Tree seedlings receive foremost care while growing in a managed nursery: fertile soil; ample moisture; and weed, insect and disease control. Lifting seedlings out of this comfort zone shocks them. Consider: they are dislodged from the soil; their roots are often torn; they are handled several times; they are packaged, shipped, exposed to wind and heat, and placed in planting bags or machine buckets; their roots are unveiled to open air; and they are often replanted in harsh soil where they are left to high temperatures with the hope of adequate precipitation for sustenance through the first few growing seasons (Figure 1).

If key steps are not carefully followed during handling and planting, mortality rate rises. Both hardwood and pine seedling survival is more likely if attention is given to the following:

1. **Plant in late fall or early winter.**
   In southern U.S. locations, mid-December through mid-March are the best months for planting seedlings. By planting well before the growing season, roots will settle into their new environment and prepare to supply water to the buds and foliage when warmer temperatures arrive.

2. **Plant on cooler days.**
   Temperatures that range between 35–60 degrees F are best for planting. Higher temperatures cause transpiration to increase and will dry the roots (transpiration is the process by which water vapor leaves a living plant and enters the atmosphere). Lower temperatures could freeze the roots, causing mortality.

3. **Protect seedlings during vehicular transport.**
   Transporting seedlings in an enclosed vehicle is preferred to open-air transport. Cover the bags of seedlings with a tarp during transport. High winds increase transpiration. It is best to transport on cool days or at cooler times of the day.

4. **Store seedlings properly.**
   Find a place to store your seedlings well ahead of their arrival from the nursery. If immediate planting is not possible, seedlings should be stored in an enclosed cooler where temperature and moisture are regulated. Keeping the air temperature low and the humidity high will slow transpiration. Maintain air temperature at 35-38 degrees F. When stacking bags of seedlings for long storage periods, crisscross them, leaving large air

“It is better not to have planted, than to have planted incorrectly.”

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**Figure 1.** Black walnut (Juglans nigra L.) seedlings ready for machine planting. Take care not to expose the roots to air for long periods.
gaps for better ventilation. Otherwise, heat will build near the center of the bags. If temperature-controlled facilities are not available, or if the seedlings will be planted quickly, store the seedlings in a cool, dark location, away from the wind (in a cellar, barn, etc.). It is best not to open the bags; however, if the bags cannot be stored in a cool location, open them periodically for inspection to determine if watering is necessary. Be careful not to add too much water. Rather, keep seedlings moist, not saturated. Excess water can harm the roots if left too long.

5. Treat seedlings properly at the planting site.
Seedlings can deteriorate rapidly, particularly once on the planting site. High air temperature and wind will stress the seedlings (especially when atmosphere humidity is low). Park your transport vehicle in the shade, in lower spots, shielding the seedlings from destructive elements (heat, light and wind). Insulation tarps provide desirable protection. Avoid opening the seedling bags until near the time of planting. Avoid exposing the roots to the open air for very long. If air temperature reaches 75 degrees F, planting should cease. Large portable coolers are ideal for field storage of seedlings, but are often not available.

Two methods are used for planting tree seedlings: hand planting and machine planting. Both are acceptable. Hand planting (Figure 2) is more common on steeper terrain or in forested areas that have recently been harvested. Seedlings are placed in planting bags, then hand tools such as a dibble bar or hoedad is used to penetrate the soil and create an opening for the roots. Once the seedling is planted, the hole is resealed with the tool and foot pressure (to close soil air pockets).

7. Conduct a survival check.
A survival exam should be conducted near the end of the first growing season. Hardwood trees may need to be examined in late summer before the leaves turn color and
fall off. The survival plots should be systematically dispersed and measure one-hundredth of an acre (such plots have a radius of 11 feet 9.3 inches). If cost-share funds were used to establish the planting, it may be necessary to maintain a certain level or percentage of live seedlings. In most cases, a survival rate of 300 or more trees per acre is recommended. The original planting plan should have specified this minimum survival level. Your professional forester can assist with the survival check and replanting recommendations.

Cost-share assistance for tree planting from the federal or state government is occasionally available. For more information regarding planning and implementing a tree planting project, contact the Tennessee Department of Agriculture, Forestry Division, at 615-837-5411 or http://www.state.tn.us/agriculture/forestry/index.html. If done correctly, seedling survival is more likely, and the benefits of forest restoration will be enjoyed more quickly.