

# Selecting Quality Trees from the Nursery

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# Selecting quality trees from the nursery



**Poor quality vs. good quality**

# 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

# 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

# Tree survival in the landscape can depend on the 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

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# Maximum tree size at planting

Depends on several criteria:

- Irrigation capabilities
- Site drainage
- Weed control and mulch management



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# Root ball dimensions

- Root balls of any shape can be planted in well-drained soil.
- Tall root balls help keep deeper roots moist.
- Shallow root balls may dry quicker on well-drained sites than deeper root balls.
- Low-profile (wide and shallow) root balls are better suited than traditionally-shaped root balls for planting in poorly-drained and compacted sites.

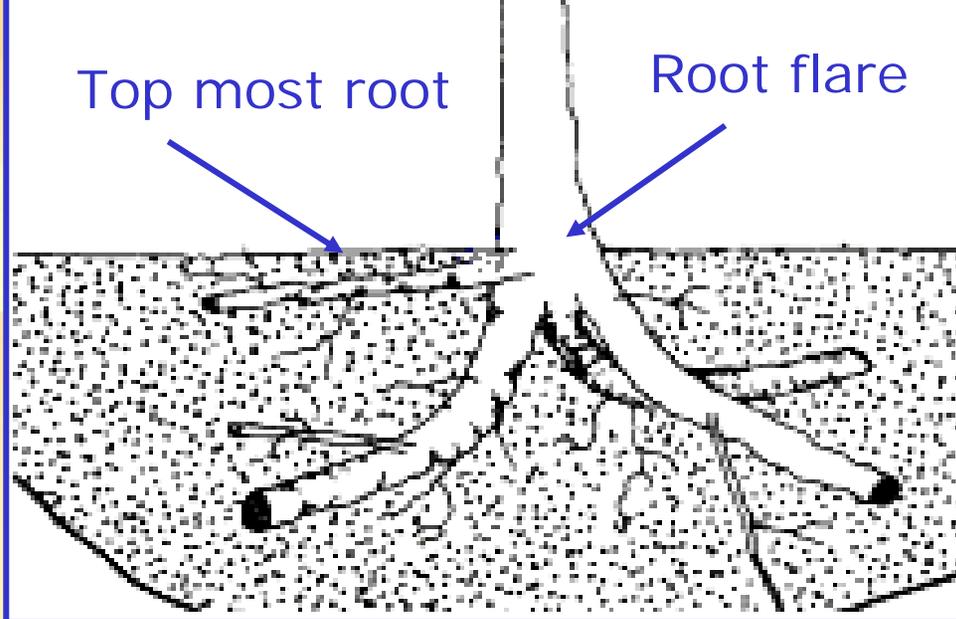


# Important considerations

- Production method
- Maximum size at planting
- Root ball dimensions and texture
- **Root collar location**
- Root defects
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- Other

# Root collar location

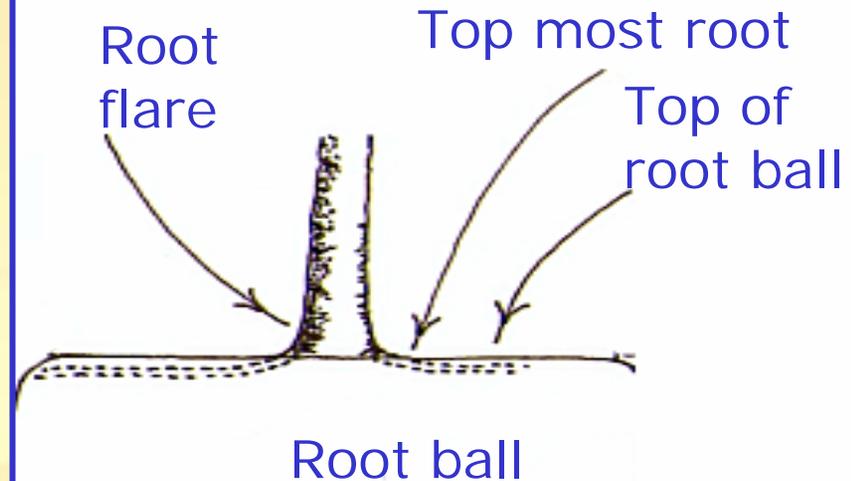
## Bare root tree or B&B



- The top-most root that emerges from the trunk should be within two inches of the top surface of the root ball.

