

PLANTING GUIDELINES: CONTAINER TREES & SHRUBS

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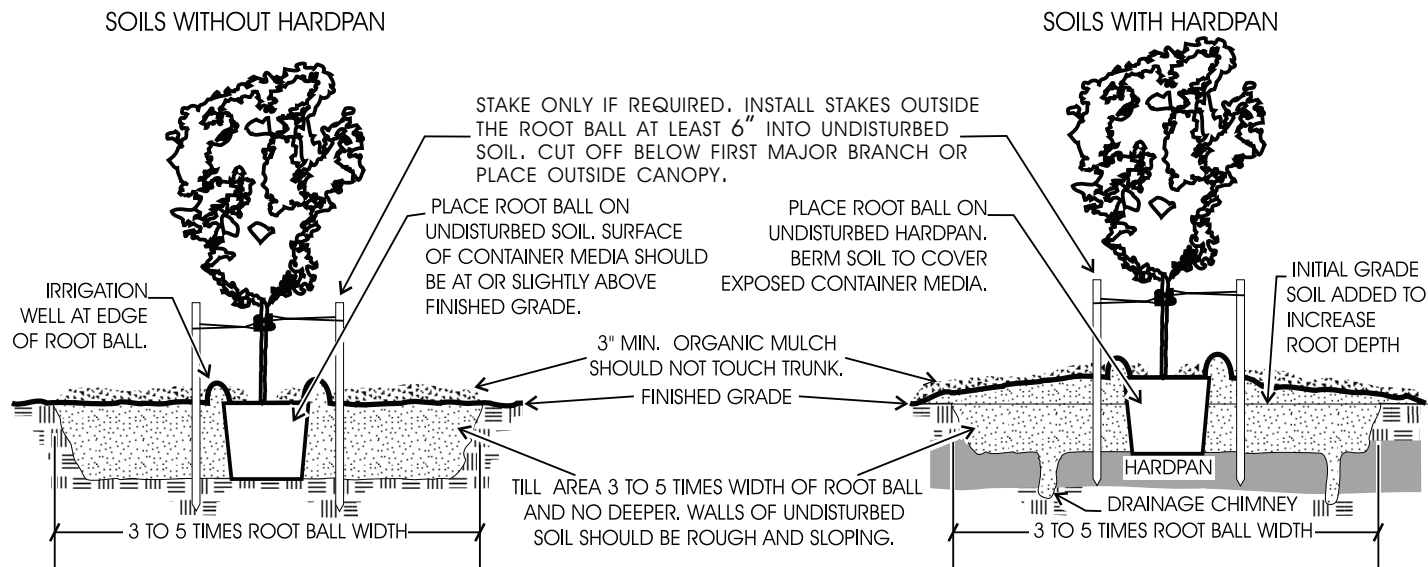


Figure 1. Planting and staking a tree in soil without a hardpan (left) and with a hardpan (right).

Introduction

The majority of tree and shrub roots occur within the top two feet of soil and extend up to 3 to 5 times the width of the canopy. These roots hold the plant in place and absorb 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 (2 to 4 inches deep), and proper staking of trees when required.

MATERIALS REQUIRED

1. Soil

Native soil should be reasonably free of construction materials and other debris. Ideally soil should be 18 to 24 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 8 to 10 inches. If you would prefer to determine your soil type without cost, please see the following USDA website: <http://soils.usda.gov/education/resources/lessons/texture/> for easy-to-follow instructions on determining soil texture.

2. Soil Amendments:

Do not add organic amendments, such as manure, compost, or wood chips, to the soil. These amendments do not improve, and may inhibit 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.

3. Plant Materials:

Select strong, healthy native or desert adapted plant material. See Cooperative Extension publication Plant Selection and Selecting Your Plants at: <http://ag.arizona.edu/pubs/garden/az1153.pdf>.

4. Tree Stakes and Ties:

Wood or metal stakes can be used. Wood stakes are generally 2 inches in diameter. Tie material to fasten the trunk to the stake should be smooth and broad to protect the trunk from physical damage. Suitable ties include material made from elastic webbing or tape, cloth, rubber, or polyethylene. Wire covered with garden hose or polyethylene tape where it touches the trunk is also used.

