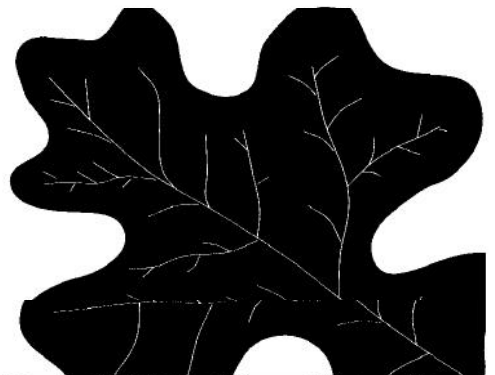
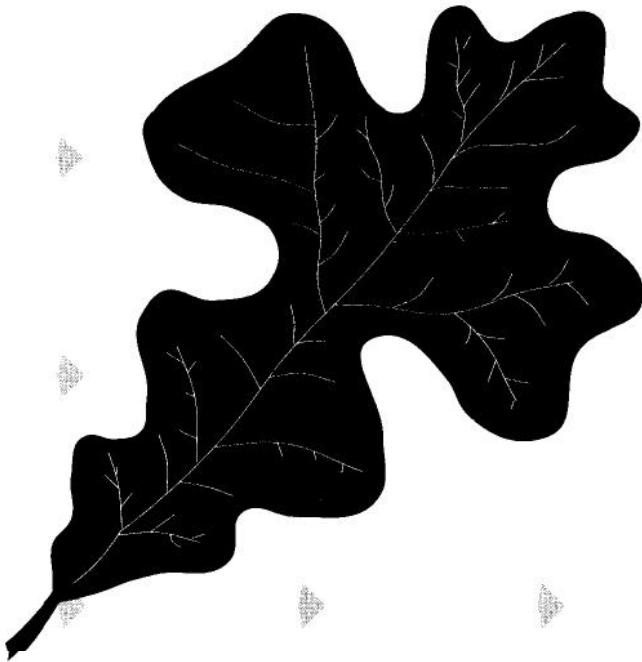


# Plant Trees Right!

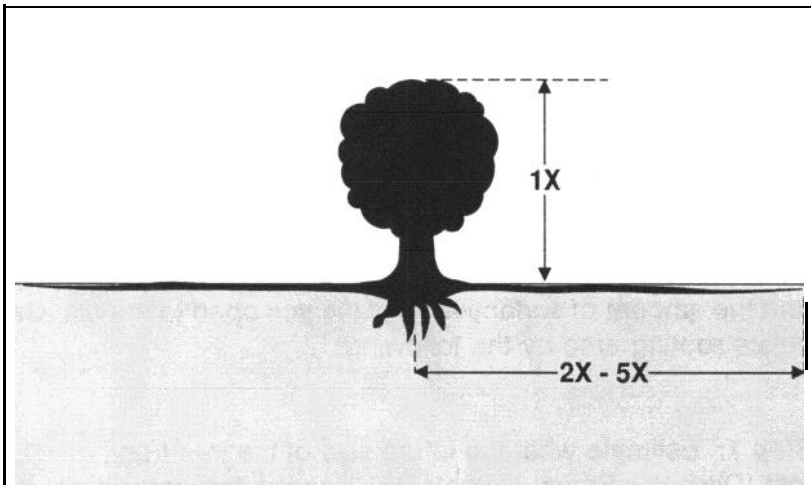


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# Plant Trees Right!

Getting trees started correctly in your yard, along streets or in a park is critical to long tree life, easy care and low-cost maintenance. One way to ensure trees are planted correctly is to give them plenty of room to grow. Fruit trees, trees in landscape beds and specimen ornamental trees are grown for different reasons and are not planted the same way as shade and street trees. Here, we deal with shade and street tree planting.

Do not plant trees in spaces too small for their mature size. Do not put a large oak in a flower pot unless you can provide intensive maintenance and care. When little follow-up care and maintenance is planned, the best thing for trees is to provide them with plenty of space. It is critical to provide adequate space for rapidly expanding root systems. Trees with large areas in which to grow have the best chance of being healthy and long-lived, and of developing few problems. The amount of space required varies with soil conditions, site stress levels and species of tree (Figure 1).



**Figure 1. The above-ground portions of a tree occupy less space than the below-ground portions.**

## PLANTING PROCEDURES

There are a number of planting procedures that help ensure proper tree establishment. 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 provide essential materials to the roots or the tree will die. Planting is the first step in a root management program that leads to long and healthy tree life. A well-planted tree is a great asset to the people who own it and live around it.

### SITE SELECTION

Select the area for planting based upon the growth characters and biology of the tree species, the size of area the tree 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 afterthought rather than part of the design process.

