

# Proper tree planting techniques

## Proper planting is the first step in root management.

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■ Getting shade trees and street trees started correctly is critical to long tree life, easy care and low-cost maintenance.

One way to ensure that trees are planted correctly is to give them plenty of room to grow; don't plant trees in spaces too small for their mature size. The amount of space required varies with soil conditions, site stress levels and species of tree.

Good planting allows a tree to colonize a site and positions tree roots where they can grow well. The soil environment must contain adequate space and essential materials to the roots. Planting is the first step in root management.

**Site selection**—Select the area for planting based on the growth characteristics and biology of the tree species, the size of the area it will occupy when mature, the presence of potentially damaging conditions (like overhead or underground utility lines), and functional and aesthetic design, *in that order*. Thousands of trees die every year when tree biology is an after-thought of the design process.

**Rooting space**—The amount of rooting space needed by a tree depends primar-

ily on its mature size, the expected amount of stress the tree will be under, and management input. Soil texture, aeration of the soil, and the amount of surface area of the soil open to the air are also considerations. Calculate rooting area (see sidebar).

**Planting area treatment**—The planting site should be an area at least 10 times the diameter of the initial root spread or rootball of the tree. The entire planting site should be tilled or spaded as deeply as possible (at least eight inches). On badly compacted sites, sub-soiling, aeration and deep tilling (16 inches) may be required.

Do not incorporate organic materials like peat or manure into the soil; they should be added as mulch. Adding materials that will change soil texture will disrupt soil water movement. Also, do not till or dig in areas where other tree roots already exist.

Test the soil to determine the level of essential elements, pH, and potential productivity. pH should fall between 5.8 and 7.0 for most native trees. Dolomitic limestone can be added to raise pH in highly acidic (low pH) soils. High soil pHs (cement wash areas) lead to elemental shortages.

In areas where rooting is limited and tilling is not possible, it is important to provide as much soil space as the site permits for tree roots. Allow as many square

feet of open soil surface as possible in tree wells, containers, parking lot areas or tree lawns. Ideally, at least 100 sq. ft. of open soil surface is needed for long-lived, healthy trees.

**Hole shape**—The actual planting hole, placed in the middle of the planting site, should have a compacted soil pedestal and steeply-slanted sides.

The rootball should rest on a compacted soil pedestal in the bottom of the hole. This soil pedestal can be compacted with your foot since the roots are going to spread outward, not downward. The pedestal will encourage root spreading.

The tree should be positioned to rest at the same level in the soil as it did in the nursery. You can tell where the old soil level was by looking at the stem base. In heavy textured soils (clays), it is better to plant trees one inch too high than to plant trees one inch too low.

Planting hole sides should never be vertical (straight up and down). They should always be slanted at least 45° from the ground surface. Slanted hole sides



allow and encourage roots to spread out and grow into native soil. In limited rooting areas, slanted hole sides can help prevent the tree from becoming pot-bound in the hole.

**Hole size**—The diameter of the planting hole should be at least three times the diameter of the root ball. The hole must be large enough to allow for proper root growth and distribution. Do not bend or pack roots into too small a hole.

**Tree placement**—Do not put water into the hole before the tree is planted. You should water the root ball heavily after planting.

Remove the tree from all bindings, ties, wires, burlap or wrapping. For larger trees, it is important that you remove all ties and as much of the packaging material as possible.

Do not leave trees in wire baskets or surrounded by any other kind of material or fabric. Any materials left around the tree will disrupt root growth and affect long-term root distribution.

Tree wrap can be used to protect the tree during the planting process. But it should be removed immediately after the planting site is finished.

**Tree planting**—Tree roots should not be exposed to full sunlight and air for more than a few seconds. Immediately upon opening the container or wrapping, use your fingers to gently pull the outer roots away from the rootball.

Gently break up and disrupt the nursery soil around the roots. Place the tree in the hole and carefully backfill with the native soil. Do not add any type of soil amendment or fertilizer to the native soil fill or the hole.

Try to keep the roots in roughly their original orientation. Do not sharply bend, abrade or twist them. Pull apart or cut roots that are closely surrounding or girdling the stem base. Plant trees with their roots spread horizontally, not downward.

Snugly pack the soil around the roots. Eliminate large air pockets but do not tamp or compact the soil. Roots must have close contact with the soil in order to properly function.

After the tree is planted, extensively water the entire planting site to help settle the soil and minimize large air pockets. Extensive watering helps establish connections between the tree and the soil-water system.

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## Calculating rooting area

**Step 1:** Use the following chart to estimate what the size of the trunk at 4-1/2 feet above the ground (diameter at breast height, DBH) will be, at the age shown for the expected stress level.

<u>Site stress levels</u>	<u>Est. dia. of tree at age:</u>	<u>Example areas</u>
extreme stress	7 yrs.	downtown, parking lots
moderate stress	15 yrs.	residential streets, intensive use parks
low stress	25 yrs.	yard trees

**Step 2:** Expected DBH (in inches) x 2.0 = side dimension of a square planting space (in feet) or  
Expected DBH (in inches) x 2.25 = diameter of a circular planting space (in feet).

**Example:** A 3-1/2-inch DBH tree in a parking lot would be growing in a very stressful site. Expected diameter (DBH) in seven years is five inches. The amount of rooting space you should provide at planting time for this tree would be a 10 x 10 foot square area (5" DBH x 2.0 = 10 feet) or a 11.25-foot diameter circular area (5" DBH x 2.25 = 11.25).

## Mulch for trees: wide but not deep

■ To get a newly planted tree off to a strong start, put a 3- to 5-inch layer of mulch around its base, says Mark Timmons, a horticultural consultant.

Timmons says work done by Dr. Gary Watson at the Morton Arboretum near Chicago shows that mulched trees develop significantly faster than non-mulched trees under the same conditions. Timmons says the mulch moderates soil temperatures and moisture for the tree roots.

Be careful not to apply the mulch too deeply, but don't worry about making too large a circle of mulch around the tree base.

"The guys that thought up the word dripline didn't do us a favor," says Timmons, explaining that many turf managers make the mistake of thinking almost all of a tree's root system lies within the imaginary circle beneath the tree extending straight down from the circumference of the tree's foliage.

He says that many tree

roots radiate out much further than that, sometimes 2 or 2 1/2 times the height of the tree.

"The root system of a tree is almost always more extensive than the tree canopy," says Timmons.

Another common misconception concerns tree taproots, says Timmons of Mark Timmons & Associates, Louisville. "Most trees as they mature lose what rudimentary tap root that had when they were young," he says.

This is particularly true when a tree is growing in heavy clay soil. There isn't much oxygen in these soil, and what little there is is within the top 18 inches of soil.

Timmons, who consults with turf/landscape managers and golf course superintendents in the Midwest, made these comments at the 1992 Golf Course Superintendents Association of American Convention this past February.



**Mark Timmons says tree root systems can be amazingly extensive.**