

# PLANTING PROCEDURES FOR BARE-ROOT TREE SEEDLINGS IN LANDSCAPE SETTINGS

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Planting trees is a rewarding experience. It provides an opportunity to exercise your mind and body while making a lasting positive impact on the environment. Successful plantings often require site preparation along with proper handling and planting procedures that follow chronological steps. Included is a summary of pre-planting, planting, and post-planting considerations. You may also wish to consult professionals to assist in your project.

This publication has been developed for homeowners planting small, bare-root tree seedlings. It is not intended as a complete guide for those engaged in larger reforestation projects.

## PRE-PLANTING

Select the planting site – once planted, trees aren't easily moved. As a result, it is important to assess the planting location prior to choosing a species of tree to plant. Be sure trees have room to express their growth potential which could cause issues over time. For example, do not plant too close to structures, avoid shallow rooted species near sidewalks, and pay attention to rights-of-way. It is often helpful to envision the trees when they are mature.

Decide on the species to plant – after examining the planting site, select trees that fit the site conditions and your objectives. Understand that trees vary in drought tolerance, rooting patterns, shade tolerance, height, crown shape, seed production, longevity, and aesthetics. The USDA Natural Resources Conservation Service (NRCS) Web Soil Survey can be a useful tool to select tree species that will perform best based on soil and other site characteristics. Matching tree species to current site conditions is an important best management practice.

Site preparation – might be necessary to promote tree seedling survival. Soil and vegetation may need to be managed to create favorable conditions for newly planted trees. For example, sod forming grasses such as tall fescue and bermudagrass can inhibit tree survival and may need to be controlled prior to planting. Tall fescue is a cool-season grass and is best controlled with an herbicide application in the fall. Bermudagrass is a warm-season grass and should be controlled using an appropriate herbicide application in the summer.

Acquiring tree seedlings – is an easy step for those who plan well in advance. There are programs that provide free or low-cost seedlings to participants in large-scale tree planting efforts such as Tennessee Tree Day. If you need to purchase tree seedlings, there are several options. Most state forestry agencies have tree nurseries that sell seedlings. You can usually purchase seedlings over the phone or online. There are a limited number of seedlings per species at nurseries, so ordering well in advance of planting is important. Private nurseries are another option, and they range from large companies to small nursery operations.

Transport and storage of the seedlings – bare-root tree seedlings arrive in many forms, but generally they are bundled inside large paper bags, plastic, fabric, or paper wrapping. Bare-root seedlings (as the title implies) have very little soil attached. Roots are often covered in root gel applied at the nursery to reduce drying. If seedlings have been separated for dispersal to different participants, roots also may be covered with a damp paper towel to keep them moist but not saturated. Keeping seedlings tightly contained in a bag to avoid drying is critical. Seedlings should be planted as quickly as possible. If this is not possible, store them in a cool, dark location until they are planted. Small quantities can be placed in a refrigerator for a few days. Roots must remain moist. Handle the seedlings with care, and once outside, place tightly sealed bagged seedlings under cover to avoid direct sunlight and wind.

## PLANTING

Tools of the trade – for small quantities of tree seedlings, a common shovel or spade is sufficient for planting. Professionals often use tools such as dibble bars, hoedads, or gas-powered augers.

Best timing – in the southern U.S., survival is improved when seedlings are planted between late winter and early spring, well before onset of the growing season. Dormant season planting reduces stress and allows the roots to adapt to their new environment prior to spring. Plant on cooler days and at cooler times of the day. Temperatures that range between 35-60° F are best for planting. If air temperature reaches 75° F, planting should cease. Direct sunlight and wind can quickly dry tree roots.

Spacing – will vary depending on your objectives. If you want a tree to produce a large crown, then wider spacing is necessary. To produce straight trees with less branches such as in a forest, then plant multiple trees at 10x10’ or 12x12’ spacing.

The planting hole – does not need to be large for most tree seedlings. A broad, but shallow planting hole is preferred. The hole depth should equal the root length or be slightly deeper; the width should be 2-3 times the width of the root spread.

Placement of the seedling – identify the root collar (this is the swelling that occurs at the original soil line). Place the seedling to a depth where the root collar is equal to or slightly above the level of the surrounding soil (i.e., the same depth it was planted at the nursery). Planting too deep or too shallow can kill trees.

Planting – most bare-root seedlings are small enough to plant without digging a large hole. In this case, drive the spade in the ground and rock the tool forward and back until there is an appropriately sized crevice (or small hole) to slide the seedling into the ground at the correct depth. Place the seedling so that the roots are in their natural, more downward position. It may be helpful to carefully push the seedling to the bottom of the hole and lift it slightly to the correct depth, so the roots spread out naturally. After placing the seedling, drive the spade into the ground 3-4” behind the seedling at the same angle it was planted. Pull the tool back to close the lower portion of the hole, then forward to fill the remaining gap with soil. Use your heel to close any gaps in the soil around the seedling and to remove all air pockets. Seedlings should be planted tightly in the ground so that it would be difficult to pull them out. If you need to dig a hole to accommodate larger roots, then only dig as much as necessary to accommodate the seedling at the appropriate depth. Fill the hole with the original soil (do not add soil amendments), 1/3 at a time, lightly tamping the soil to eliminate air pockets, and watering as you go. Continue until the hole is completely filled and tamp the soil so no air pockets remain. Be sure no exposed roots are above ground after planting. Water can improve growth and survival.



Tree shelters – may be beneficial. A tree shelter (a.k.a. tree tube) serves as a miniature greenhouse and protects newly planted seedlings from wildlife damage. If tree shelters are used, properly install them using materials that will last several years. Remove them before they restrict stem diameter growth.

## POST-PLANTING CARE

Mulch – mulch conserves moisture, reduces weed competition, and ameliorates the soil to allow for better root growth. Place mulch around the tree but avoid touching the base. Do not “mound” the mulch in a volcano-like shape at the base of a tree. Apply it shallow, but wide (2-3” deep and with an 18” radius).

Water as needed – until the tree adapts to the new environment, supplemental water might be needed. A gallon or so of water (as needed), applied slowly twice a week, is a good rule of thumb for the first two growing seasons. Mulching and watering are only practical in landscape settings, not in remote areas.

Avoid – pruning and fertilizing for the first three years. Foliage is essential for photosynthesis and survival, so do not remove healthy branches or twigs. Fertilizer is not necessary on most sites. Fertilize only if a soil test detects noticeable nutrient deficiency. Contact your local county Extension office for soil testing procedures.

Weed control – may be necessary to increase survival. Mowing, weed eating, appropriate herbicide application, or pruning back competing vegetation may be warranted.

Monitoring – annual monitoring will better assure overall health and survival of seedlings.

Final Thoughts - best management practices include properly matching tree species to the site, planting trees that are native to the region, caring for seedlings before/during/after planting, and diversifying the planting with several species. Adherence to these instructions will increase the chances of a successful planting. For further assistance, contact your local University of Tennessee Extension office at: [utextension.tennessee.edu/office-locations-departments-centers/](http://utextension.tennessee.edu/office-locations-departments-centers/)