### ROOTING SPACE

The amount of rooting space needed by a tree depends primarily upon its mature size, the expected lifespan given the amount of stress the tree will be under and management input. Other considerations include soil texture, aeration of the soil and the amount of surface area of the soil open to the air. Calculate rooting area by the following:

**Step 1:** Estimate what the future size of the tree trunk at 4 1/2 feet (Diameter Breast Height; DBH) above the ground will be, based on an expected life span of:

<b>Tree Age</b>	<b>Site Stress Levels</b>	<b>Example Areas</b>
7 years	Extreme stress	downtown areas and parking lots
15 years	Moderate stress	streets along residential areas and in intensive-use parks
25 years	Low stress	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)

*(Calculation; based on 60 ft<sup>2</sup> basal area optimum · 750 ft<sup>2</sup> per foot of cross-sectional area.)*

**EXAMPLE:**

A 3 1/2-inch DBH oak tree along a city street is growing in a very stressful site. Expected diameter (DBH) in seven years is five inches. The amount of rooting space you should provide **today** when planting this tree would be a 10 x 10 foot square area or a 11.25-foot diameter circular area. (5 inch DBH x 2.0 = 10-foot square rooting area **or** 5 inch DBH x 2.25 = 11.25-foot diameter circular planting space.)

**PLANTING AREA TREATMENT**

The planting site comprises an area at least two to three times the diameter of the calculated root spread of the tree to be planted. If possible, the entire planting site should be tilled or spaded as deep as possible (at least eight inches). On badly compacted sites, sub-soiling, aeration and deep tilling (16 inches deep) may be required.

The soil of the planting site needs to be broken up and aer-

ated. Tilling or spading the planting site will allow tree roots to effectively colonize the site and will inhibit competing plant roots. Do not incorporate organic materials such as peat or manure into the soil. Organic amendments should be added as mulch. Do not add materials that will change soil texture because this disrupts soil water movement. Do not till or dig in areas where other tree roots already exist,

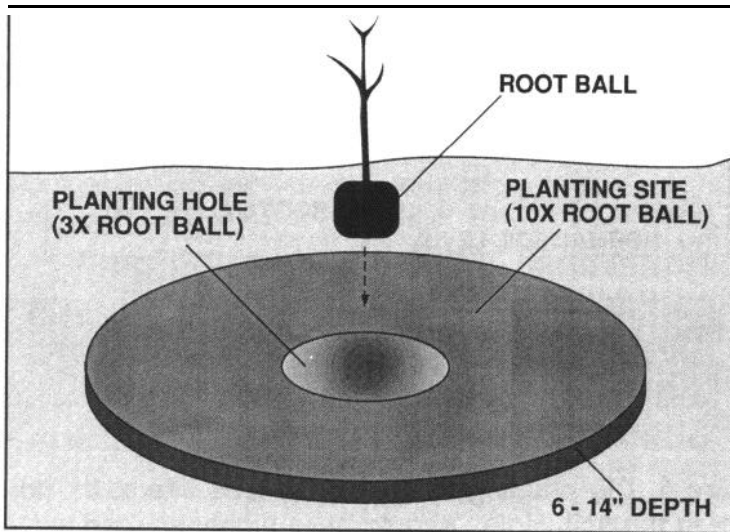
To determine the level of essential elements, pH and potential productivity of a soil, perform a soil test. Soil pH should be between 5.8 and 7.0 for most native trees. Dolomitic limestone can be added to raise pH in highly acidic soils (low pH). A high soil pH (such as in cement wash areas) leads to elemental shortages.

In areas where rooting is limited and tilling is not possible, it is important to provide as much soil space for tree roots as the site permits. 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 square feet of open soil surface is needed for healthy trees. This amount of space is not available for most sidewalk/street trees, so as much space as possible should be provided. Remember, trees with limited rooting areas will need more care and have a shorter life span than trees with large soil areas in which to grow.

The purpose of tilling the entire planting site is to encourage tree roots to effectively colonize the native soil beyond the edge of the root ball or planting hole. Many trees perish because they cannot grow into the native soil surrounding the planting hole. These trees sit in an area from which they cannot escape and which can not provide them with essential materials needed for long life (Figure 2).

## **HOLE** SHAPE

The actual planting hole, placed in the middle of the planting site, should look like Figure 3. One feature of the hole is a compacted soil pedestal in the bottom of the hole, upon which the root ball rests. This soil pedestal can be strongly compacted with your foot because the roots are going to grow outward, not downward. The pedestal will encourage root spreading.



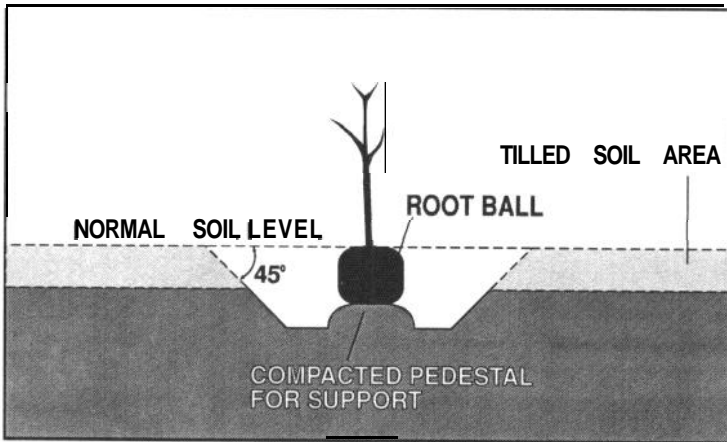
**Figure 2. Till or break up soil over the entire planting site to encourage tree root growth.**

Position the tree 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 one inch too low.

