Agricultural Extension Service
The University of Tennessee

SP 574

Post-Planting Tree Care: Fallacies and Recommendations

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Most trees experience shock after transplanting because of the disturbance to the root system. In balled and burlapped (B&B) transplants, it is estimated that 4 to 9 percent of the original root system and about 2 percent of the soil volume occupied by the root system in the nursery is contained in the root ball (Watson 1994). Trees try to keep a balance between the above-ground portion of the tree and the root system (Perry 1982). When the amount of the root system is reduced during transplanting, the above-ground portion of the tree is also affected. The tree either is stimulated to regenerate more roots to balance the top, or the top partially dies back, or both so that the shoots and the roots establish equilibrium.

Although containerized trees have a complete root system when transplanted, the container has limited the volume and extent of the root system. Because of restricted root development, most container plants are watered daily before transplanting. The roots in the planting medium of the container act as a wick during water uptake, only drawing water from the container medium. The differences in water potentials between the planting medium and the native soil will either take water away from the container medium, causing water deficits, or draw water toward the container medium, causing saturation and limiting oxygen to the roots. At either extreme, water uptake is limited. The solution is not to have water potential extremes between the native soil and the container medium. Water must be available to the root system at all times to allow the roots to expand from the medium to the soil.

Thus, transplanting success depends primarily on the care of the root system

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Excessive depth of mulch. No more than 3 inches of mulch is recommended.

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Mulch is frequently used for decoration and pattern often to the detriment of trees.

Sara Clatterbuck (both photos)

Circling roots in container stock should be cut to initiate new roots and to allow roots to grow from the container media into the native soil.

before and after transplanting. It is important for roots to gain access to the native soil from container-bound and B&B plants.

Recommendations

Watering

Water is the most critical factor in transplanting success! Keeping the soil moist, but not wet, through watering is the best avenue to ensure survival and growth of your transplanted tree. Different species of trees and different soils make a general, overall watering recommendation unrealistic. When watering a tree, apply enough to thoroughly soak the soil in the root zone. Transplanted trees require more water than they did in the nursery. Frequent watering of transplants provides more benefit than applying large volumes of water infrequently because of the smaller root system. This is in direct contrast to the recommendation for established trees, where large water volumes are considered better than light, frequent applications (Gilman 1994). Drip irrigation systems and water reservoir devices can facilitate watering. Proper water management is the key for establishing transplants quickly.

Mulch

Apply mulch 2 to 3 inches deep on the surface of the planting hole and extending perhaps 2 or more feet beyond the perimeter of the hole. Organic mulch will conserve water in the soil, allow better infiltration of water into the soil during rainfall events or watering and helps to prevent weeds. Do not place mulch against the tree trunk or apply mulch too thickly.

Size of Planting Hole

The planting hole should be at least 2 or 3 times as wide, and in some cases, where soils are compacted, up to 5 times as wide as the root ball. Wide, shallow holes encourage horizontal root growth, by decreasing the resistance for root penetration into the native soil. The larger planting hole and loosened backfill expedites root growth. The sooner the roots are able to penetrate and grow into the native soil, the sooner the tree will become fully established after transplanting.

Score Root Balls

If roots are circling around the root ball exterior, cut through the roots in a few places. Circling roots are usually found in container stock. Cutting helps prevent circling roots from eventually girdling the trunk. Cutting roots will also initiate root regeneration and growth that increases the probability that roots will grow from the container medium into the native soil.

Some Fallacies of Planting Care

Addition of Soil Amendments

Backfill planting holes with existing *unamended* soil. Do not incorporate organic matter such as peat moss into the backfill. Differences in soil pore sizes will be created, causing problems with water movement, water retention and root growth between the root ball, planting hole and surrounding soil. Backfill half of the planting hole and water thoroughly to settle out air pockets. Water again once backfilling is completed.

Addition of Fertilizer

Research on trees transplanted from field nurseries indicates that there is little benefit to fertilizing at planting (Van de Werken 1981). Usually trees are not limited by nutrient deficiencies in Tennessee and do not require fertilization. Most trees do not respond to extra phosphorus and potassium, but additions of nitrogen may give an occasional growth response in young trees (Williams 1988). Since most tree roots are in the upper 12 inches of the soil, trees will receive some benefit when fertilizing turfgrass (Tankersley and Samples 1999). Fertilizer should *not* be incorporated in the backfill during planting, where it could easily damage exposed tree roots.

Tree fertilization is not recommended on native soils because it is usually not needed and is an unnecessary expense. There is no justification for "fertilizer spikes" or fertilizer in holes bored in the soil or for injecting fertilizer into the soil (Perry 1982). Always have a soil test performed to determine the need for fertilizer. Information about soil tests can be obtained from your local Extension office. For further information on tree fertilization, refer to UT Agricultural Extension Service publication SP 548, **Fertilizing Landscape Trees** (Conlon and Clatterbuck 1999).

