

## When and How to stake a tree

Staking a tree that does not need it can do more harm than good. Movement of the trunk helps strengthen it by thickening it and giving it taper from bottom to top. Trunk movement also stimulates root growth. So although staked trees might grow taller faster than their un staked counterparts, their trunks are weaker and their root systems are less developed.

When done incorrectly, staking further compounds a young tree's problems. If a tree is tied to a stake too tightly, girdling can occur, weakening and even possibly killing the tree unless the problem is addressed in time. Movement of a tree above where it is tied too tightly to a stake, like movement of an un staked trunk, results in a thicker trunk above the tie. This difference in thickness upsets smooth travel of water and nutrients up and down the developing trunk. Too tight a tie coupled with too rigid a stake can anchor a plant so firmly below the tie that a strong wind can actually blow off the top of the tree. Tying a tree too loosely to a stake also causes problems. The bark is continuously rubbed, resulting in wounds that may never heal properly.

However, a tree does benefit from staking. A young tree with a dense crown of leaves combined with a disproportionately small root ball is almost certain to require a stake. By staking a tree like this, its root ball will be held motionless in the soil. This temporary, artificial stability allows the roots to grow into the surrounding soil, thereby anchoring the tree and giving it a more permanent, natural stability.

Stiff winds coursing through a dense crown of leaves can also spell trouble root ball to rock back and forth instead of remaining stationary, the winds prevent developing roots from taking hold. This excessive movement could lead to a "crowbar hole," a gap that develops around the base of a tree where water collects, potentially causing root rot. To determine if a newly planted tree's roots are moving, grab the trunk and move it back and forth gently, watching for shifting soil at the base of the tree. If I see movement, I know there's a problem that staking can address. A stake will help to hold the trunk in place long enough for it to develop sufficient thickness and taper to thwart such movement. In the weeks and months following the planting of any tree, frequently inspect the ground where the trunk emerges to see if a crowbar hole is developing.

Staking a tree can also offer protection. A lawn mower can be kept from continually banging a trunk and abrading its bark by some strategically placed stakes. Of course, if you have circled your tree with shredded mulch, leaf litter, pine needles or any other type of mulch, you won't need to mow near the tree. For protection, a trunk needs at least three stakes circling it.

Support for any young tree should let the top of the tree move freely and allow for some movement of the trunk, all without causing abrasion where the tie makes contact. A tie placed too high (more than two-thirds of the way up the trunk) will not allow sufficient movement of the top of the tree. To let the lower part of the trunk move adequately, use only one tie per stake.

An elastic material, such as the inner tube of a bicycle tire, is best for a tie because it allows movement at and below the point of attachment, while keeping a firm enough grip on the trunk to avoid abrasion. Other satisfactory tying materials include elastic webbing and nylon stockings. To keep the trunk from rubbing against the stake, it is best to tie any of these materials in a figure eight loop between the trunk and the stake. The common practice of using wire padded with a length of garden hose is less satisfactory for tying because it cannot grip the trunk firmly without eventually girdling it.

Good materials for the stakes themselves are lengths of metal rebar, wooden posts, and metal pipes. I've also staked small trees with fiberglass posts sold for use with electric fencing, which have the added advantage of being flexible themselves. Stakes should be strong enough to provide whatever support is needed but should never be so large or be placed in such a way that a tree's trunk is too shaded. Otherwise the trunk will naturally bend away from the stake.

A single stake may suffice for a small tree whose trunk is less than a couple of inches in diameter. For a larger tree, up to 4 inches in diameter, use two or three stakes, tying each one separately to the trunk.

## Placement of Stakes/Anchors and Stem Attachments:

**Placement of stakes or anchors:** As a rule of thumb, use as few as possible. For many, smaller trees, one stake is sufficient to keep the tree vertical and stable (Fig. 6). Place the stake upwind from the direction of prevailing spring/summer winds. Drive the stake into the outer edge of the planting hole, safely away from the root system but still within the mulched planting area.

