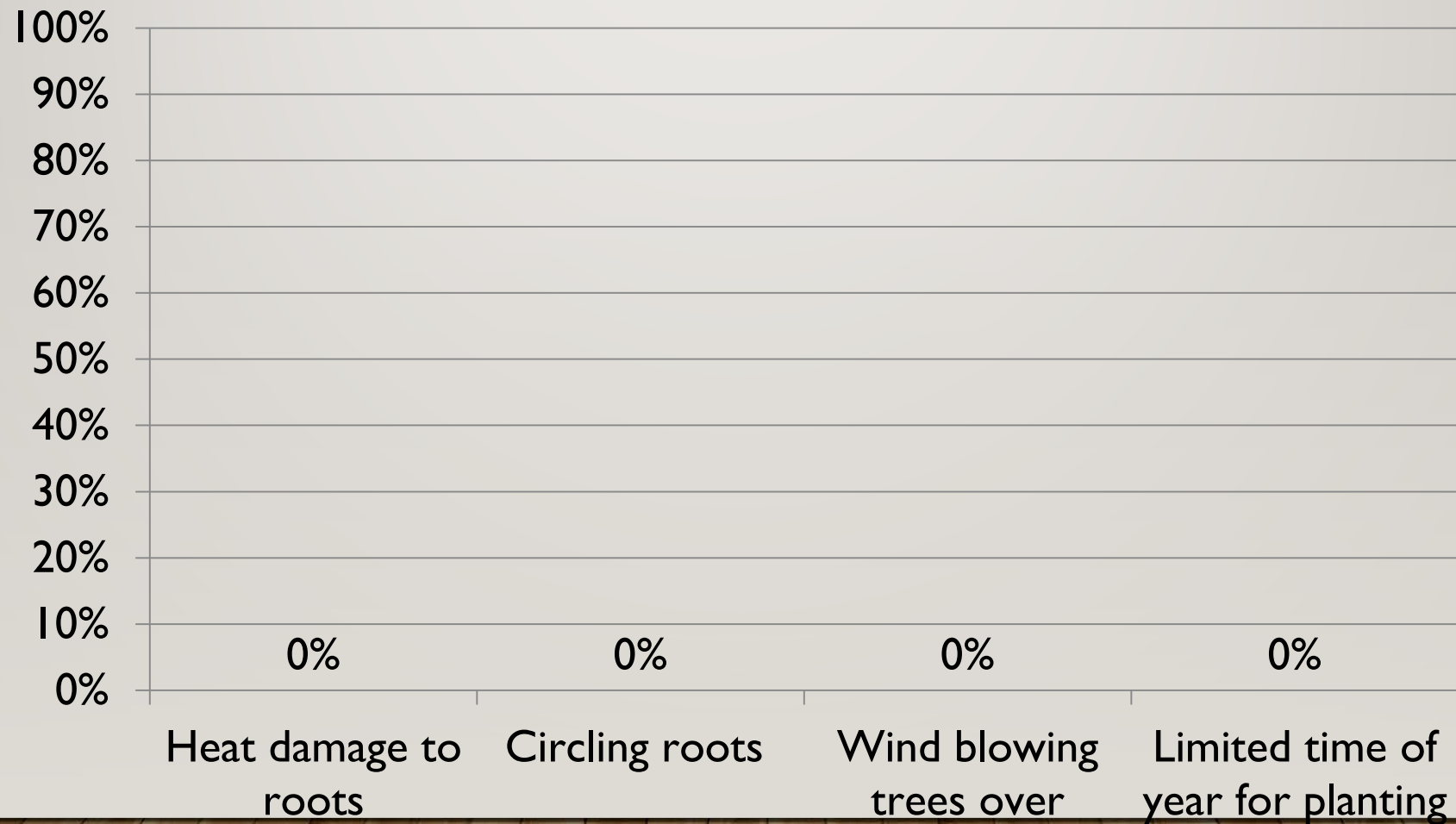
WHY CONTAINERIZED PRODUCTION?

- Ability to sell and plant year round
- Ease of storage and movement



Which is not a problem in container production?

1. Heat damage to roots
2. Circling roots
3. Wind blowing trees over
4. Limited time of year for planting



POT IN POT



FABRIC CONTAINERS



IN GROUND PRODUCTION



Oak not root pruned



ROOT PRUNED LAST PRODUCTION YEAR ONLY



ROOT PRUNED LAST YEAR AND YEAR BEFORE



One year after transplanting

**NOT ROOT
PRUNED**



Root pruned last
production year



Root pruned last 2
production years



CONCLUSIONS ABOUT ROOT PRUNING

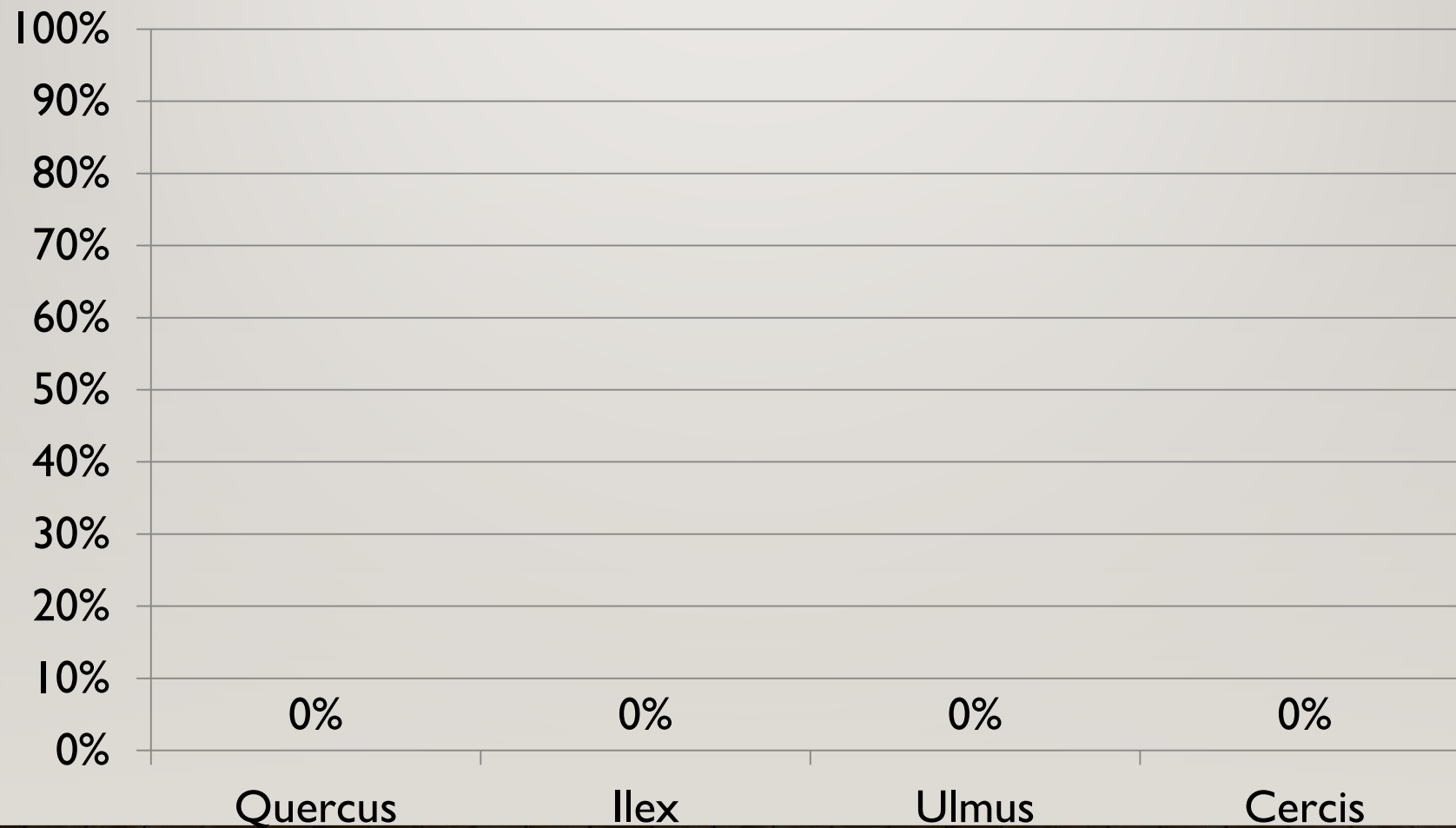
Root pruning during production provides a product that:

- 1) is slightly smaller
- 2) has a denser, more fibrous root system
- 3) has a more uniform root system
- 4) transplants more successfully

Note: Not all species require root pruning. Some have a dense fibrous root system without root pruning.

Which tree species is least likely to benefit from root pruning

1. Quercus
2. Ilex
3. Ulmus
4. Cercis



TREE SPECIES WITH NATURALLY FIBROUS ROOT SYSTEMS

- Crape myrtle
- Holly
- Maple
- Birch



BARE ROOT

- Most frequently:
 - Fruit and Nut trees
 - Revegetation

37



PLANTING BARE ROOT TREES

- Only need a hole as big as root system
- Soak trees for one hour
- Ideal tree size – 3 to 4 feet

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Set tree at the same depth it grew in the nursery