- To check for circling roots, displace or remove soil or media that is above the top-most root

## Container tree



**Planted too  
deeply in  
container**

Original soil  
level



# Planted too deeply B&B



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# Root defects

- Root ball defects can occur on all trees regardless of the production method.
- Defects on main roots close to the trunk are difficult to correct.
- Can have a significant impact on landscape performance.
- Are often not visible to the buyer, and become evident only after establishment in the landscape.
- Do not plant trees with intact circling roots.

# Root circling defects



Figure left: Roots circling at the top and sides of the root ball.

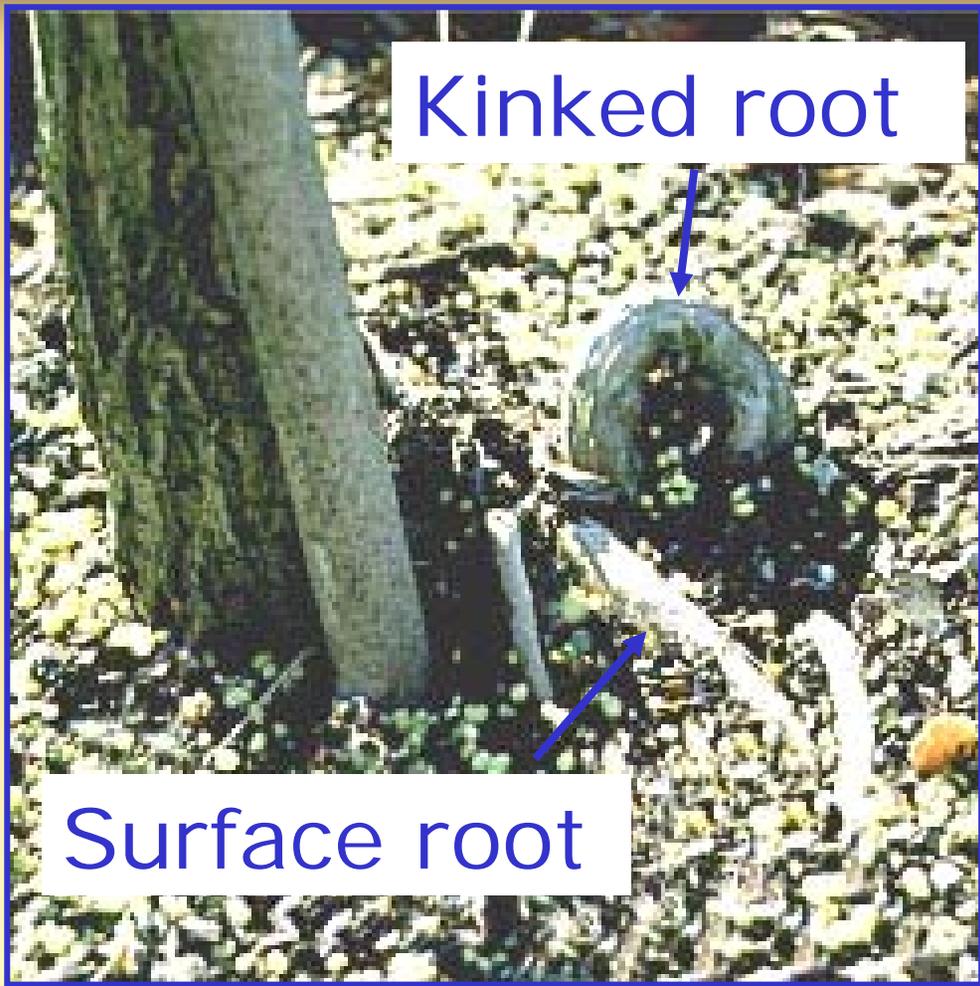
Figure right: Cracks at the surface can be a sign of circling roots.



