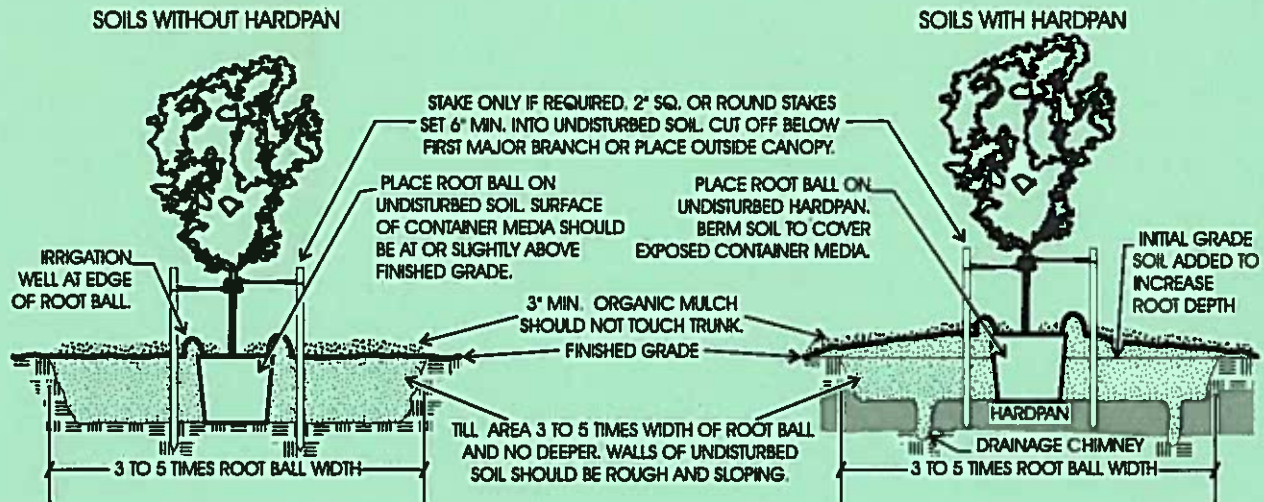


PLANTING GUIDELINES: CONTAINER TREES & SHRUBS

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Introduction

The majority of tree and shrub roots lies within the top two feet of soil and extend one and a half to four times the width of the crown, the aboveground portion of the plant. These roots hold the plant in place and absorb most of the water and nutrients. Steps taken during planting to encourage the growth of these roots can reduce establishment time and improve plant survival and stability. Such steps include shallow, wide planting holes, no organic amendments in the backfill, an organic surface mulch, and proper staking of trees when required.

Materials Required

- Soil:** Native soil should be reasonably free of construction materials and other debris. Ideally soil should be eighteen to twenty-four inches deep. Soil imported to increase depth or to achieve other objectives should be free of diseases, pests, weeds, debris, and should be similar to native soil. Do not put a sandy soil on top of a clay soil or vice versa. Your local nursery, landscape company, or extension office can estimate the type of soil you have from a sample. Cultivate compacted soils to a depth of eight to ten inches.
- Soil Amendments:** Do not add organic amendments, such as manure, compost, or wood chips, to the soil. These amendments do not improve, and may worsen, the growth of the plant. Nitrogen is usually lacking and can be effectively applied to the soil surface a year after planting.

Experience may suggest that another nutrient, usually iron, is also lacking. If so, apply at manufacturer's recommended rates before cultivating.

- Plant Materials:** Select strong, healthy plant material. (See Cooperative Extension publication *Plant Selection and Selecting Plants*.)
- Tree Stakes and Ties:** Wood stakes should be two inches in diameter or two inches square. Several types of tie materials are now available including webbing and tapes. There is no evidence that one type is superior in all situations. The most commonly used ties are constructed of half inch reinforced garden hose, fabric hose, or similar materials, and fourteen to twelve gauge galvanized wire (see detail under staking).
- Mulch:** Suitable organic mulch materials include ground bark, wood chips, and compost.

Drainage Test

Poor drainage can cause problems because roots drown in soils that stay too wet for too long. Conduct a drainage test if you have a shallow soil, a heavy clay soil, or a compacted soil.