PUT THE SAME SOIL BACK IN THE HOLE

39



40

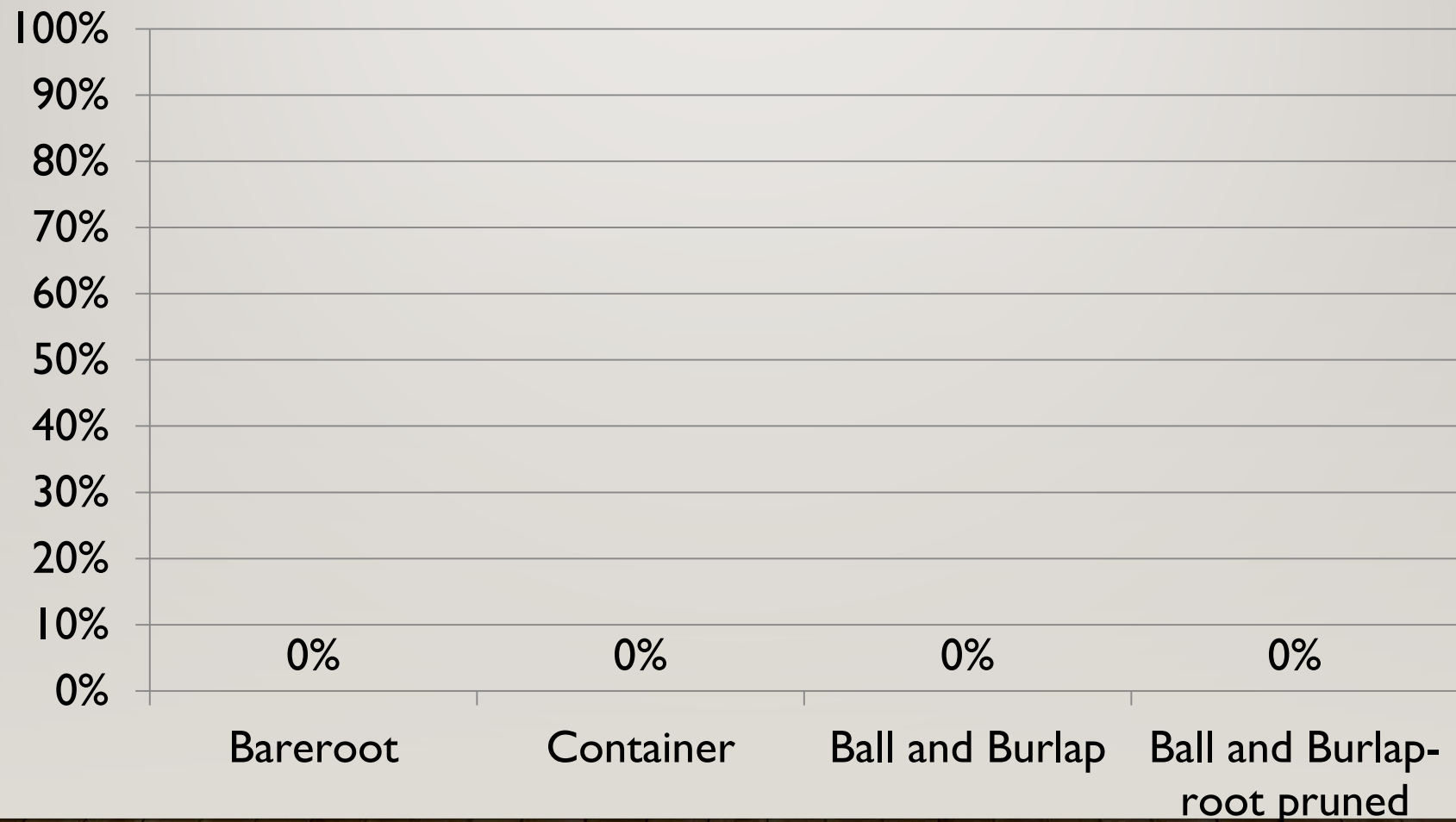
WATER THE TREE
IN WITH A
BUCKET OR HOSE

SETTLE SOIL
AROUND THE
ROOTS



Which production method produces the heaviest rootball?

1. Bareroot
2. Container
3. Ball and Burlap
4. Ball and Burlap-root pruned



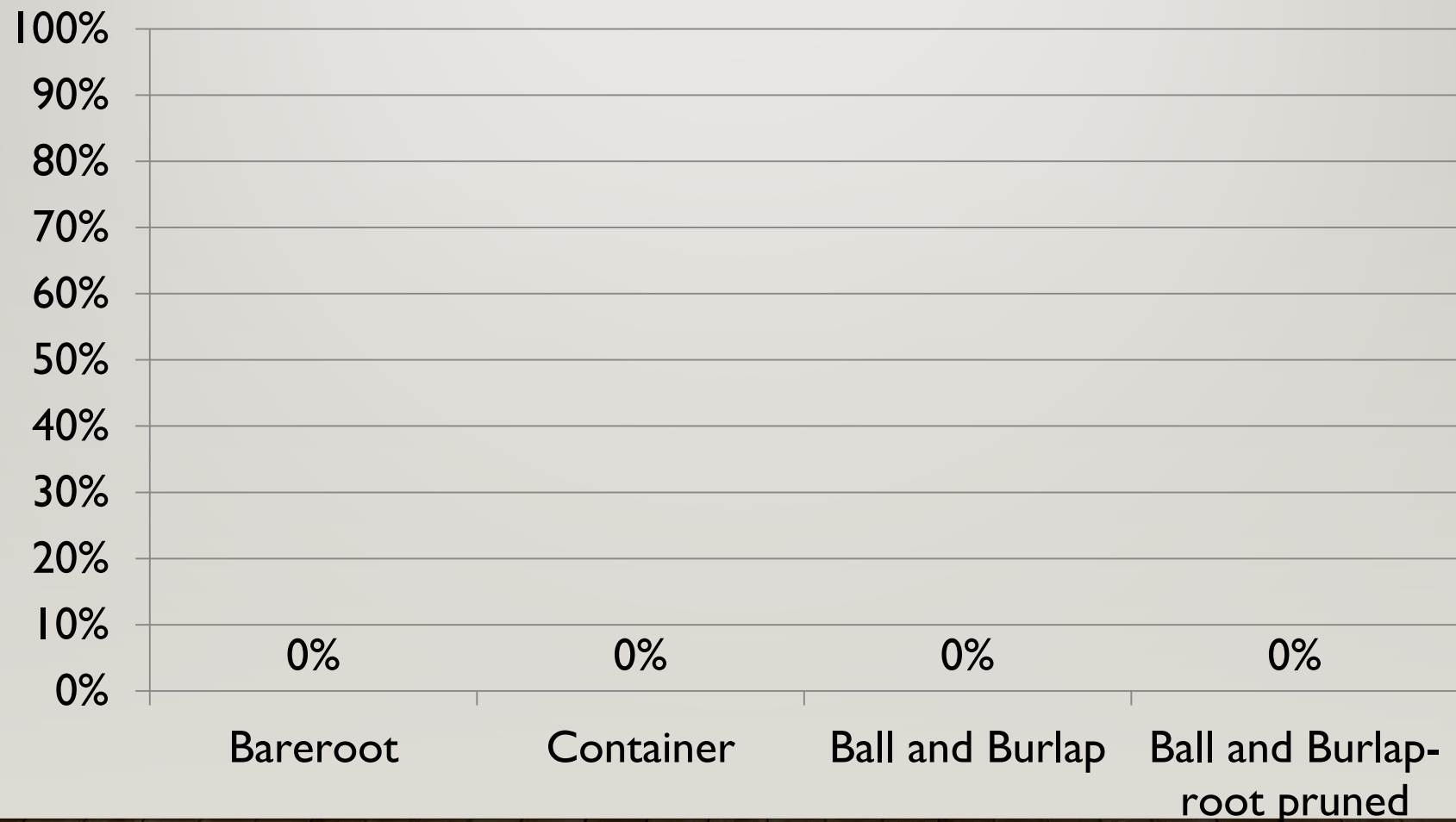
CHOOSE AMONG TREE PRODUCTION METHODS BASED ON WEIGHT AND STAKING CAPABILITIES

Production method	Root ball weight	Need for staking
Container: above ground or pot-in-pot	light	frequently
Fabric containers in ground	light to moderate	usually
B&B not root pruned	heavy	sometimes
B&B root pruned	heavy	sometimes
Bare root	very light	usually

* B&B = Balled-in-burlap

Which production method is best when irrigation will be limited after planting?

1. Bareroot
2. Container
3. Ball and Burlap
4. Ball and Burlap-root pruned



TREE SURVIVAL IN THE LANDSCAPE CAN DEPEND ON THE PRODUCTION METHOD AND IRRIGATION PRACTICES AFTER PLANTING

Production method	Survival with frequent irrigation after planting
Container: above ground or pot-in-pot	very good to excellent
Fabric containers in ground	very good to excellent
B&B not root pruned	fair to good
B&B root pruned	excellent
Bare root	excellent

* B&B = Balled-in-burlap

TREE SURVIVAL IN THE LANDSCAPE

PRODUCTION METHOD AND IRRIGATION PRACTICES AFTER PLANTING

Production method	Survival with frequent irrigation after planting	Survival with infrequent irrigation after planting
Container: above ground or pot-in-pot	very good to excellent	fair
Fabric containers in ground	very good to excellent	poor to fair
B&B not root pruned	fair to good	poor to fair
B&B root pruned	excellent	good
Bare root	excellent	good

* B&B = Balled-in-burlap



HERE IS THE SUMMARY STORY

Under limited irrigation:

- Root pruned, hardened-off B&B – last to die
- Bare root
- Containers – in the middle
- Recently dug B&B – first to die

Under appropriate, intensive irrigation:

It does not appear to matter

QUALITY ROOTS

- **Introduction to tree root growth**
- Root growth in containers
- Root growth in field grown trees
- Root growth in fabric bags

INTRODUCTION TO ROOT GROWTH

- Roots are generally not as deep as you might think
- Some trees have deep roots under the trunk and canopy
- The majority of roots are in the **top two feet**
- Roots are typically above the water table and above any hardpan or compacted soil layers
- Many of the small diameter roots are in the top 12 inches



QUALITY ROOTS

- Introduction to tree root growth
- **Root growth in containers**
- Root growth in field grown trees
- Root growth in fabric bags

ROOT GROWTH IN A CONTAINER NURSERY

- Roots in their natural environment grow to well beyond the edge of the branches
- Without specially designed containers, severe root defects can develop as roots are deflected by container walls
- Some of these specially designed containers will be illustrated and described here

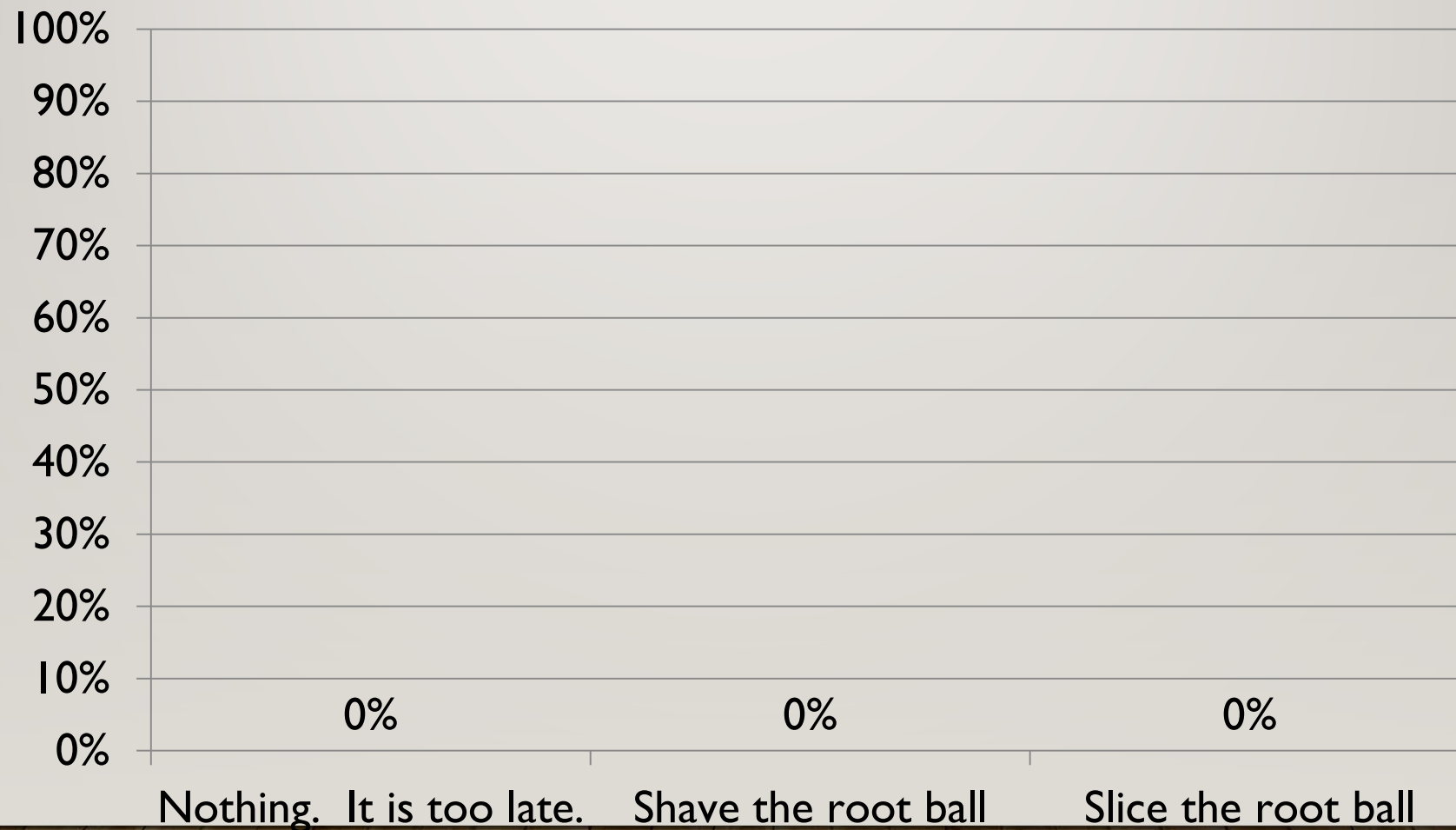
WHAT'S WRONG WITH THIS ROOT SYSTEM?