If one stake is not sufficient, place two stakes that run parallel to the prevailing winds (Fig. 7). For guying straightened, wind thrown trees, use three stakes or anchors, equally spaced around the tree with one placed upwind from the prevailing winds (Fig. 8). Never place guying anchors outside of the mulched planting bed because this can become a safety hazard to people walking by or playing near the trees.

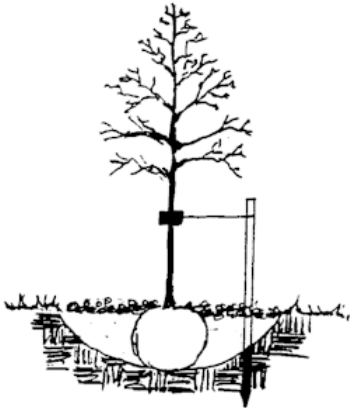


Fig. 6: One stake, 2/3 up the stem.

**Placement of stem attachment:** For staking trees, the wide, flexible stem attachment materials should be placed either 1/3 or 2/3 the distance from the ground up to the first set of branches (Fig. 6, 7). Never place the attachments directly beneath the first set of branches. Stems will snap in heavy wind loads if the canopy (branches and leaves) move but the stem is held rigid directly below the canopy (Fig. 4). For guying trees, the attachments should be made on the canopy stem, that is, around the stem above the first set of branches (Fig. 9). This will allow maximum stability of the entire tree during windy periods.

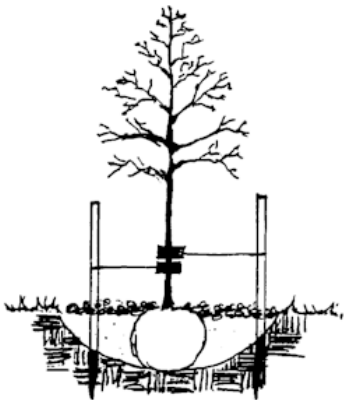


Fig.7: Two-stake method, 1/3 up stem.

Always attach the stem to the stakes or anchors loosely, with some flexibility at the point of attachment to the stem as well as the attachment of the ropes/wires to the stakes or anchors. Trees need to move a little during windy periods in order to develop flexible strength and stem diameter. Rigidly supporting trees to stakes or cables will result in tall but weak stems.

**Removing the Stakes and Anchors:** Install the staking or guying attachments at planting time or straightening time and leave them in place for one growing season. Remove the attachments in the autumn for spring planted trees and in the autumn for trees planted the previous autumn. After removing the attachments, check the tree for stability

If the tree's root system still moves in the soil when the stem is moved or if the stem still bends excessively, reattach the connections to the stakes – loosely to accommodate new growth – and leave the stakes/anchors on for one more season.

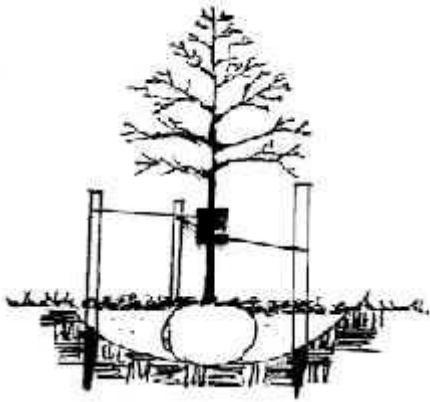
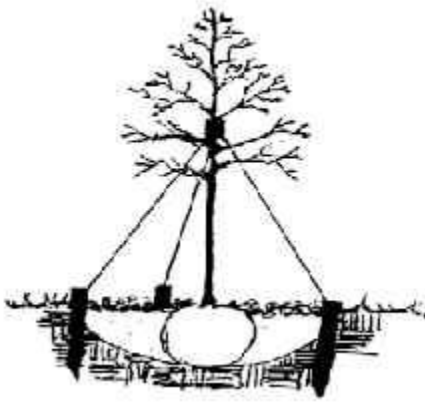


Fig. 8: Three stake method.



the mulched area.

Fig. 9: Guyed tree with attachments on canopy stem and anchors placed within