The second feature of a planting hole is the steeply slanted sides. Planting hole sides should never be vertical (straight up and down), but they should be slanted at least 45 degrees 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 (Figure 3).

## **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 a hole that is too small. In limited root areas, a properly dug hole is the best gift you can give a tree.



**Figure 3. Dig planting holes so the tree sits at its normal level in the soil. Holes should have highly slanted sides.**

## TREE PLACEMENT

Now that the hole has been dug properly and the depth measured to ensure the tree will be planted at ground level and at the same depth at which it grew in the nursery, planting can begin. Do not put water into the hole before the tree is planted. Instead, water the root ball heavily before planting.

Remove the tree from **all** bindings, ties, wires, burlap or other wrapping. For larger trees, remove all ties and as much packaging material as possible. Do not leave trees in wire baskets or surrounded by any other kind of material or fabric. Any materials left surrounding the tree will disrupt root growth and affect long-term root distribution.

## 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 root ball. 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.

Do not change soil texture. Changing soil texture by amending the soil or by layering different materials in the planting hole disturbs water movement and holding capacity within the soil. Never put gravel, straw or an organic amendment layer below the soil surface. Buried layers of radically different textures can cause saturated soil conditions that will drown roots, so never add anything that will change the native texture of the soil.

Try to keep the roots in roughly their original orientation. Do not sharply bend, abrade, or twist roots. Pull apart or cut roots that are closely surrounding or girdling the stem base. Plant trees with their roots spread horizontally rather than 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 function properly. After the tree is planted, extensively water the entire planting site to help settle the soil and minimize large air pockets. Watering helps establish connections between the tree and the soil-water system of the site.

## **TREE CARE**

### CARE AT PLANTING

If you have purchased a high-quality tree from a reputable nursery, pruning and fertilization will not be needed for the first full growing season. Trees need time to react and adjust to the new growing site. You should not add fertilizers, especially ones high in nitrogen, or do any pruning except for removal of declining or dying branches. After the first growing season, a conservative fertilization program based upon soil testing, and a properly managed branch training program can be instituted.

Never apply fertilizers at rates based upon tree trunk size (diameter inches). Instead, use fertilizer application rates dependent upon open soil rooting space. In limited rooting areas fertilizer will need to be split into several separate applications.

## MULCHING

Mulching is nearly essential to the successful growth of young trees. Mulch helps conserve soil water, moderates soil temperatures, inhibits other competing plants, and acts as a barrier between trees and landscape machines. Mulch should cover an area at least two times larger than the planting hole. Larger mulch islands can greatly reduce competition and maintenance problems, so do not mulch out to the edge of the planting hole and stop. Try to encourage roots to grow into the native soil by mulching larger areas.

## WATER RINGS

Water rings are basins of soil built-up around the tree to help with water infiltration. Because they can disrupt proper root system development, generally they should not be used. In cases of severe maintenance, topography or soil infiltration problems where you must build a water basin around a tree, build it well beyond the edge of the planting hole. The water basin should never be smaller than or the same size as the planting hole. Water rings should be destroyed by the end of the second growing season.

## STAKING AND GUYING

Most new trees, if properly grown and cared for, do not need to be staked. If the tree is in a high wind area, staking and guying can be beneficial to prevent catastrophic damage. Any stakes that you put into the ground should, if they are close enough to be in the root ball area, be driven through the root ball and into the native soil for good support.

A small tree must be able to move in the wind and flex from its base for proper development. Never tighten a tree between two or three stakes. Never use wire even if the wire is inside garden hose, foam or other protective devices. Instead, use flexible materials. Under best management, staking and guying materials should never touch the tree but should be attached

only to the stakes.

Stakes and guys are used to prevent the tree from falling over as a result of root ball slippage in high winds. They are not to prevent the tree from moving in normal winds. After three to five years, remove all stakes and guys on young trees. Extremely large trees may require staking and guying for a much longer period to ensure that roots are becoming established and can carry the full weight of wind loading.

## COMPETITION

Do not establish additional plants such as azaleas, ground covers, turfgrass or annuals around a tree. Use mulch to minimize interference from competition and allelopathy. Interference from other plants stresses a tree and makes other stressful conditions (drought) worse. If it is essential to establish additional plants around a tree, wait until the tree is well established (three to seven years old).

## CONCLUSIONS

Plant trees correctly and they will provide you with a host of values over a long life. Poor planting leads to stress, pest and growth problems that ruin even the best planting material. **Plant trees right!**



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### **Forest Resources**

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C. Wayne Jordan, Director