- Maple planted from a 1 gal. container into this 15 gal. container 15 months ago
- It is past time to move this tree to a larger container or plant it
- What can you do?

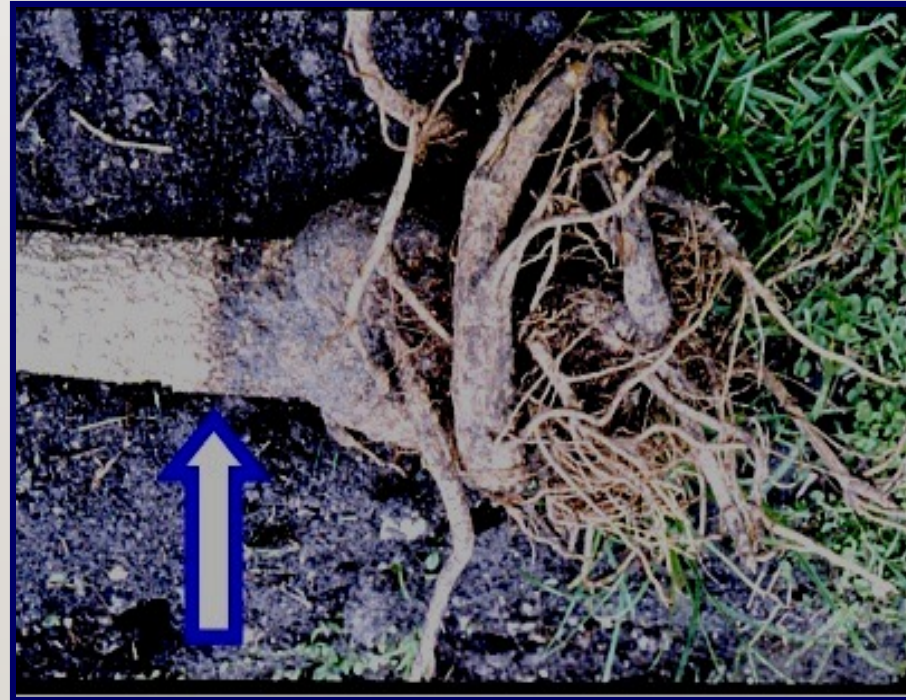
What can you do?

1. Nothing. It is too late.
2. Shave the root ball
3. Slice the root ball



WHAT'S WRONG WITH THIS ROOT SYSTEM?

- Circling root 3 years after planting a 1 gal. liner
- It was much smaller 3 years earlier and should have been cut then
- The 1 gal. liner was also planted too deep



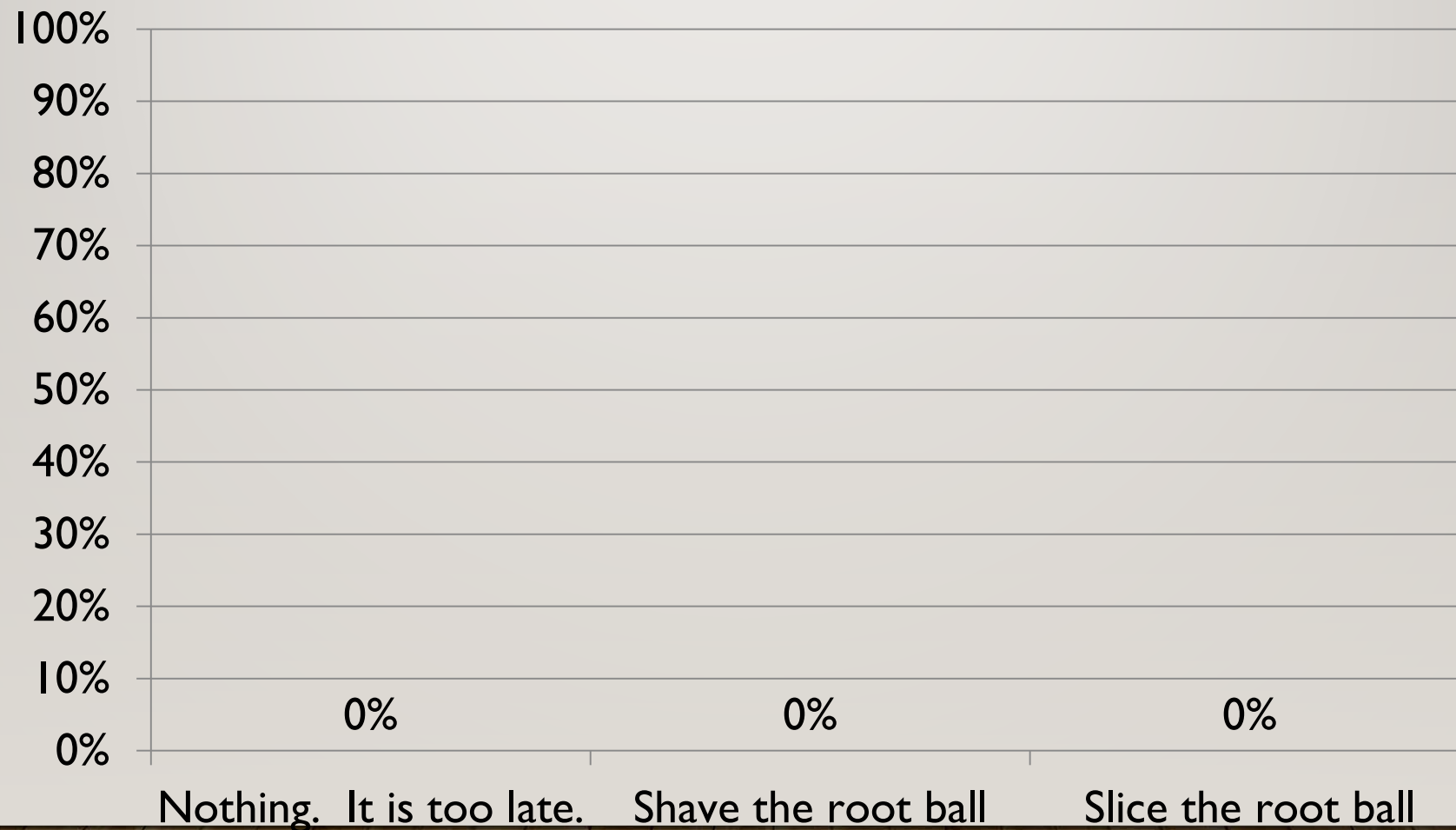
WHAT'S WRONG WITH THIS ROOT SYSTEM?



- This large root (arrow) was circling the one gallon container 18 months ago
- Tree was potted into a larger container without slicing the circling root

What can you do?

1. Nothing. It is too late.
2. Shave the root ball
3. Slice the root ball



CONTAINER TYPE EXAMPLES



- **Shown above from left to right:** wood box with Spin Out™, wood box, low profile plastic, plastic with Spin Out™, plastic, low profile air root pruned (Accelerator), standard air root pruned (Accelerator)

TREES FROM DIFFERENT CONTAINER TYPES



- These red maples were grown in seven different 15-gallon container types; note the varying shapes of the root balls resulting from the different containers
- The tops grew identically as they have in many other demonstrations and studies
- Roots on the wooden boxes, air root pruned containers, Spin Out™ treated containers, and low profile containers had less circling roots than trees in the standard black plastic containers

NO ROOTS ON OUTSIDE OF ROOT BALL

- This root ball is firm and does not fall apart
- There are very few circling roots
- These two factors combined indicate good quality



MANY ROOTS INSIDE BUT FEW ON THE EDGE OF ROOT BALL INDICATE QUALITY



- The media has been partially removed on this 15 gal. container red maple to expose the roots
- This high quality root ball has many small diameter roots
- There were few circling roots on the outside edge of the root ball

AIR ROOT PRUNING CONTAINERS REDUCE NUMBER OF CIRCLING ROOTS



- Plastic (shown above), metal, or fabric containers with holes in the sides reduce incidence of circling roots
- Air dries the media on the outside edge of the root ball preventing root growth there
- There are several manufacturers of these specially designed containers