# Possible result from circling roots



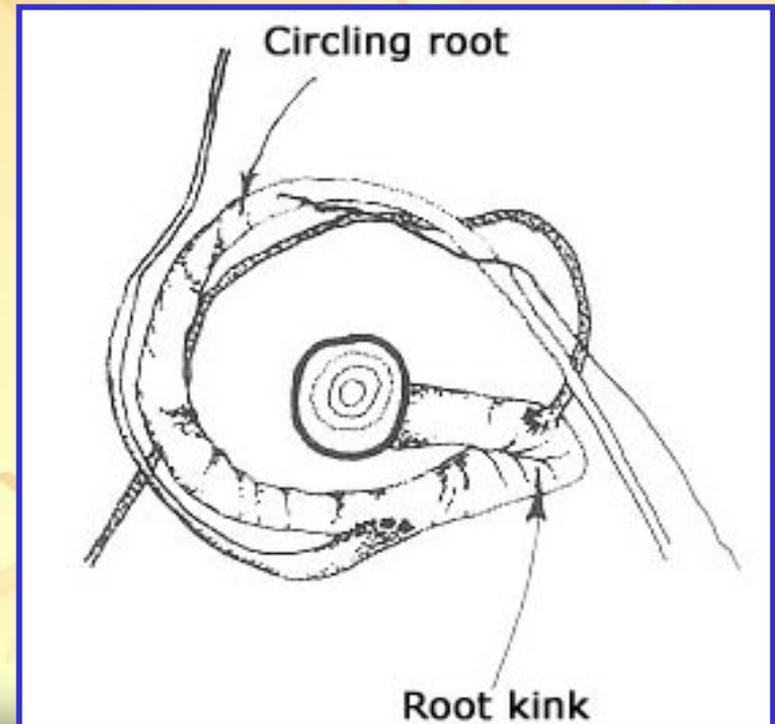
Kinked root



Surface root

# Kinked roots

Kinked roots and surface roots growing across the root ball close to the trunk can cause problems later in the landscape.



# Loose root ball



Root balls should remain firm and tight. This helps insure that roots will remain in contact with soil in the root ball.

If roots separate from the soil then trees become stressed.