- Test drainage by digging a hole one foot deep or so in dry soil. Fill hole completely with water twice during the day. Drainage is poor if water is still standing 24 hours after the second filling.
- Chimney holes may improve poor drainage due to a shallow, thin hard pan. These are holes dug through the hard pan (see illustration on right side of first page). Dig several

chimney holes beside, not beneath, root ball to avoid root rot due to excess water. Fill these holes with the same soil used in the planting hole, not gravel.

3. Adding soil to increase rooting depth can also improve drainage (see illustration). Use soil that is similar to native soil and allow for settling.

Planting Trees and Shrubs

1. Mark a circular area three to five times the diameter of the root ball. Till this area to a depth no deeper than the root ball. Walls of the undisturbed soil should be rough and slope out. Dig a hole in the center of the tilled area slightly wider and no deeper than the root ball.

Nursery containers	Width of tilled area	Volume of mulch required
Gallons	Feet	Cubic Feet
1	2.5	1.5
2	3.5	3.0
3	4.0	4.0
5	4.5	4.5
7	6.0	8.0
10	6.5	10
15	7.5	13
Boxes		
24	10	30
36	15	65
48	20	115
60	30	260
72	34	340
84	35	360
96	40	465

Calculations based on circular planting hole for gallon containers and square hole for boxes.

2. Always handle the plant by the container or the root ball, never by the trunk or branches. Remove the plant from the container with minimal disturbance to the root ball. Place larger containers on their side and tap the sides and bottom with a hammer or other blunt object. This will usually free the walls so you can slide the root ball out. Always score the root ball to disturb the surface and to cut any circling roots. This encourages roots to grow into the surrounding soil. Make a vertical cut one-fourth to one half inch deep four times around the sides and twice across the bottom.
3. The top of the root ball should be level with or slightly above the finished grade to avoid crown rots and other problems. Fill the hole with unamended soil. Do not pack the soil.
4. Remove the nursery stake and ties. Do not prune unnecessarily. Remove only dead, broken or diseased branches using clean, sharp bypass pruners. Do not use anvil-type pruners and do not cover wounds with sealant or paint.
5. Form an irrigation well, if used, at the edge of the root ball

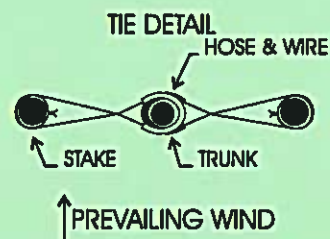
(see illustration). Irrigate the plant and the entire tilled area. Apply enough water to thoroughly wet the soil to the depth of the root ball. This will remove air pockets without compacting the soil. More soil may have to be added after the first irrigation. It is important to put water in the irrigation well for the first few weeks to make sure the root ball is wet. If the irrigation well is wider than the root ball, it may stay dry even though the soil is wet. Expand the irrigation well or adopt another method of irrigation once roots are growing into the surrounding soil.

6. Mulch the entire tilled area with three to four inches of organic material. Try to keep mulch away from the trunk. If planting in a lawn, try to keep the tilled area free of grass.

Staking Trees

Stake trees only if they cannot stand without support or if threatened by wind, frost heaving, or similar problems.

1. Use only two stakes. Place them outside the root ball and irrigation well at right angles to the prevailing wind (see detail). Make sure stakes penetrate undisturbed soil at least six inches.
2. To determine the height to place the ties, hold trunk with one hand a few inches above ground. If trunk bends over, move up the trunk a few inches and try again. Continue until you find the lowest point on trunk at which it will not bend. Place ties about six inches above this point. Use one set of ties only.
3. Horticultural tape can be used to tie small trees. Tie wire and webbing can be used on larger trees with thick bark. If using tie wire and reinforced garden hose, thread wire through the hose as shown. The garden hose should be just long enough to loop around the trunk. Twist wires to keep the garden hose from moving along the wire. The trunk should not move inside the garden hose loop.



4. Fasten wires to stake so the cut ends are between the stake and the tree, not exposed on the outside of the stake. Twist wires to tighten. There should be enough slack to allow the trunk and garden hose to move as a unit.
5. Cut the stakes off below the canopy to prevent wounds to branches.
6. Inspect and loosen wires periodically as the tree grows to avoid girdling the trunk. Remove stakes as soon as possible, generally within a year.

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