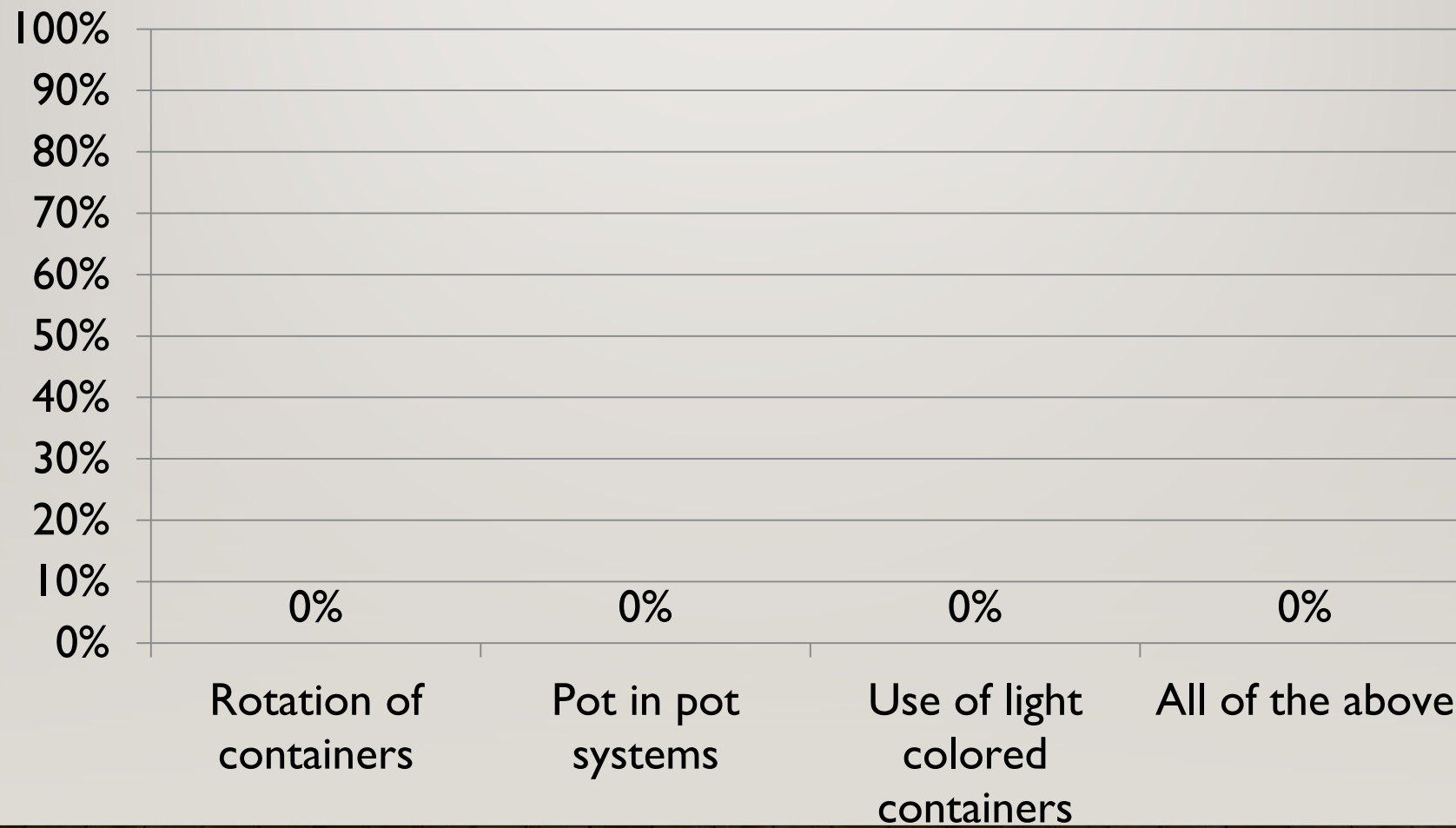
ONE-SIDED ROOT SYSTEM FROM HIGH CONTAINER TEMPERATURES



- High temperatures within the container caused root death
- Few roots are able to grow on the hot side of the container
- Trees can become unstable after planting into the landscape

What production practices could minimize one sided root systems?

1. Rotation of containers
2. Pot in pot systems
3. Use of light colored containers
4. All of the above



QUALITY ROOTS

- Introduction to tree root growth
- Root growth in containers
- **Root growth in field grown trees**
- Root growth in fabric bags

ROOT GROWTH IN A FIELD NURSERY

- Roots will extend twice to three times the edge of the branch tips on many trees unless manipulated by cultural practices
- Root growth can be manipulated by genetics, irrigation, fertilization, and root pruning
- The next series of slides illustrates the impacts of these cultural practices on the quality of the root system inside the root ball of field grown trees

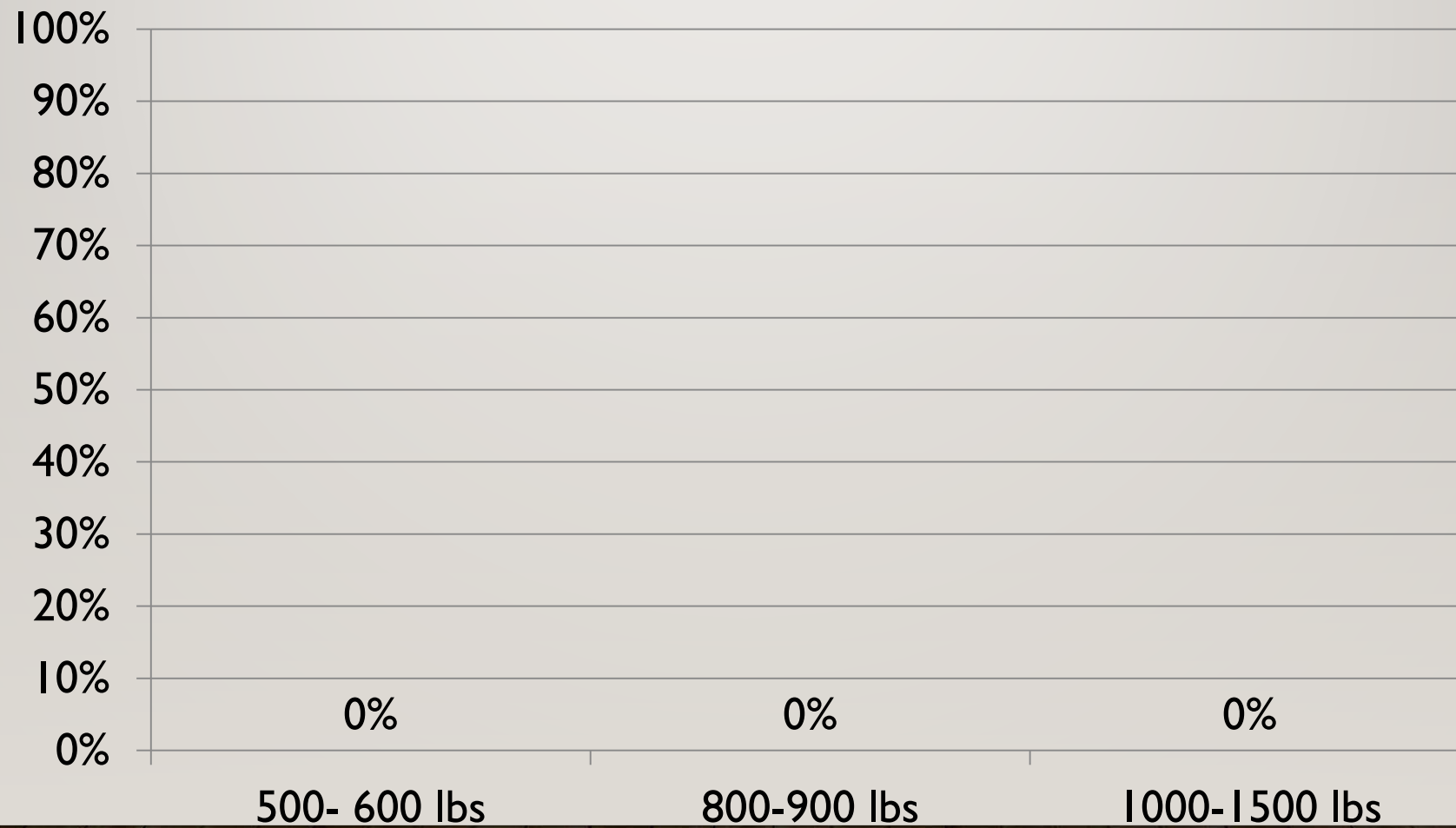
FIELD GROWN TREES SHOULD BE LIFTED BY THE ROOT BALL



- Moving field grown trees into the landscape requires machinery
- Trees are gently lifted by straps or ropes secured to the root ball as shown here
- Lifting by the trunk can result in trunk damage that will cause severe injury to or kill the tree

How much does a 40 inch root ball weigh?

1. 500- 600 lbs
2. 800-900 lbs
3. 1000-1500 lbs

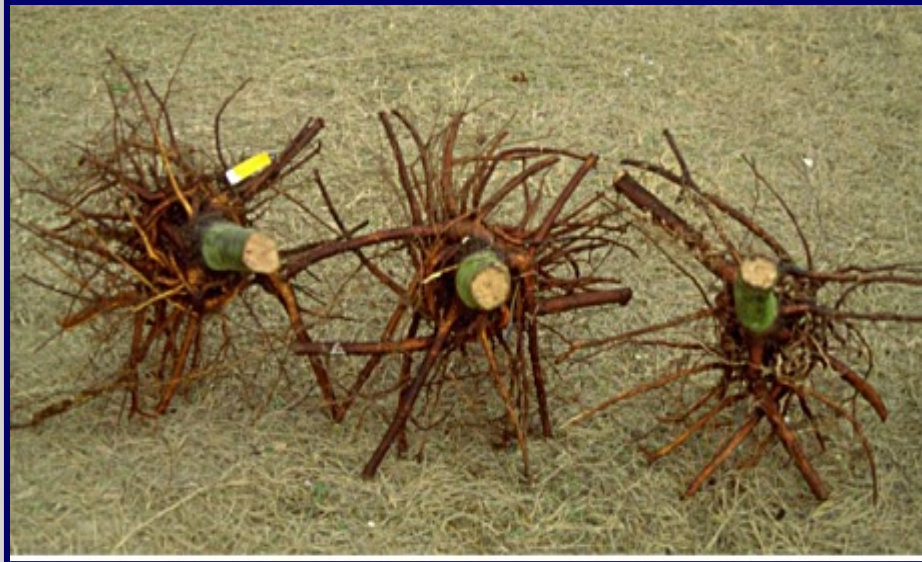


ROOT SYSTEM ON A FIELD GROWN TREE

- Once dug, field grown trees have a reduced root system compared to when they were growing in the nursery
- Appropriate irrigation must be applied to maintain health



ROOT SYSTEMS VARY



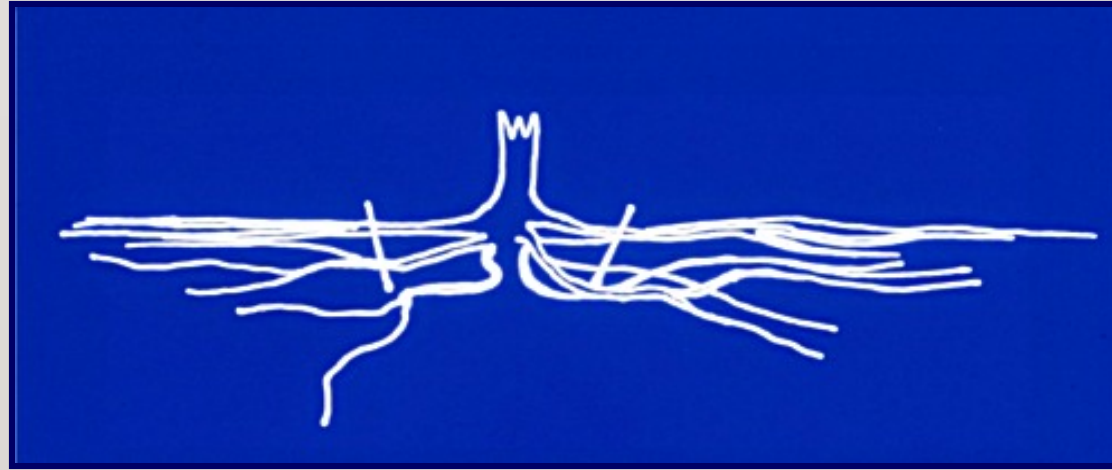
- Roots systems vary from one tree to the next and from one soil type to the next
- These oak trees were grown from acorns
- The roots of the tree on the left were more dense than the one on the right
- Cutting propagated trees of oaks and perhaps other trees have more uniform root systems