5. Mulch:

Suitable surface applied organic mulch materials include ground bark, wood chips, and coarse compost.

DRAINAGE TEST

Poor drainage can cause problems because roots are damaged 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.

1. Test drainage by digging a hole approximately one foot deep in dry soil. Fill hole completely with water twice during the day. Drainage is poor if any water is still standing 24 hours after the second filling. This can be done in the planting hole as it moistens the planting area to prevent dry soil absorbing water out of the root ball.
2. Chimney holes may improve poor drainage due to a shallow, thin hard pan. These are holes dug through the hard pan (Figure 1). 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. Since it is impossible to determine the depth of any hardpan or caliche layer, drainage chimneys may not always be practical where these layers are several feet thick.
3. Trees and shrubs can be planted on a raised mound by adding soil to increase rooting depth and improve drainage. Use soil that is similar to native soil and allow for settling.

PLANTING TREES AND SHRUBS

1. Mark a circular area 3 to 4 times the diameter of the plant root ball. Loosen this area to a depth no deeper than the root ball. Walls of the undisturbed soil should be rough and sloping outwardly. Dig a hole in the center of the tilled area slightly wider and no deeper than the root ball.
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. 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.

When planting balled and burlapped (B & B) plants, loosen the burlap from around the stem, fold back the burlap or remove and then cover with backfill soil. If there is a wire basket around the root ball, cut the top two or three rings of wire off the basket prior to planting to prevent root damage.

Bare root plants should be planted in the same way as B & B or container grown plants. Care should be taken not to

Tables 1. Calculations are based on loosening an area four times the diameter of the rootball and application of surface mulch 3" thick.

Nursery Containers	Width of Tilled Area	Volume of Mulch Required
Gallons	Feet	Cubic Feet
1	2.0	1.5
2	3.0	3.0
3	3.7	4.0
5	4.0	4.5
7	4.7	8
10	5.0	10
15	5.7	13

plant the tree or shrub too deep. Structural roots should be just below the soil surface. All grafted trees should have the graft union (where the root stock and the top (scion) meet) above the final grade and with the graft union facing away from the afternoon sun.

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 cover wounds with sealant or paint.
5. Form an irrigation well or berm, if used, at the edge of the root ball (Fig. 1). 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 (which can dry out the soil and roots) without compacting the soil. This is best done by hand watering with a hose if possible. 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 moist. 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 two to four inches of organic material. Keep mulch away from the trunk. If planting in a lawn, try to keep the planting area free of grass by either hand weeding or careful applications of herbicide.

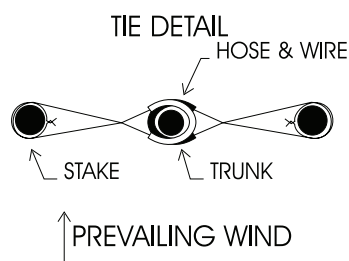
STAKING TREES

Trees are staked for support, anchorage or protection. Stake trees only if they cannot stand without support or if they need protection from other influences or are 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. 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 to stakes. 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 tie 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 tree tie garden hose to move as a unit. This gentle movement of the trunk will help develop trunk caliper and taper.

5. Cut the stakes off below the canopy to prevent wounds to branches.

6. Inspect and loosen tie wires periodically as the tree grows to avoid girdling the trunk. Remove stakes as soon as possible which is generally within a year. Always remove the nursery trunk stake at planting time.

Summary

- Always choose healthy native or desert adapted plants that are not damaged or overgrown, check for root binding.
- Dig a shallow wide hole that is no deeper than the root ball.
- Do not add soil amendments; use native soil for backfill.

- Stake the young tree only if it needs support to stay upright or anchored. Remove the stake 6 to 12 months after planting to prevent girdling.
- Use broad, smooth tree ties that will not damage the plant's bark.
- Irrigate the tree to settle the soil and remove air pockets, if possible hand water the first few times with a hose; adjust the plant height as necessary.
- Mulch the disturbed area to a depth of 3-4 inches taking care to keep the mulch material away from of the trunk.
- Form a berm or well that is wider than the tree canopy after new roots are established outside the root ball.



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