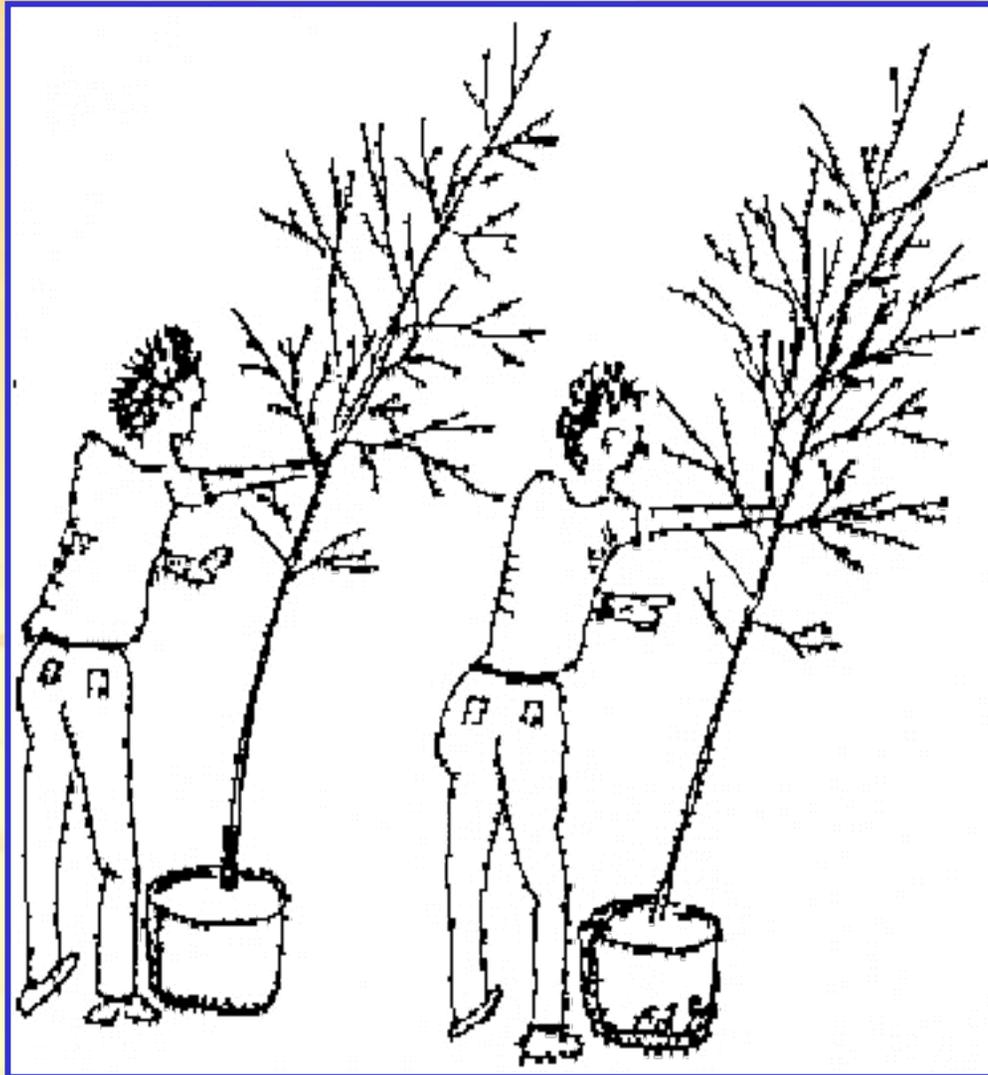
Pictures show root balls tightly secured



# Trunk moves back and forth without bending

Good Quality ←

Trunk bends along its length as it is pushed.



→ Poor Quality

Trunk does not bend as it is pushed indicates a root problem.



## Root-bound

Too many roots are on the outside of the root ball. Many are circling around the container.

# Root ball/container undersized



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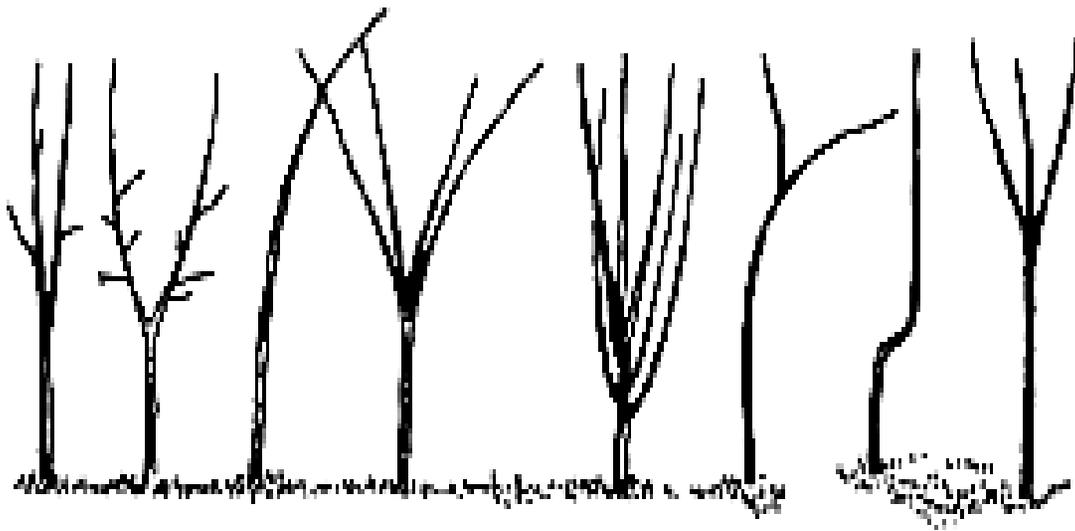
# Root ball standards