ROOT DENSITY DIFFERENCES DUE TO NURSERY IRRIGATION

- Left -were not irrigated during nursery production
- Middle- received irrigation only on the soil that was to become the root ball
- Right- received the same volume of irrigation as those in the center but water was applied to a three foot diameter circle around the trunk
- Trees in the center had the most fine roots in the root ball



ROOT PRUNING FIELD GROWN TREES

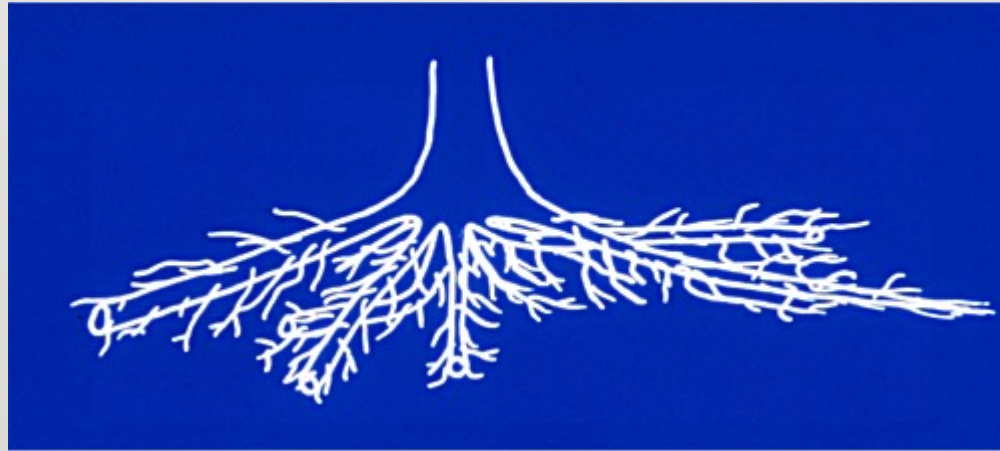


- Root pruning can increase root density in the root ball
- Pruning roots on two sides of the tree as shown above can ensure that the tree will not fall over should a storm strike after pruning

SAMPLE ROOT PRUNING PROTOCOL FOR NURSERY PRODUCTION

- Spade root pruning was accomplished by slicing a square tipped balling shovel 36 cm (14 in) long into the soil at an angle similar to that of a mechanical tree spade
- North and South 1/8 circumference segments (12.5 percent of circumference each, totaling 25% circumference) were pruned in April 20 cm (8 in) from the trunk and East and West 1/8 segments were root pruned in May
- Root pruning was repeated in August (NW and SE segments) and September (NE and SW segments) 27 cm (11 in) from the trunk
- The bottom of the hand spade did not reach far enough into the soil to overlap adjacent slices so any roots growing directly down under the trunk were not cut

ROOT PRUNING INCREASES ROOT DENSITY IN THE ROOT BALL



- Root pruning can increase root density in the root ball and can help prepare the tree for survival in the landscape
- More small diameter roots and fewer large diameter roots result from root pruning
- This has been shown (Watson and Gilman) to increase transplant success compared to non-root pruned trees and compared to trees grown in containers

TREES ARE DUG WITH A VARIETY OF MACHINES



- A 32-inch tree spade is mounted on the front of this skid-steer vehicle

DIGGING THE TREE



- The spade blades sink into the soil cutting all roots prior to lifting; then the tree is lifted with the spade

MATERIALS NEEDED TO SECURE THE ROOT BALL OF A FIELD GROWN TREE



- A black sleeve of woven ground cloth manufactured to fit the outside of the wire basket is slipped over the basket
- Strapping or rope is secured to the wire basket and the basket is lowered into the hole dug by the tree spade
- Then the treated or untreated burlap is placed inside the wire basket

TREE IS LOWERED INTO THE BASKET

- After the treated or untreated burlap is placed inside the wire basket, the tree is lowered into the basket



BURLAP IS SECURED TIGHTLY AROUND THE ROOT BALL



- The burlap is pulled tight and pinned into place

WIRE BASKET IS TIGHTENED

- Various devices are used to bend the wire so the basket is firmly securing the soil in the root ball
- You do not want any movement of the soil and roots during handling and shipping



FINISHED ROOT BALL



- This finished root ball has black woven cloth on the outside, burlap inside the wire basket, white string securing the five basket loops, and green rope tied to the basket for lifting

IRRIGATE FRESH DUG TREES REGULARLY

- Freshly dug trees in the warmest climates (southern US) require irrigation several times daily
- Many growers provide water with a low volume mist or spray system as shown here



FINISHED FIELD GROWN TREE



- This tree is hardened-off and ready for shipping to the landscape
- A good indication of when the tree is ready for planting into the landscape is when roots have grown through the burlap; this typically takes several weeks to a couple months depending on the time of year
- The black woven ground cloth must be removed (as shown) before planting

HARDENED-OFF FIELD GROWN TREE

- Notice the white root tips growing through the burlap; this indicates that the tree has survived the digging process
- The survival of this tree is now dependant on the irrigation and handling it receives in the landscape
- A tree with roots growing through the burlap in this fashion is said to be **hardened-off**



QUALITY ROOTS

- Introduction to tree root growth
- Root growth in containers
- Root growth in field grown trees
- **Root growth in fabric bags**

ROOT GROWTH IN FABRIC CONTAINERS

- Some nurseries produce trees in fabric containers in field soil
- The fabric restricts, but does not prevent, roots from growing into the soil outside the fabric container
- Root balls of field-grown trees are similar to those grown in fabric containers except that the fabric container root ball is smaller
- Applying irrigation and fertilizer only to the top of the root ball can help increase roots in the ball compared to applying it to a larger area around the container

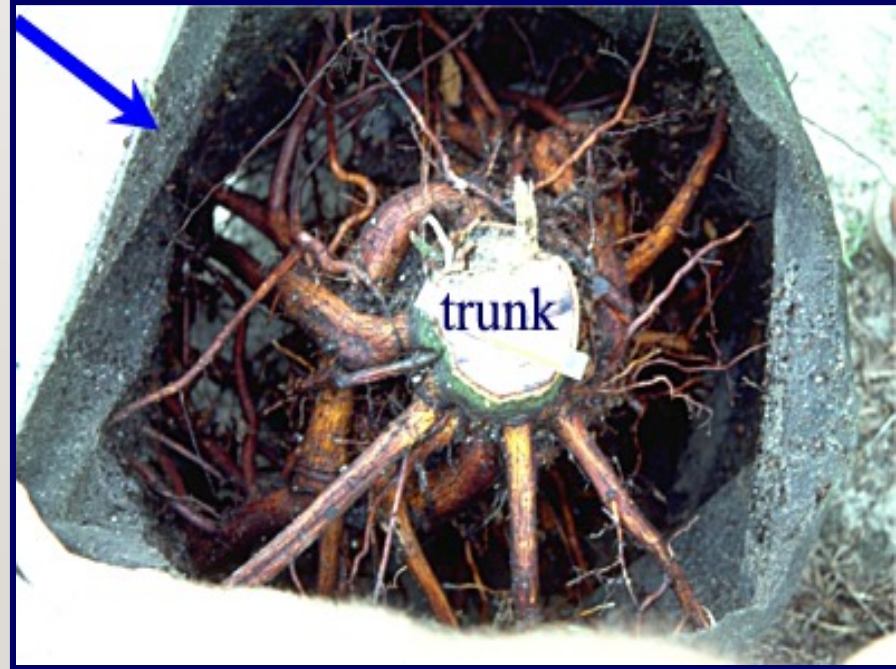
TREE IN FABRIC CONTAINER JUST DUG FROM THE FIELD



- Fabric containers can be used in the ground or above ground
- When used **above ground** roots remain mostly in the bag except for those that grow through the fabric at the bottom
- When used **in the ground** (as illustrated here), roots grow outside the fabric but they are mostly girdled by the fabric which prevents them from getting too large; roots outside the fabric and the bag are removed from the tree when the tree is harvested

TREE IN A FABRIC CONTAINER

- Fabric container (arrow) keeps many of the large diameter roots inside the bag
- Small roots are located inside and outside the bag
- This oak tree has circling roots close to the trunk as a result of growing in a smaller container for too long



TREE IN A DIFFERENT FABRIC CONTAINER



- This is a fabric container from a different manufacturer
- Many roots are shown growing through the fabric and into the soil outside the fabric container
- This is normal and is to be expected in this type of production system

ROOTS PASSING THROUGH FABRIC

- Roots branch as they pass through the fabric container
- The fabric is designed to girdle large roots so they do not become large on the outside of the fabric
- Note how the one large diameter root branched to become many smaller diameter roots on the outside of the fabric



REMOVING THE FABRIC



- The fabric must be removed before stepping the tree up to a larger plastic container or before planting into the landscape
- Remove the fabric with a sharp implement such as a utility knife or sharp pruning tool
- Disturb the root ball as little as possible so roots remain more or less intact with the soil

FINISHED CROP IN FABRIC CONTAINERS

- Do not allow trees to grow too large in the fabric containers as shown here; the root ball is way too small to support this large top (note the dead tree on the left)
- Appropriately sized trees handled correctly have no problem surviving the digging process from in-ground fabric containers
- However, taking freshly dug trees directly to the landscape almost never works because irrigation cannot be managed correctly



IMPORTANT CONSIDERATIONS

- Maximum size at planting
- Root ball dimensions
- Root collar location
- Root defects
- Root ball: caliper:
height relationship
- Trunk and branch structure
- Other





SELECTING THE RIGHT TREE SIZE

- Irrigation capabilities:

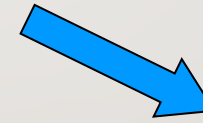
When irrigation is limited...

- Site drainage:

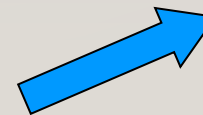
If drainage is poor...

- Weed control and mulch management:

If weeds are not controlled and compete with tree for water...



...then select small nursery stock such as 1.5 to 3 inch caliper trees.



TREE SIZE IMPACTS TREE ESTABLISHMENT RATE





TREE SIZE IMPACTS TREE ESTABLISHMENT RATE

Percent caliper, height, and spread increase between May and October 2005 for live oak transplanted from #15 and #45 containers to the field.

Container Size	% caliper increase	% height increase	% spread increase
#15 (1" caliper)	60.4a	36.5a	55.8a1
#45 (2.5" caliper)	14.8b	9.1	36.4b



CONCLUSIONS ABOUT TREE SIZE

- Smaller trees take less time and water to establish.
- Survival of smaller nursery stock is greater if irrigation capabilities are limited.
- Growth rate of small trees is significantly greater than when the same species is planted at a larger size.
- Unless plenty of water can be supplied, it is better to plant smaller trees.