Excessive Mulch

Excessive use of mulch can induce fermentation, immobilize nutrients, cut off the oxygen supply and kill trees (Perry 1982). Application of too thick a layer of mulch is common, especially where mulch is used decoratively around a tree. Tree roots, in an effort to find more oxygen, will commonly grow above the soil surface into the mulch. This makes those roots more susceptible to drought, temperature extremes, frost heaving and as a food source for soil microflora and microfauna such as nematodes and springtails.

Keep mulch from touching tree trunks and stems. Mulch increases the amount of moisture next to the trunk, inviting disease and rodent problems, if using organic mulches such as bark, pine straw or composts, and bark abrasion if using inorganic mulches such as volcanic or river rocks (Appleton and French 1996).

Do not use black plastic beneath mulch as a method to prevent weeds. The plastic blocks movement of air and water, can damage roots and ultimately kill the tree. For added weed control, use landscape fabrics that prevent penetration of weed roots, but allow air and water exchange.

Mulch is recommended when transplanting trees to prevent weedy growth, aid in moisture retention of the soil, promote gas exchange and allow better water infiltration (prevent crusting) of the soil. Two or 3 inches of mulch is adequate.

Use of Tree Wraps, Shelters and Staking

Tree wraps, tree shelters and tree staking are used frequently to protect trees from external influences. If cared for and maintained properly and regularly, these materials are worthwhile. However, our experience indicates that treated trees are not usually well maintained at regular intervals and these treatments ultimately are detrimental to the health of trees. In the majority of situations, use of these materials is not recommended unless absolutely necessary. The potential injuries incurred by using these protective measures outweigh their benefits.

Tree wraps are unnecessary on most trees. Wrapping may increase insect, disease and water damage to tree trunks. Gas exchange is limited with tree wraps and moisture is retained between the wrap and the tree trunk. Sunscald may be prevented with white tree wraps on thin-barked trees (ex. maple, birch, cherry and beech) if trees are planted on southern exposures or paved areas that accumulate heat. To avoid trunk girdling, do not attach wraps with wire, nylon rope, plastic ties or electrical tape. If wraps are used, they should be removed within one year. Frequently though, tree wraps remain on the tree until they degrade, are torn by weather events, or abraded or girdled by ties, often affecting tree health, growth and development.

Tree shelters are often used to protect young trees from rodents and other animals and from string trimmers. Advertisements have often promoted tree shelters as mini-greenhouses, creating an environment for enhanced growth of small trees. Research on four different species with 4-foot tall polypropylene shelters has indicated that height growth of trees in shelters was not significantly different from unsheltered seedlings after seven years (Clatterbuck 1999).

Tree shelters are a maintenance problem once installed and weather events often affect their utility. Shelters become detached from their stakes, wooden stakes may break or rot, and trees are often injured through abrasion with the shelter. They must be maintained and inspected each month to make sure the shelters are upright, not leaning and that they are firmly attached to the stake. Tree shelters are not recommended unless there is an animal damage problem or uncontrolled use of string trimmers. If needed, shelters require constant upkeep and maintenance. Experience teaches that most tree shelters are not maintained once installed, creating opportunities for serious damage to trees.

Staking trees is not recommended because stakes require constant maintenance. Generally, the root ball or container should be large enough to allow the tree to remain upright without staking. If not, the root ball is too small for the tree. Exceptions include steep slopes and windy areas, trees with heavy, spreading crowns such as magnolias, or large caliper trees in poorly drained soils. Allow trees a slight amount of flex rather than holding them rigidly in place. Use materials such as rubber hoses, flexible plastic flagging or wide strips of heavy cloth that will not damage the bark. Do not use wire or rope. To prevent trunk girdling, remove all guying material after one year. Again, our experience is that stakes and guying materials need constant upkeep so they function to keep the tree upright. We recommend using tree stakes only in specific circumstances, as noted above, and if they will be properly maintained and removed within one year.

Summary

Providing advantageous conditions for tree root growth increases the probabilities of successfully transplanting trees. Many widely used techniques in tree care do not increase the chances of success and may actually cause more harm or injury to the tree. Proper water management in the first several months after transplanting reduces the stressful establishment period by promoting rapid root growth. Trees that regenerate roots rapidly, establish more quickly and are more tolerant of drought.

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Sara Clatterbuck (both photos)

Tree staking can damage the tree if not regularly maintained. Note that the protective covering is misaligned allowing the guide wire to cut into the tree.

Sara Clatterbuck

A tree wrap and staking that has not been maintained

Wayne K. Clatterbuck (all 3 photos)

Young yellow-poplar tree exceeding the diameter of the tree shelter causing the tree to dieback and resprout.

Appreciation is expressed to Sam Jackson for design of this publication.

SP 574 - 15M - 12 - 00

R12 - 4910 - 21 - 006- 01

Printing for this publication was funded by the USDA Forest Service through a grant with the Tennessee Department of Agriculture, Division of Forestry. The *Trees for Tennessee Landscapes* series is sponsored by the Tennessee Urban Forestry Council.