Trunk Caliper (Inches)	Min ball diameter on <b>field grown</b> shade trees	Min root ball diameter on <b>fabric container</b> grown trees	Min <b>container</b> 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			

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# Trunk structure



poor quality



best quality

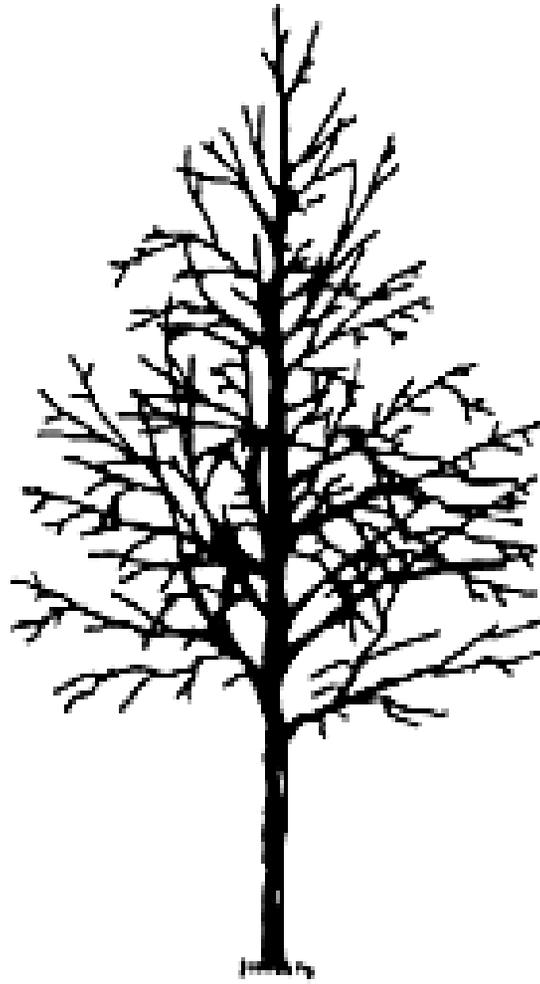
good quality

- Best quality trees have a dominant central leader or trunk up to the top of the canopy.
- Trees of lesser quality have two or more leaders.

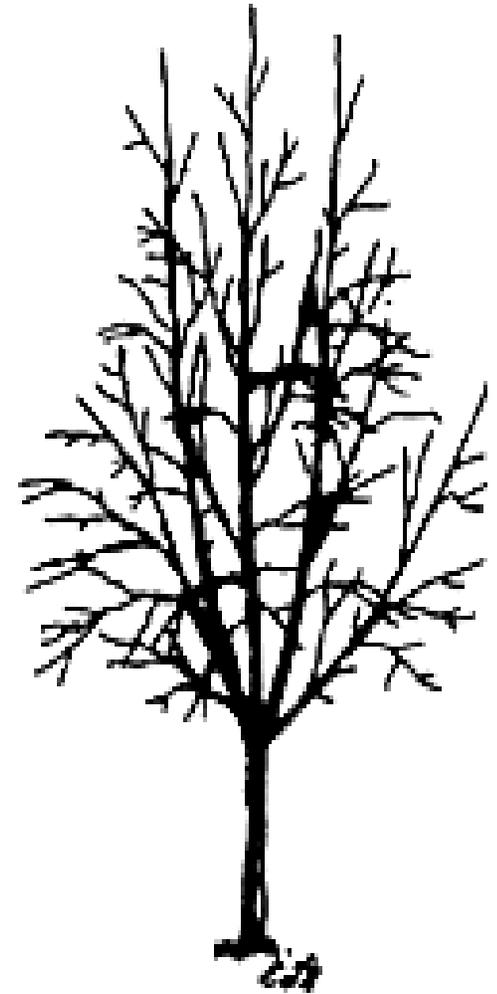
# Branch arrangement

- Major branches and trunks should not touch.
- Branches are less than  $\frac{2}{3}$  diameter of trunk.
- Permanent branches on large trees should be spaced 18 inches apart.
- Main branches on smaller trees should be 6 inches apart.