IMPORTANT CONSIDERATIONS

- Maximum size at planting
- **Root ball dimensions**
- Root collar location
- Root defects
- Root ball: caliper:
height relationship
- Trunk and branch structure
- Other





ROOT BALL DIMENSIONS

- Root balls of any shape perform equally well in well-drained soil.
 - Tall root balls help keep deeper roots moist.
 - Wide and shallow root balls are better suited for planting in poorly-drained and compacted sites.
 - Shallow root balls dry quicker on well-drained sites.
- 

GOOD FOR POORLY DRAINED SITE



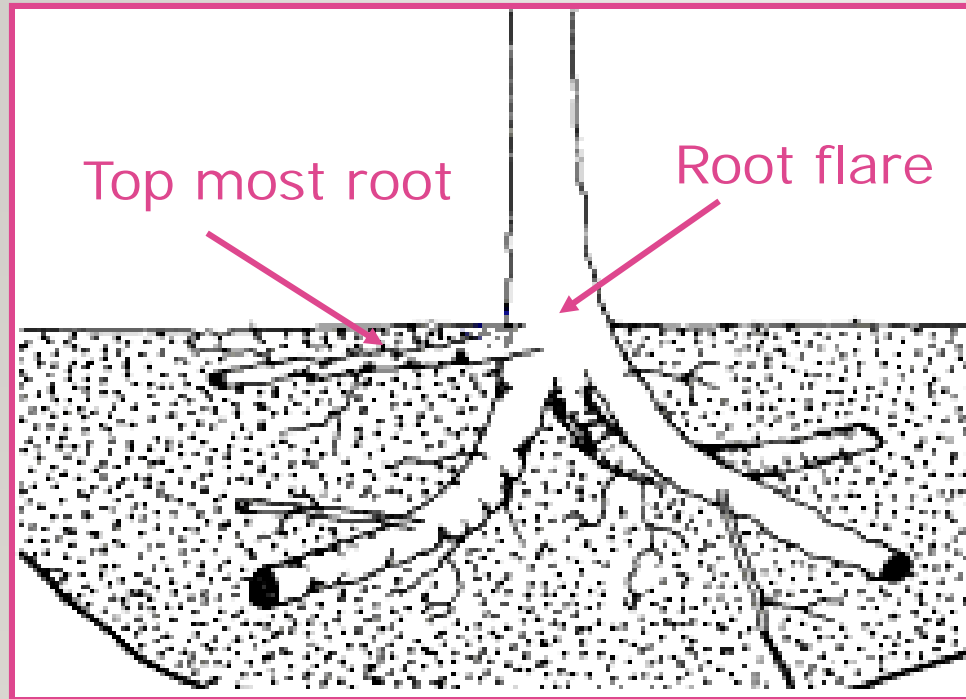
IMPORTANT CONSIDERATIONS

- Maximum size at planting
- Root ball dimensions
- **Root collar location**
- Root defects
- Root ball: caliper:
height relationship
- Trunk and branch structure
- Other





ROOT COLLAR LOCATION



- Remove soil or media around the base of the trunk until you locate the top-most root.
- The top-most major root should be within 2-3” of the surface of the root ball.

