

RESEARCH LABORATORY TECHNICAL REPORT



Transplanting Trees and Shrubs

Using AirSpade®

E. Thomas Smiley, PhD, Urban Forestry

& Bruce R. Fraedrich, PhD, Plant Pathology

In order to increase the survival rate of large transplanted trees and to reduce the weight of large root balls, soil can be removed from the root ball using high pressure air.

Transplanting protocol

1. Root Pruning. If time is available before the tree is to be transplanted, root prune the candidate plants a year or two prior to transplanting to improve the likelihood of transplant success, especially in sandy soil and with species that inherently have low rates of survival such as white oak and dogwood.

2. Irrigation. In the weeks/months prior to moving, be sure the plants are irrigated. Soils at the time of harvest should be near *field capacity*, moist but not muddy.

3. Define and trench the root ball. Trench around the perimeter of the root ball to be harvested. The radius of the harvested root system should be at least 6" for every inch of stem caliper. Because the soil is being removed, the radius of this root ball can be as much as 12" per inch of stem caliper. The trench should be dug deeper than the depth of the finished root ball so that excess soil can be moved into the trench. A cable can be used at this point to cut deep-growing roots and tap roots if appropriate for the species and site.

4. Remove excess soil. Using the AirSpade® or other supersonic air excavation tool, remove soil from the root ball. Work from the perimeter of the trench inward toward the stem moving the soil into the

trench. On large trees, two or more spades working together will expedite the process. As roots are exposed, they can be sprayed with a slurry of hydrogel (finely ground formulations) to minimize roots drying out. Depending on the size of the tree, the hydrogel can be mixed and applied with a motorized back-pack sprayer or larger hydraulic sprayers.

As the root plate is exposed, any excess soil and uncut sinker roots can be removed from the lower portion of the root system using spades/shovels. A portion of the root system close to the tree can retain soil depending on weight requirements of the equipment moving the tree.

5. Alternative method of soil removal. A tree can also be dug with a tree spade, laid on its "side" outside the hole and the soil removed using the AirSpade® and mechanical means.

6. Moving the bare-root tree. Once soil is removed and the root system is free, the tree can be moved with a front-end loader with forks or by using a crane/boom with the cinch attached to the stem. Stem tissues must be well protected from abrasion.

Planting bare-root trees

1. Dig the receiving hole no deeper than the maximum depth of the root plate of the transplanted tree and at least twice as wide as the diameter of the plate.

2. Amend the backfill with organic matter and fertilizer as needed. Organic matter should compose 5-10% of the weight of the backfill. Use the higher percentage in heavy clay and sandy soils. Fertilizer should be incorporated into the backfill as prescribed by soil nutrient analysis.

3. Place the tree in the hole and backfill with soil. Thoroughly saturate the backfill with water to create a slurry to ensure soil fills all the voids around the roots.

4. Expose the root collar. Ensure the root collar or top of first buttress root is level with or slightly above grade.

5. Stake or guy the tree according to ISA BMP on Tree Transplanting.

6. Mulch. Properly apply 2-4 inches of organic mulch over the planting area keeping it off of the main stem and root flare.

7. Inspect. Maintain inspections and irrigation schedule.



Founded in 1926, The Bartlett Tree Research Laboratories is the research wing of Bartlett Tree Experts. Scientists here develop guidelines for all of the Company's services. The Lab also houses a state-of-the-art plant diagnostic clinic and provides vital technical support to Bartlett arborists and field staff for the benefit of our clients.