Good quality



Poor quality



# Young quality tree

- Can have small temporary branches along the lower trunk.
- Lower branches help the root system and lower trunk to grow and develop.
- Protects trunk by forming a barrier to mechanical injury.





## Poor quality

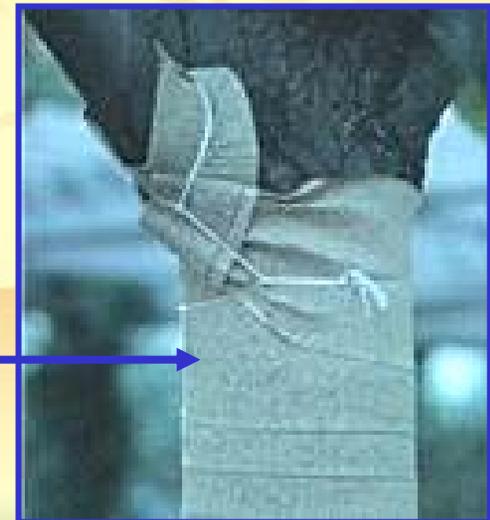
- Codominant stems
- Major branches/ trunks touching
- V-shaped crotch angles (not as strong as U shaped crotch angles).
- Included bark

# Important considerations

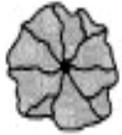
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# Other factors influencing tree quality

- Canopy uniformity and fullness.
- Quality of old pruning cuts.
- Seed or propagule source.
- Insect and disease infestation.
- Trunk injury or broken branches.
- Tree wrap (may be covering up wounds).
- Foliage color and size.
- Dieback in canopy.
- Presence of stakes.



Top View



Side View

Top View

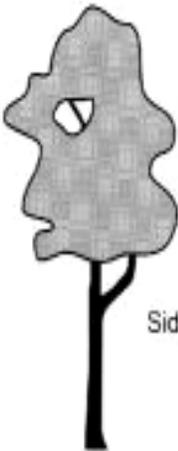
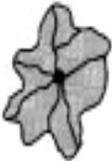


Side View

Good uniformity and fullness

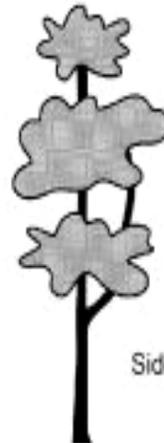
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Top View