NICELY POSITIONED ROOT COLLAR



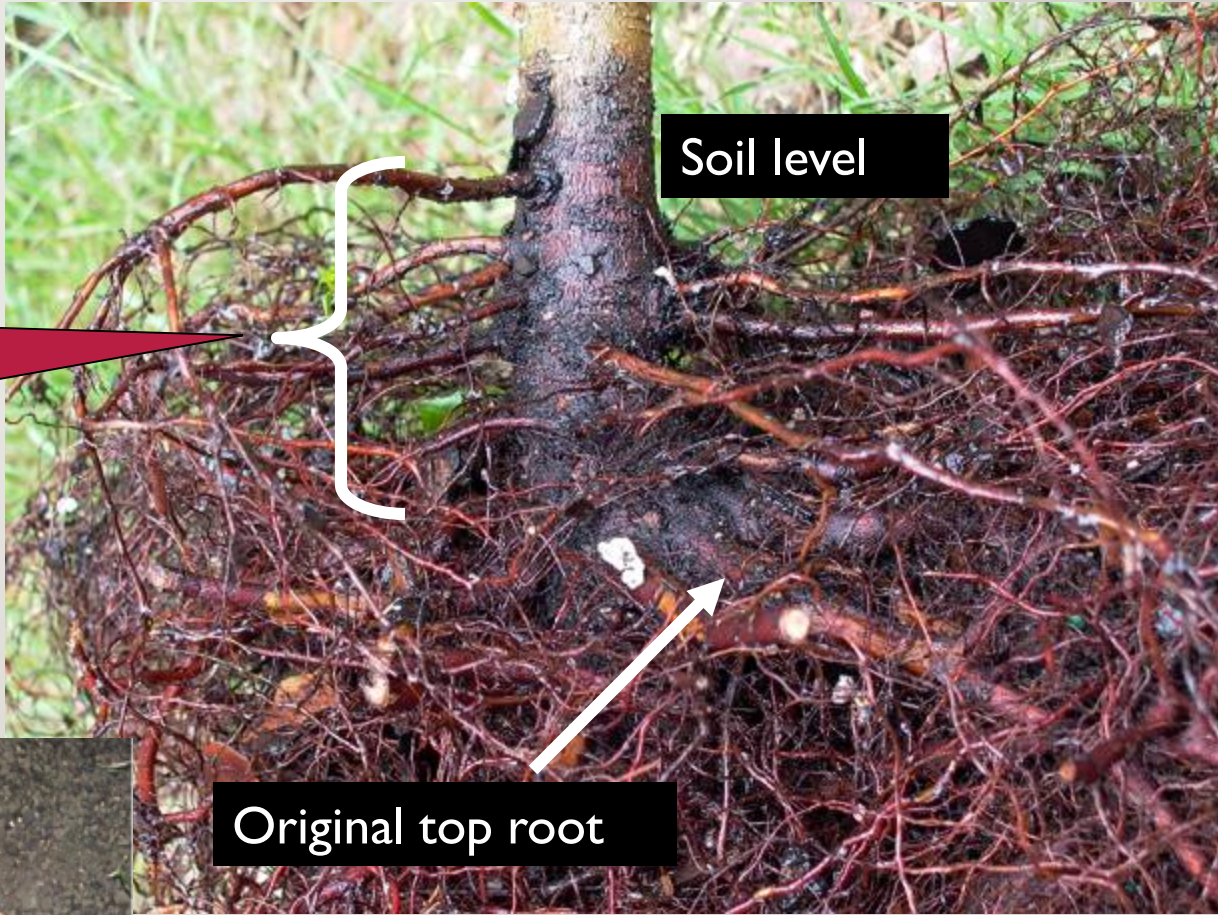


TRUNK WITHOUT
FLARE SHOULD
TRIGGER A ROOT
CHECK



PLANTED TOO DEEPLY

Roots generated after planting



Most common

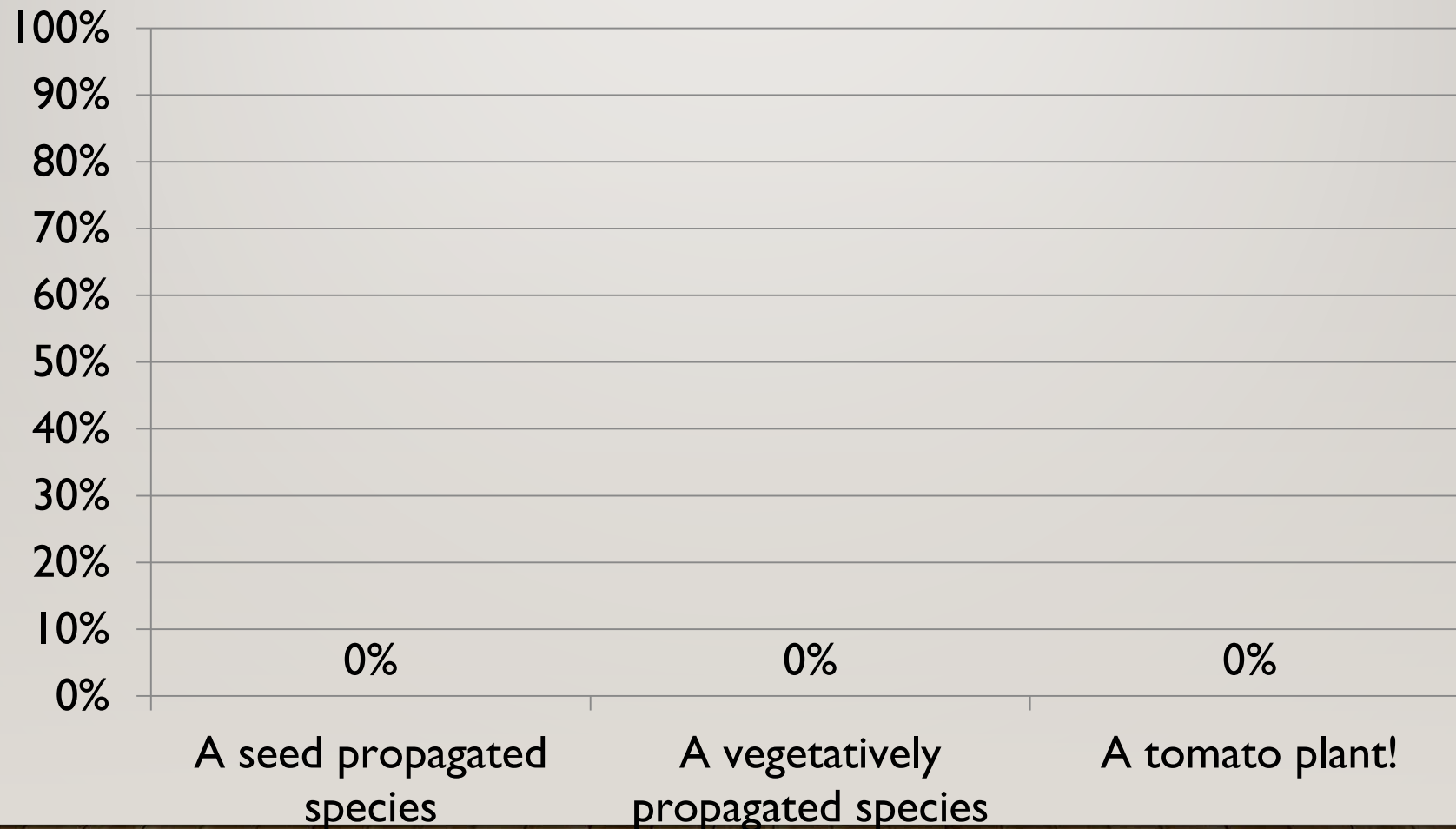


No roots generated after planting

Less common

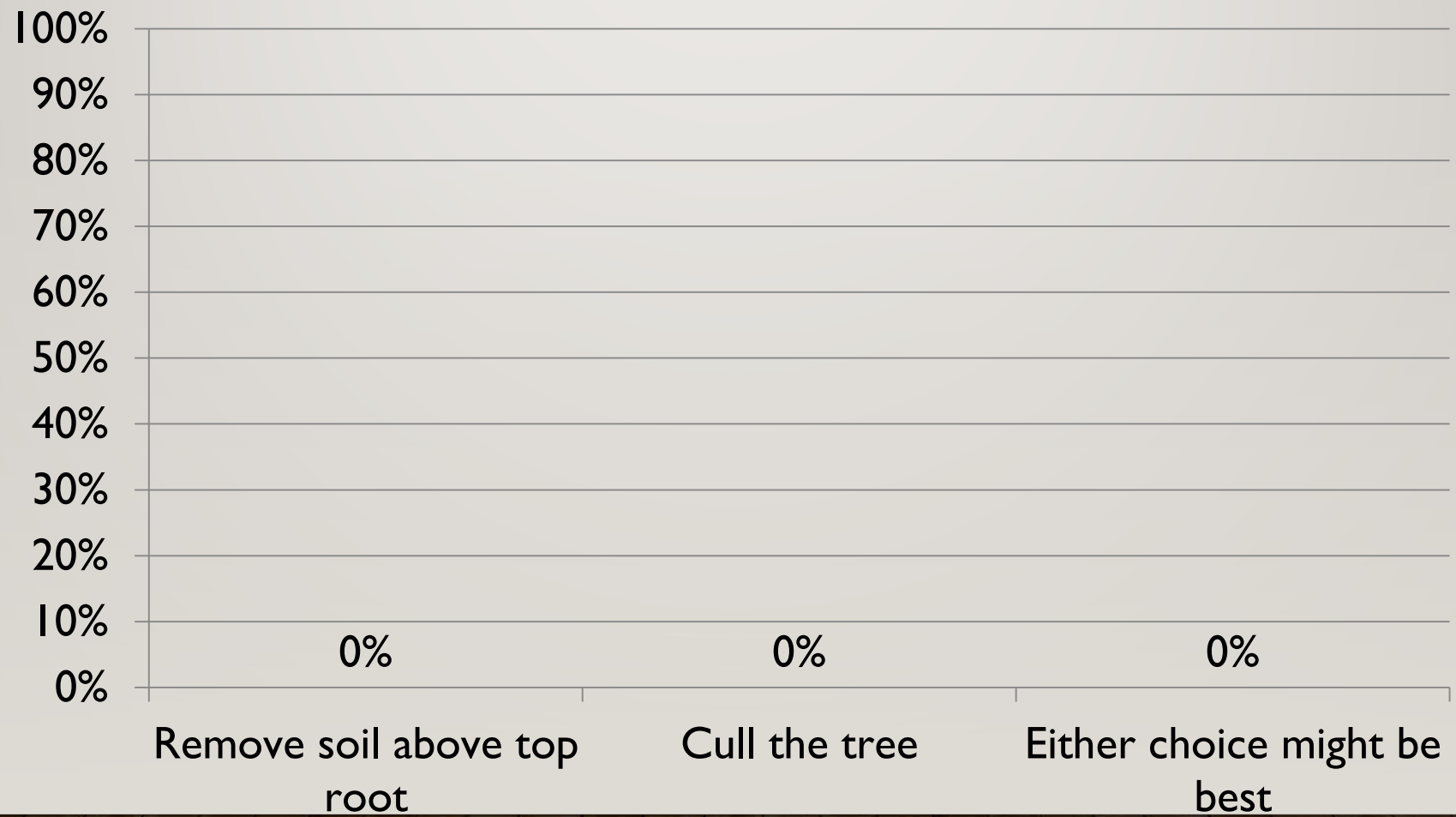
WHICH IS MORE LIKELY TO DEVELOP ROOTS ABOVE THE ROOT BALL?

1. A seed propagated species
2. A vegetatively propagated species
3. A tomato plant!



What can you do?

1. Remove soil above top root
2. Cull the tree
3. Either choice might be best



CONCLUSIONS ABOUT TREES PLANTED TOO DEEP

- Cull the tree. OR
- Soil, media, and roots growing above the original top-most root should be mostly removed prior to planting.

IMPORTANT CONSIDERATIONS

- Production method
- Maximum size at planting
- Root ball dimensions
- Root collar location
- **Root defects**
- Root ball: caliper: height relationship
- Trunk and branch structure
- Other



TYPES OF ROOT DEFECTS

- Circling roots
- Kinked roots
- Girdling roots
- Root-bound



CIRCLING ROOTS



Notice roots circling at the top and sides of the root ball.

Circling roots develop when trees are grown in containers for a prolonged period, causing roots to be deflected by the container wall and to circle the outside of the root ball.



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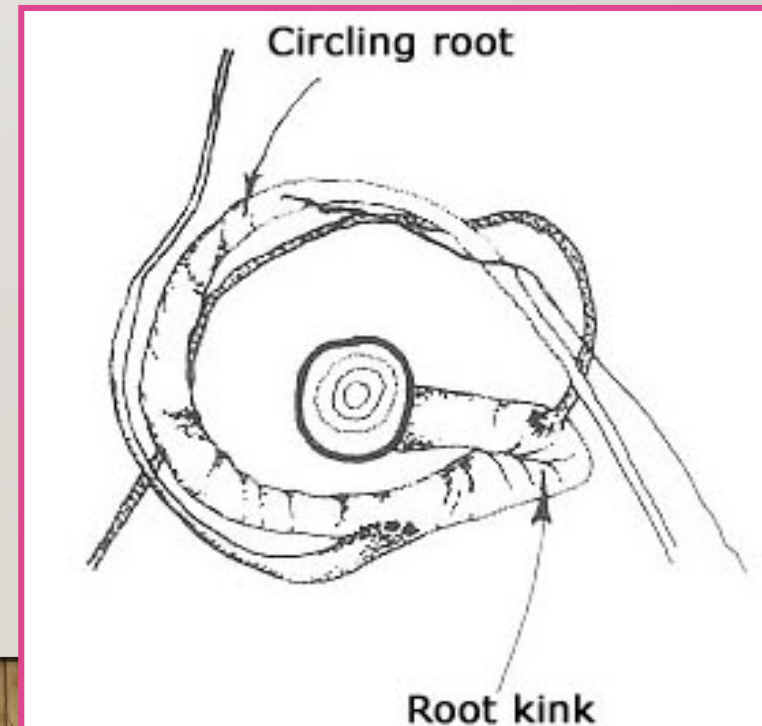
The cause ...
circling roots



KINKED ROOTS



Kinked roots occur if roots are folded into a propagation bed at the seedling stage.



GIRDLING ROOT



Girdling roots are formed when regenerated roots grow perpendicular to a cut root, or from growing in a container too long.

As the tree grows, these roots may meet the trunk and begin to strangle it.

GIRDLING ROOT BRINGS DOWN A GIANT



Indented trunk





ROOT-BOUND



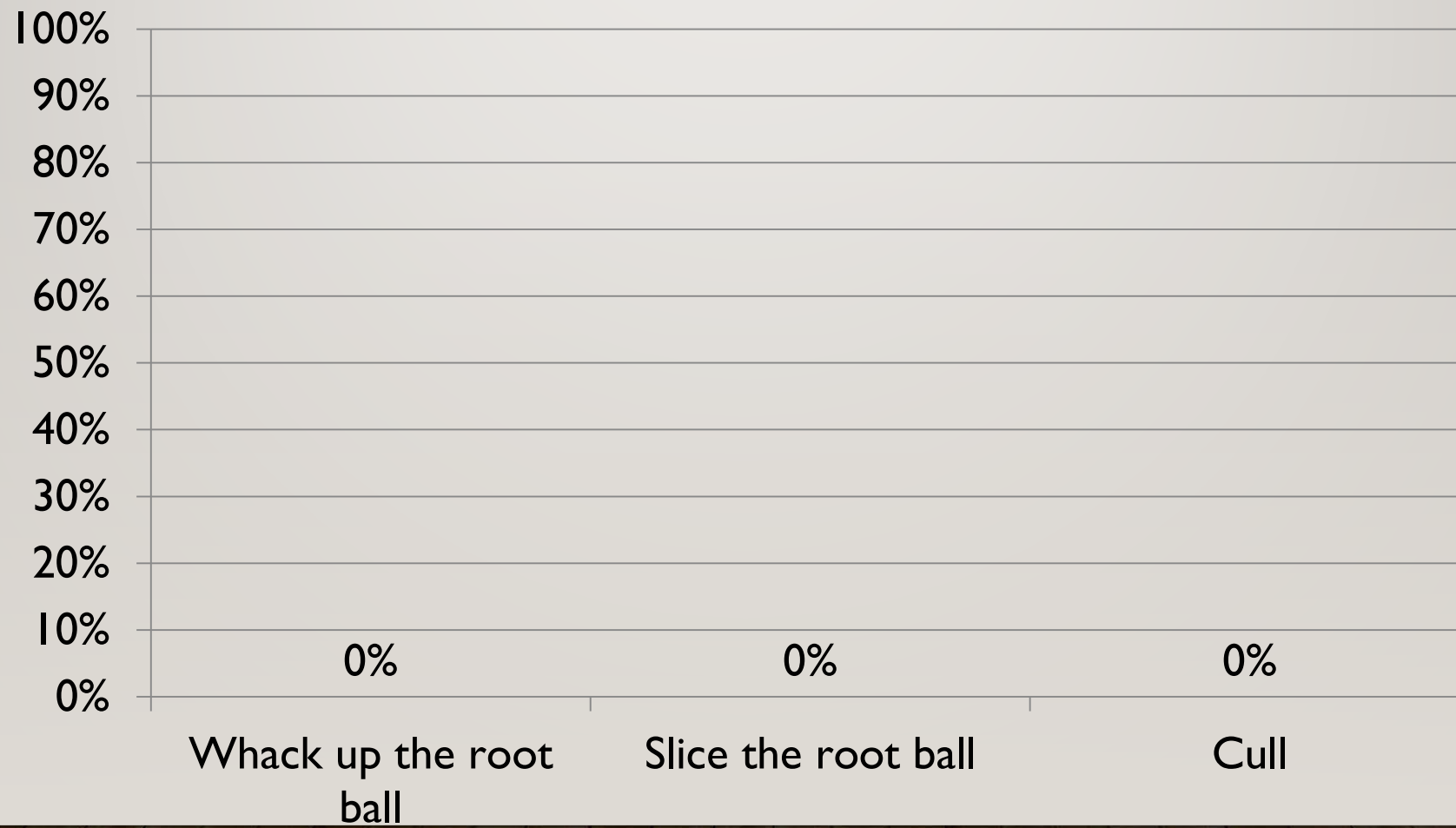
Root-bound trees have many roots circling around the outside of the root ball.

This causes a physical barrier, preventing the tree from spreading roots into the landscape soil after planting.



WHAT SHOULD YOU DO?

1. Whack up the root ball
2. Slice the root ball
3. Cull



MANY ROOTS INSIDE BUT FEW ON THE EDGE OF ROOT BALL INDICATE QUALITY.



