

# Increase the odds of tree survival

*The causes of tree loss are complex, yet two common and correctable problems can contribute to tree failure: poor planting stock selection and the failure to ensure that the planting stock is in good condition.*

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Transplant failure in red oak. Note how wrap was used to hide wounds on trunk.

**P**lanting trees is win-win landscape service that benefits the property owner, the landscape professional and the public.

However, many trees fail within the first year of planting and the condition of many others are so poor that clients want them removed. Replacement costs are expensive for the nurserymen and landscape contractors and tree losses are major disappointments to homeowners and property managers.

## **Selection of tree species**

During the many years I performed tree health diagnoses at the Shade Tree Laboratory I noted a pattern of frequently seeing many species as "patients" while rarely seeing or hearing about health problems on other species. The "high frequency" of complaint trees were usually exotics. The "low frequency" complaint trees were usually native trees. I have discussed this observation with many colleagues who have worked in plant health clinics around the United States and they admitted that they also made similar observations. Trees that grow locally and occur naturally in our fields and forests usually have few health problems. This can partly be attributed to the fact that the 'native trees' are occurring naturally within their natural range and on sites that are suitable for their existence. Any tree species, when planted in areas to which they are not acclimated or where the site conditions are not adequate will have increased stress which will often show up as increased occurrence and susceptibility to pests and diseases.

When you select a tree for a landscape location you need to ask what type of maintenance will be available for the tree after planting. If you aren't certain that the owner/manager is committed to providing a long term program of high maintenance, you should consider using native plant materials that will be suitable for the specific site conditions. Always assume that public shade trees will receive low maintenance at best and don't overlook other limiting factors such as tree tolerance to drought, salt,

compaction or pollution.

In the northeast, red maple, white pine, red cedar, black gum and sweet gum, are native trees that have few health problems. In the south, a similar list can include slash pine, sabal palms, live oak and laurel oak. These trees can be successfully grown with minimal maintenance. Many more native trees with few health problems can be added for these two regions of the country, and additional lists can be generated for any part of the country.

#### Selecting planting stock from the nursery

Tree planting should be defined as transplanting a tree from a nursery and successfully establishing it in the landscape. For landscapers and others who purchase trees in volume for development projects, facilities, golf courses, parks or streets, tree planting requires several key steps which *all* must be followed.

1) **Conduct nursery inspections.** Travel around the nursery to see what stock is available and determine how the nursery is managed. Be sure note any health problems. Then, locate trees you will consider for your clients. Conduct a thorough examination of the condition of each tree that you are considering for purchase. These steps also ensure that you consider those nurseries within a reasonable distance from your site, increasing the likelihood of selecting trees adapted to local conditions and reduced potential for stress from extended transportation. Your examination should include:

- ▶ Structure of trunk and branches - Select trees with trunks that have a single leader, and are free of cankers, major wounds and large branch cuts. Branches must be strongly attached to the trunk and must not arise from a single or very narrow location. Avoid trees with weak branch attachment or co-dominant stems that are weakly attached to each other. Included bark at the union of branch to trunk is a dead giveaway of weak attachment.
- ▶ Soil type - Try to match the soil type of the nursery with that of the planting location as much as

## Proper drainage a key: here's how

Slow water drainage can be a problem in heavy soils and on compacted landscape soils. Where drainage is slow there is also reduced availability of oxygen to the roots. Tree species have varying tolerances to excess soil moisture and the resulting lack of aeration; consider the kinds of trees you see in wet/moist areas and how different tree species respond to flooding. Drowning plants will exhibit similar symptoms as trees suffering from drought: browning and drying from the leaf edges inward and defoliation.

If you are concerned about poor drainage you can check the extent of the problem with the commitment of some time and a few simple steps:

- ▶ dig a hole approximately 10 inches deep and 10 inches in diameter;
- ▶ fill the hole with water and allow it to drain;
- ▶ fill the hole with water a second time and measure the rate at which the waters drains from the hole;
- ▶ water should drain from the saturated hole at a rate of about one inch per hour.<sup>1</sup>

Another method would be to:

- ▶ dig a shallow hole one to two inches deep;
- ▶ press a cylinder six inches deep and six inches in diameter into the soil to a depth of one to one and one-half inches;
- ▶ keep water in the cylinder for eight to ten hours;
- ▶ after the last filling, if the water does not lower at least one inch within two hours, you may have a percolation problem.<sup>2</sup>

If you have slow draining soils there are options of varying degrees of effort:

- ▶ in the early stages of landscaping, loosen

and rip the soil to break it up before final grading;

- ▶ final grading or changing the grade so as to ensure that drainage is directed away from the planting hole;
- ▶ while the benefits of soil amendments are disputed, if the decision is made to amend the soil, do not use sand as a sole amending material and if using organic materials, ensure that only composted materials are used.
- ▶ plant the tree slightly raised (to a maximum of 1/3 of the root ball) above the grade in a wide, shallow hole and be sure to mulch the area (2-3 inches is sufficient and not touching the tree trunk).
- ▶ consider planting the tree in a different location;