Side View

Top View



Side View

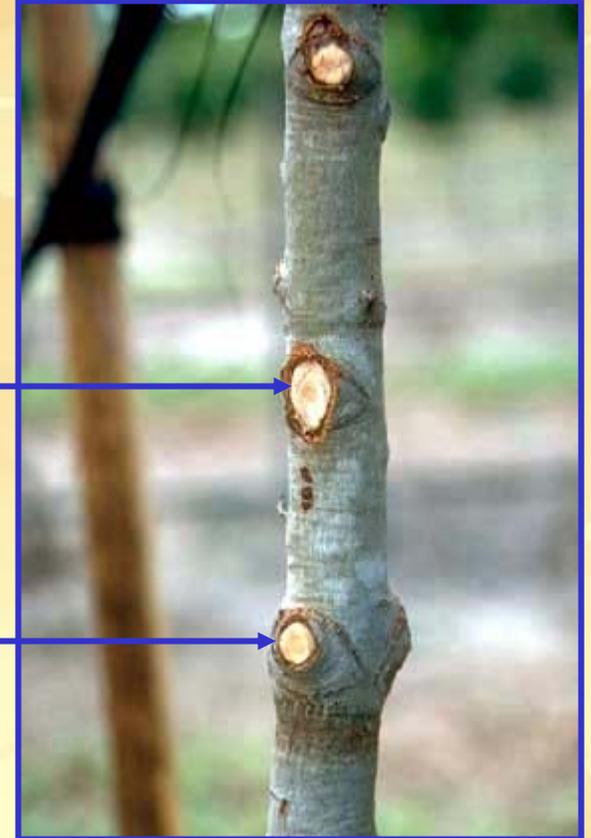
Poor uniformity and fullness

**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.

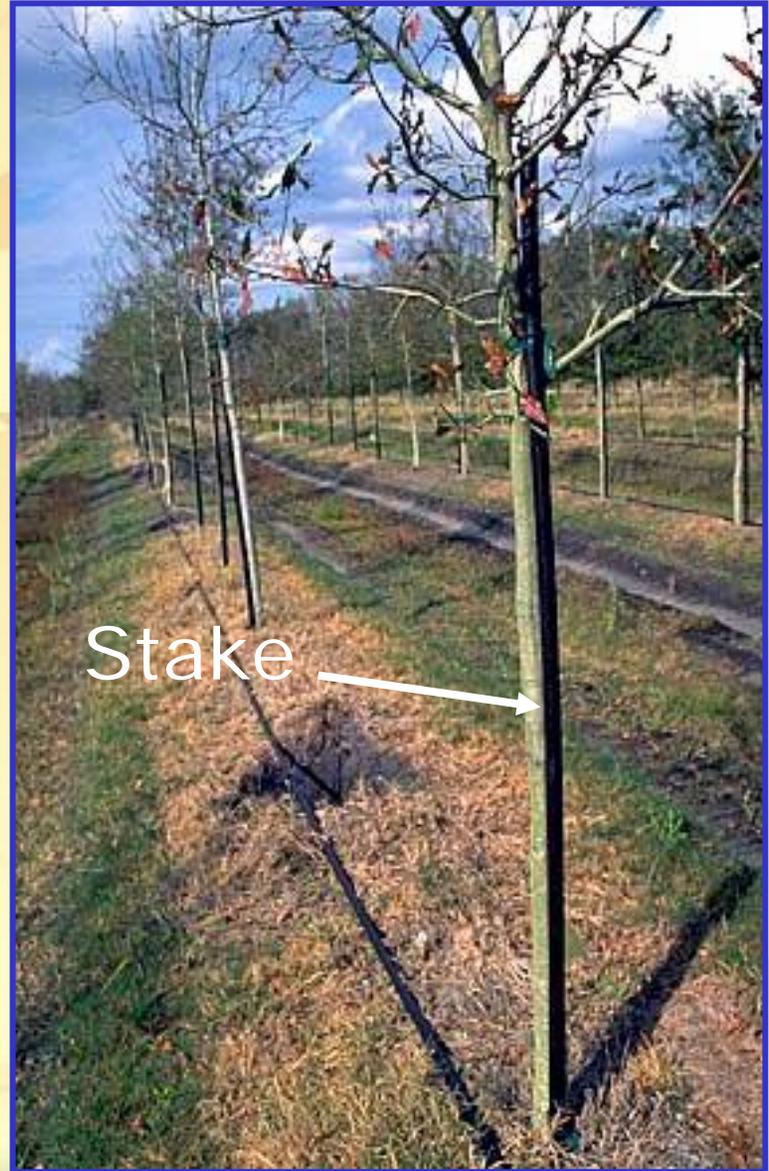


Foliage  
color  
and size



Seed or  
propagule  
source

# Presence of stakes





# **Examples of good quality trees**

# Quality oak

- One dominant trunk
- Branches spaced evenly
- Canopy full and uniform



# Quality linden

- This young linden has small branches are spaced evenly along one dominant trunk



# Quality red maples

- One dominant trunk to the top of the canopy
- Trunks taper well (larger at the base than at the top)



# Quality Chinese 'Drake' elm

- 'Drake' elm does not naturally develop one dominant trunk unless trained with pruning.
- Competing stems and branches were cut back regularly to produce the single leader on this elm.



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