QUICK TEST FOR ROOT QUALITY

Good
Quality

Trunk bends




Poor
Quality

Trunk does
not bend



CONCLUSIONS ABOUT ROOT DEFECTS

-
- Root defects have a significant impact on tree performance in the landscape.
 - Defects can occur on all trees regardless of the production method.
 - Problems are easier to correct in the nursery when the tree is young; some correction can occur at the time of planting.
- 

IMPORTANT CONSIDERATIONS

- Production method
- Maximum size at planting
- Root ball dimensions
- Root collar location
- Root defects
- **Root ball: caliper: height relationship**
- Trunk and branch structure
- Other



ROOT BALL STANDARDS

Trunk Caliper (Inches)	Min ball diameter on field grown shade trees	Min root ball diameter on fabric container grown trees	Min container size (gallons)	Min tree height on standard trees	Min tree height on slower grown trees	Max tree height
1	16	12	5	6	5	10
2	24	18	20	10	8	14
3	32	20	45	12	9.5	16
4	42	30	95	14	10.5	18
5	54	36	95			



WAY OVER-GROWN





CONCLUSIONS ABOUT ROOT: HEIGHT RATIO

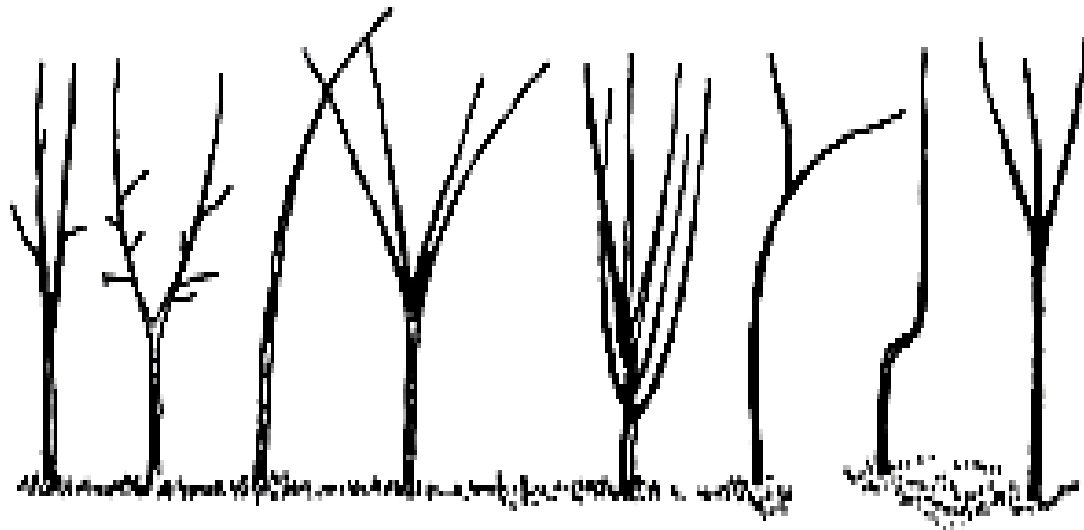
- Ideally, the dimensions of the root ball should exceed the minimum that is recommended.

IMPORTANT CONSIDERATIONS FOR SELECTION

- Production method
- Maximum size at planting
- Root ball dimensions
- Root collar location
- Root defects
- Root ball: caliper: height relationship
- **Trunk and branch structure**
- Other



TRUNK STRUCTURE



poor quality



best quality

good quality

- Shade trees of lesser quality have two or more trunks
- Best quality shade trees have one dominant trunk

BRANCH ARRANGEME NT

- Major branches and trunks should not touch.
- Branches should be less than $\frac{2}{3}$ trunk diameter.
- Main branches on shade trees should be spaced apart.

Good quality



Poor quality



QUALITY TREE

- Small temporary branches are OK
- Lower branches help the root system and lower trunk grow
- Protects trunk by forming a barrier to mechanical injury.
- Trashy Trunk




POOR QUALITY



- Codominant stems
- Major branches/ trunks touching
- V-shaped crotch
- Included bark



CONCLUSIONS ABOUT STRUCTURE

- Choose trees that have been trained in the nursery to have good structure.
 - Trees with good form at time of planting will need maintenance to keep one dominant trunk.
 - Trees with poor structure will need more severe and time-consuming pruning visits.
- 

IMPORTANT CONSIDERATIONS FOR SELECTION

- Production method
- Maximum size at planting
- Root ball dimensions
- Root collar location
- Root defects
- Root ball: caliper: height relationship
- Trunk and branch structure
- **Other**

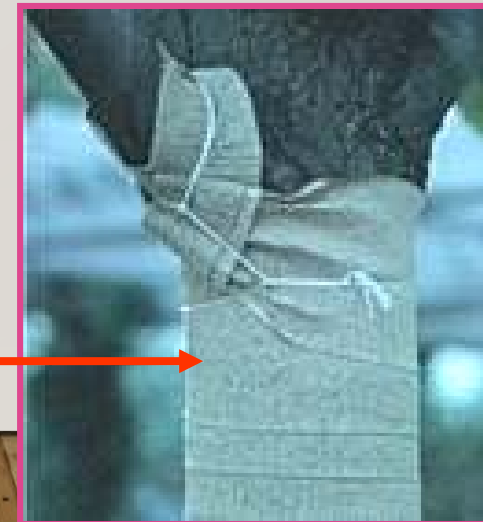


OTHER FACTORS INFLUENCING TREE QUALITY

- Trunk injury or broken branches.
- Tree wrap (may be covering up wounds).
- Disease or insect damage.
- Canopy uniformity and fullness.
- Quality of old pruning cuts.
- Seed or propagule source.
- Foliage color and size.
- Presence of stakes.



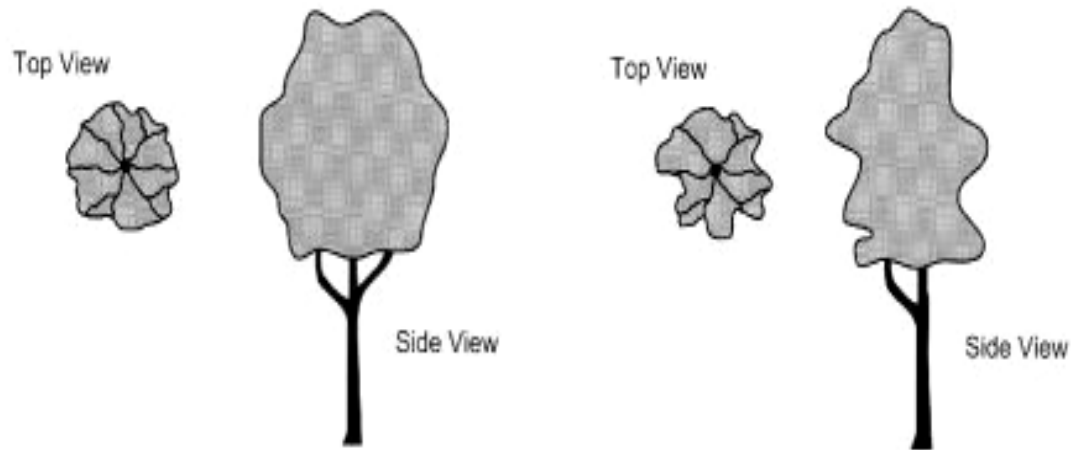
Tree wrap



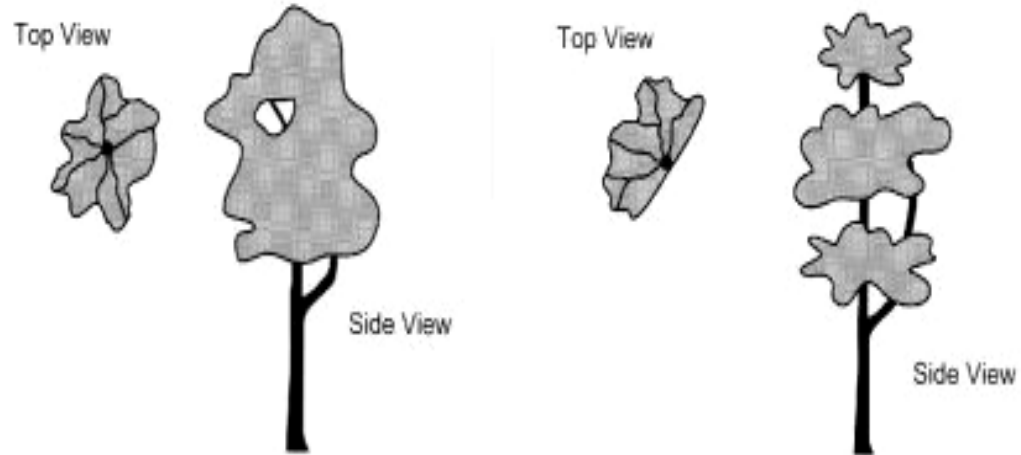


**Carefully inspect
the tree for
disease or insect
damage.**





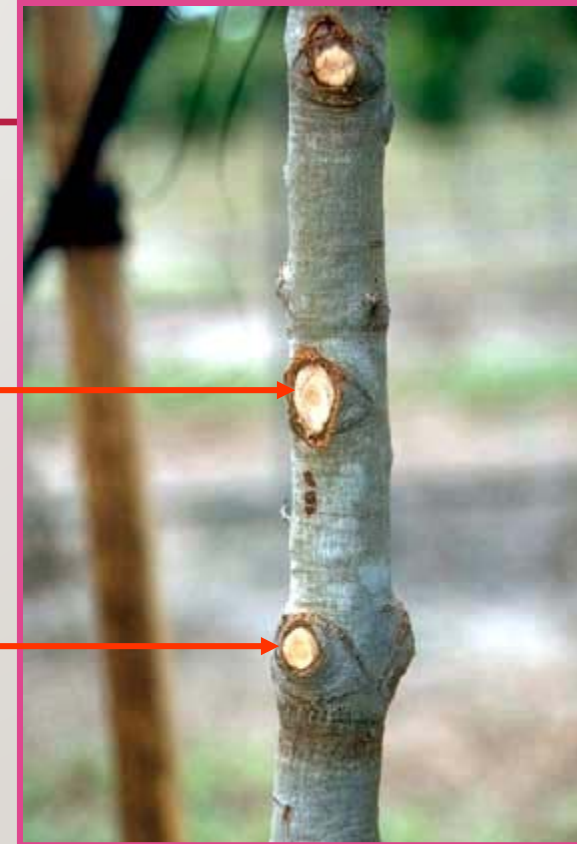
Good uniformity and fullness



Poor uniformity and fullness

CANOPY UNIFORMITY AND FULLNESS

QUALITY OF OLD PRUNING CUTS



Flush cut

Good cut



Callus forming only around sides of flush cut. Branch collar no longer present.



**FOLIAGE
COLOR
AND SIZE**



PRESENCE OF STAKES



MISSION ACCOMPLISHED



- One dominant trunk
- Branches spaced evenly
- Canopy full and uniform
- Healthy root system free from defects