Massachusetts Urban & Community Forestry Program
The Citizen Forester

The Successful Planting Initiative Part III: Tree Establishment

By Rick W. Harper
Extension Assistant Professor of Urban & Community Forestry, UMass-Amherst

Published in The Citizen Forester, May 2013

Having reviewed the important elements from the site assessment phase and the plant selection phase, we now have a better understanding about the local environmental conditions (i.e. light levels, spatial constraints, climate) that selected urban trees will be growing in, their site requirements (i.e. soil conditions, space requirements), and their attributes (i.e. flowering/ fruiting habit, tree height potential, etc.) While the plant selection phase can allow for the proactive management of many important forthcoming challenges, it is the establishment phase itself that can directly impact even the short-term success of a planting initiative.

The ultimate objective of the establishment phase is to ensure the survival of the tree in its new environment. As we know, the act of transplanting itself can be a very stressful occurrence. Depending on the system of production, significant amounts of root loss may occur, and even the most basic biological functions (i.e. plant growth) may be compromised for up to several years. And these are the trees that survive this experience -- there are many specimens that don't make it past even the short term (the first two or three years) in their new location.

According to a planting that was studied almost a decade (2004) ago, nearly two-thirds of the trees featured excessive soil on top of their root systems. This can be compared to a study conducted a decade and a half earlier, where significantly fewer (i.e., one-third) trees established featured excessive soil on top of their root systems. Since we believe that excessive soil on root systems may be associated with a number of problems (i.e. the formation of girdling roots, various disease and insect-related challenges, overall reduction of tree longevity), why the apparent increase in this trend from the late 80's through 2004?

As with many situations, a number of potential factors have been speculated about:

A swamp white oak (Quercus bicolor) being dug with a tree spade. A significant amount of roots may be lost at the time of transplant.

1. In the production site:

   - Excessive planting depth from the earliest stages of propagation and growth
   - Weed management practices (i.e. cultivation) where soil may potentially end up accruing around the base of the tree
   - Transplant practices where soil may potentially accumulate on top of the roots as trees are dug and balled

2. In the new establishment site:

   - Excessive planting depth
   - Settling of the plant or the root ball itself (referred to as 'pancaking')

- Addition/accumulation of excessive materials (i.e. mulching as part of the after-care)

As with any challenge, an intervention at the right time with the right strategy can often go a long way to remediating the situation. Fortunately, many problems that may exist as a result of production may be addressed in the establishment phase A N D challenges often associated with the establishment stage can be prevented through good practice. Field-grown/balled and burlapped trees are believed to comprise up to 90% of the types of trees that are currently established in a typical tree planting in the Northeast. Assuming this production system, good establishment practices include the following:

- Digging a planting hole of ample width, at least 2x the width of the rootball (recommendations range from 2x-5x the diameter of the rootball)
- Ensuring that burlap, twine and wire baskets are entirely removed
- Placing the tree in the hole at both the appropriate upright angle and depth
- Appropriate replacement of soil so that there is not excessive coverage to roots or contact above the root flare at the stem
- Appropriate addition of a two to three-inch layer of mulch, not contacting the bark of the tree
- Immediate watering, with a plan for regular follow-up
- A final quality-control check, where depth of structural roots is verified -- possibly with the use of a chaining pin or some other measuring implement

Though this urban site offers abundant useable soil volume, establishment practices should have included the application of mulch, in part to help prevent mechanical injury.

An important -- but often overlooked -- part of the establishment phase is personal expectation. Conventional wisdom (supported by research) indicates at least a three-year period where recently-established trees will likely grow very little; when considering other factors consistent with an urban setting, this period may in fact be significantly longer. Additionally, the demand for larger trees at the time of installation can further prolong the wait for the new tree(s) to start growing in earnest. Whatever the specific time period for a particular planting, the idea that patience is a virtue applies -- especially when it comes to waiting for our trees to take root, and take off.

Rick W. Harper, serves as Extension Assistant Professor of Urban & Community Forestry, UMass Department of Environmental Conservation, Amherst, and is also an ISA Board-Certified Master Arborist.

The Massachusetts Urban & Community Forestry Program welcomes new subscribers to ***The Citizen Forester****. To sign up, email eric.seaborn@state.ma.us.*

For further reading on tree establishment

University of Massachusetts, Landscape, Nursery & Urban Forestry Fact Sheets
http://extension.umass.edu/landscape/fact-sheets

"Cornell Guide for Planting Trees and Shrubs" by Richard Weir III
http://www.ecommons.cornell.edu/handle/1813/3572

"Recommended Urban Trees" by Nina Bassuk, Ph.D.
http://www.hort.cornell.edu/uhi/outreach/recurbtree/

For further reading on tree roots and excessive soil conditions

http://www.mortonarb.org/meet-our-scientists/gary-watson.html