

CMG GardenNotes #634

Tree Staking and Underground Stabilization

Outline: Consequences of staking, page 1
Purposes for staking, page 2
Staking procedures, page 3
Underground stabilization, page 4

Staking became a routine procedure when trees were planted in deep holes and the trees sunk and tilted as the soil settled. In the *Science of Planting Trees*, where trees are set on undisturbed soil and a ring of soil is firmed around the base before backfilling, staking is not needed in many landscape settings.

The Consequences of Staking

- Tree grows taller faster.
- Staking (the lack of tree movement) slows root spread.
- Tree has less growth in trunk caliper near the ground but more near the top support ties. Staking often produces a reverse trunk taper that increases the potential for storm damage.
- Staked trees experience more wind damage than un-staked trees of equal height (top of tree is not free to bend in wind).
- Bark is often damaged by the ties. In a survey of 10,000 street trees, 90% were damaged by the ties.
- If the stake is close to the trunk, it can develop uneven xylem growth (where the stake shades the trunk) making the trunk tilt to the side. Keep stakes at least 6 inches away from the trunk.

Purposes for Staking

No staking – In most home landscape settings, no staking is necessary if the tree is set on undisturbed soil (where it can't sink and tilt) with soil firmed around the base of the root ball before backfilling. Exceptions include the three types of staking below.

Protection staking is used where the tree needs protection from human activities, such as the football game on the front lawn or from passersby along a street planting.

Protection staking may include standard staking techniques with 3-4 posts and straps or may include a structure surrounding the tree but not actually touching the tree trunk. [Figure 1]

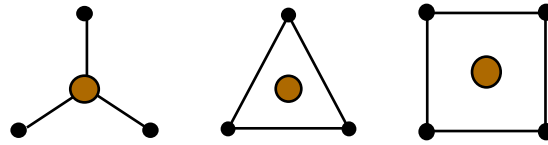


Figure 1. Configurations for protection staking

Anchor staking – In areas of high winds, anchor staking may be needed. When anchor staking small trees, use 2 or 3 straps along the trunk about 18 inches above the ground. [Figure 2]

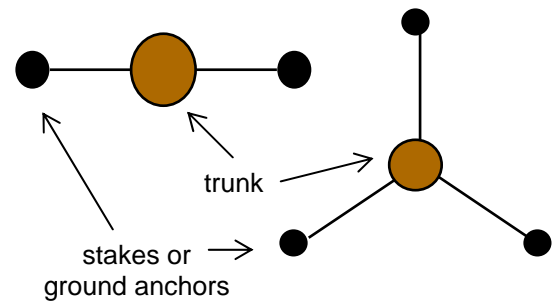


Figure 2. Configurations for anchor staking. Anchor staking may be needed in areas of high winds.

Support staking – If the tree has a floppy trunk that is not self-supporting, support staking will be needed. Straps would be located six inches above the point where the tree will stand upright, but at least three feet below the terminal leader.

Staking Procedures

When staking, use flat grommated straps because they spread the pressure over a wider area, reducing the potential for bark damage. Straps should lay flat against the trunk and should not be bunched up or twisted. Straps may be spaced a few inches apart along the trunk. Two or three straps are routinely used in tree staking.

Straps may tie back to wood or metal posts or to anchors in the ground. Place posts 15 to 18 inches from the trunk. Never tie a post to the trunk, as the shading will cause the trunk to curve. [Figure 3]

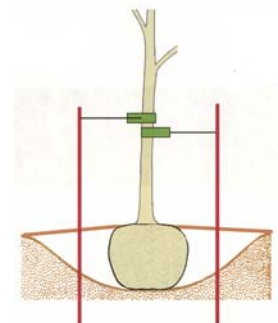
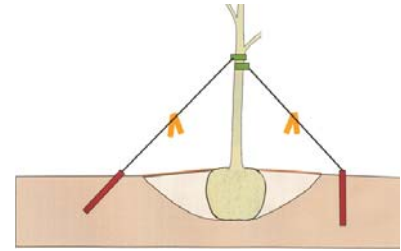


Figure 3. Routine staking includes 2-3 posts, 15-18" out from the trunk. Use flat straps to spread pressure over a wider area, reducing bark damage.

With guy-lines and ground anchors, place the guy-line at a 45° angle. Flag the guy-lines to help people see them and prevent injury. In the illustration, the anchor on the left may be more secure than the anchor on the right. [Figure 4]

Figure 4. When staking with guy-lines, place guy-lines at a 45° angle. Ground anchor on left is more secure than anchor style on the right.



In any staking system, it is best if the tree trunk has a little flexibility. Some movement in wind encourages root growth and trunk taper development. For 1-2 inch diameter trees, staking typically stays on for 1-2 seasons. On 3-4 inch diameter trees, staking may be needed for 2-3 years.

Underground Stabilization Methods

Several methods for underground stabilization are effective. They are applied prior to backfilling the planting hole. [Figure 5]

- **2-3 wood dowels** driven into the ground at edge of root ball. The dowels will decompose over time.
- **2-by-2 wood triangle over top of root ball is screwed into 2-by-2 wood stakes** driven into the ground at edge of the root ball. Wood will decompose over time.

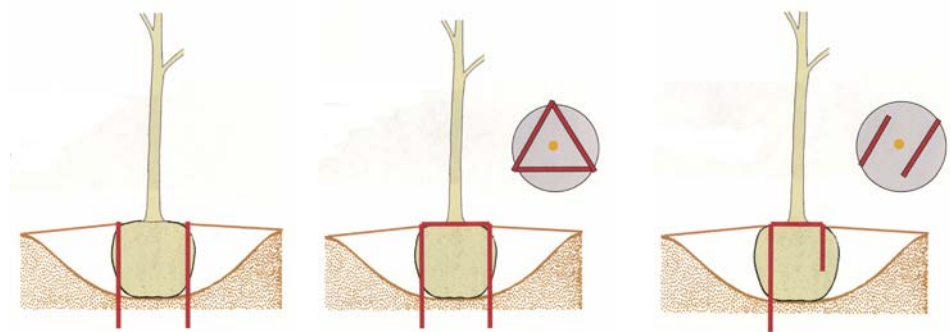


Figure 5. Methods for underground stabilization

Left: 2-3 wood dowels are driven into the ground at the edge of the root ball.

Center: 2 by 2 lumber makes a triangle plate over top of root ball. It is screwed into wood stakes driven into the ground at the corners.

Right: Metal root "staples" are driven into the ground at the edge of the root ball and hook into root ball.

- **2 metal root “staples”** – Several brands are on the market. The long leg of the staple goes into ground at the edge of the root ball. The short leg of the staple goes into the root ball. The metal staple may be an issue if the tree stump needs to be ground out in the future.

Additional Information

CMG GardenNotes on Tree Selection and Planting

- #631 Tree Placement: Right Plant, Right Place
- #632 Tree Selection: Right Plant, Right Place
- #633 The Science of Planting Trees
- #634 Tree Staking and Underground Stabilization
- #635 Care of Newly Planted Trees
- #636 Tree Planting Steps

- Books: Watson, Gary W. and Himelick, E.B. *Principles and Practices of Planting Trees and Shrubs*. International Society of Arboriculture. 1997. ISBN: 1-881956-18-0
- Web: Dr. Ed Gilman’s tree planting information at <http://hort/ifa.ufl.edu/woody/planting>

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- Colorado Master Gardener *GardenNotes* are available on-line at www.cmg.colostate.edu.
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