There are some approaches that should be avoided:

- ▶ do not add a coarser soil or simply add more fill on top of the soils as this will affect the drainage of the site, particularly without prior preparation and appropriate grading, and may have unintentional results due to the deeper soils being wetter than the upper soil layer;
- ▶ even more seriously, do not add gravel or other coarse materials to the bottom of the planting hole, as this can result in a perched water table by slowing the natural (albeit limited) drainage of the finer or compacted soils; as water will not move into the coarser soils until the finer soils are completely saturated.

—Nancy Stairs

<sup>1</sup> JAMES URBAN AND DR PHIL CRAUL, *SUCCESS WITH SOILS IN URBAN LANDSCAPES*, ARBOR AGE, JULY 1996

<sup>2</sup> RICHARD W. HARRIS, *ARBORICULTURE*, 2ND ED.

possible. Trees growing in sandy nursery soil do not establish well in soils with high clay content. Moisture stress problems can often occur when nursery and planting site soil are severely mismatched.

► Place identification tags on all trees that you intend to purchase.

2) Discuss specific transplanting procedures that are needed with the nursery

be examined at the time of delivery from the nursery *before* they are accepted for planting for your client. Match nursery tags and examine trunks, branches and root balls for damage during digging, shipping or handling. Remove any wrapping to examine the condition of the trunk. Reject any trees with large broken branches, trunk wounds or cankers, dead roots or distorted root balls from broken roots.

4) Proper siting. Stake all tree locations with the owner before you plant any of the trees. Nothing can be more frustrating to the landscape professional and threatening to a tree than to have it

moved a second time at the owner's request. Trees must have adequate drainage to survive. It has been my experience that inadequate drainage is a significant cause of mortality of transplanted trees in suburban and urban landscapes.

5) Follow-up care. Cords that tie trunk wrap and the root ball are often left in place only to girdle an otherwise correctly planted tree. Bindings need to be removed at the time of planting as does any treated or artificial burlap. Trunk supports and water wells become long-term liabilities

and should be removed after one growing season. Landscape managers and nurserymen sometimes assume the other is performing these follow-up care needs of the tree, when actually neither do! Watering is the single most needed action for a tree during the first two years after trans-



Try to match the soil type of the nursery with that of the planting location as much as possible. East-ern white pines, Massachusetts.

planting. It would be incomplete to discuss tree selection to minimize health problems without addressing the unique problem of transplanting large trees. Property owners and landscape architects often seek to create an instant landscape, and will suggest the purchase of trees greater than eight inches in caliper, and sometimes trees 16 inches or more in caliper when available at a nursery. The establishment times of these large trees is very long and the successful establishment rate can be low without appropriate care. I have often seen large trees struggle for three or more years to regain their condition at the nursery, while owners are demanding replacement and landscapers are pleading for more time. In my experience, the selection of smaller four- to five-inch caliper trees is a much better choice for everyone. Ironically, a tree of that smaller caliper will often overtake a transplanted tree of larger caliper in a few years. Instant gratification has its price in the landscape! □

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## Keep trees 'above water'

While excessive water can be problematic for newly transplanted trees, a far more common problem is insufficient water. This is an even greater problem for trees which are planted as balled and burlapped or as barerooted stock, as the loss and removal of the fine absorbing roots greatly reduces the ability of the tree to take in water.

A guideline for watering newly planted trees is that they need one inch of moisture per week (precipitation and irrigation combined). This is in addition to water for the surrounding turf and should be applied as a deep watering, as opposed to frequent sprinkling. Sandy soils may require watering at more frequent intervals.

Water should be applied at a rate that will allow the water to percolate into the soil. A soil berm located at the edge of the root ball will help avoid runoff; however, in climates where winter thawing and freezing is common, these berms should be removed in the fall. The use of trickle or drip irrigation, or products such as TreeGators, will also allow water absorption into the soil. If using a sprinkler system, place a couple of cans within the sprinkler area to determine the time needed to apply water at a rate that can be absorbed by soil.

Previous wisdom recommended that a newly-transplanted tree should be pruned to reduce transpiration. This theory has been proven incorrect, as adequate leaf area is necessary to promote root growth. Only remove any dead or broken branches and avoid pruning for another year or two.

Mulch will reduce immediate competition with turf or slow moisture evaporation from exposed soil. Mulch is appropriate and beneficial for virtually all planting situations.

—Nancy Stairs

owner/manager. Specify your preferred methods of digging and desired ball size. Discuss specific shipping arrangements, including dig date, ship date and arrival date on clients property. Reach agreement on replacement guarantees before the sale.

3) Inspection at delivery. All trees must