

TAKE CARE BEFORE PLANTING

From the time bare root seedlings are taken from the nursery bed to when they are planted, **it is critically important to keep the seedlings moist and cool** (between 33°F to 40°F). If seedlings dry out, the root hairs may become permanently damaged and cannot absorb adequate water and nutrients.

TRANSPORTATION

Seedlings can be damaged by overheating, too little moisture, and physical damage during transportation. **A refrigerated truck is the best way to transport your seedlings safely.** If refrigerated transport is not available or travel distance is short, protect seedlings from sun, wind, and excessive drying by:

- Placing foam insulation or spacer boards under the boxes and leave gaps around boxes.
- Covering packages with a light-colored or reflective tarp to protect against the sun.
- Traveling in the early morning when temperatures are cooler.
- Using ice packs, snow, or a large cooler to keep seedlings cool.

Do not place seedlings in a hot car trunk or leave them in a sunny location. If you suspect the seedlings have not been kept consistently cool since leaving the nursery; inspect the seedlings. If they are dry, moisten the seedlings with cool water and reseal the packages, planting as soon as possible.

Sorting Guidelines for DNR State Nursery Bulk Orders:

Orders from the state nurseries are sold either graded or in bulk. Bulk orders include extra seedlings to account for weak and undersized tree seedlings. When grading a bulk order, eliminate the wilted, discolored, damaged or undersized seedlings. Use the chart below as a general guide when sorting by size.

	Minimum height from root collar to topmost bud	Minimum root length
1-year-old Conifers	4 inches	6 inches
2-year-old Conifers	4 – 5 inches	6 – 8 inches
3-year-old Conifers	6 – 8 inches	8 inches
1-year-old Hardwoods	6 – 8 inches	8 inches
2-year-old Hardwoods	8 – 10 inches	8 inches

STORAGE

Plant seedlings as soon as possible after delivery! Seedlings stored for short periods of time (1–5 days), must be kept cool.

The best storage temperature is between 33°F and 40°F. Temperatures from 40°F to 50°F are tolerable for short periods, and above 50°F seedling damage is possible. The longer the storage period and the warmer the temperature, the greater the risk of damage.

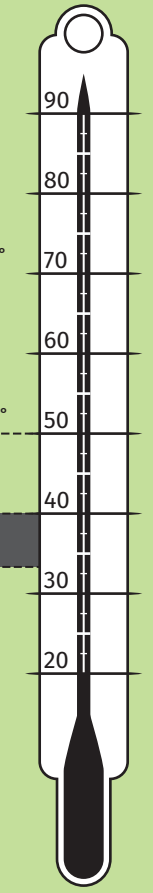
TEMPERATURE GUIDELINES FOR DORMANT BARE ROOT SEEDLINGS

UNACCEPTABLE STORAGE CONDITIONS
(Seedling damage is possible)

TOLERABLE
(example: root cellar or cool barn)

BEST Temperature Range
33° – 40°

FREEZE DAMAGE RISK



TEMPERATURE (°F)

Figures courtesy of Nita Upchurch and the Iowa Department of Natural Resources.
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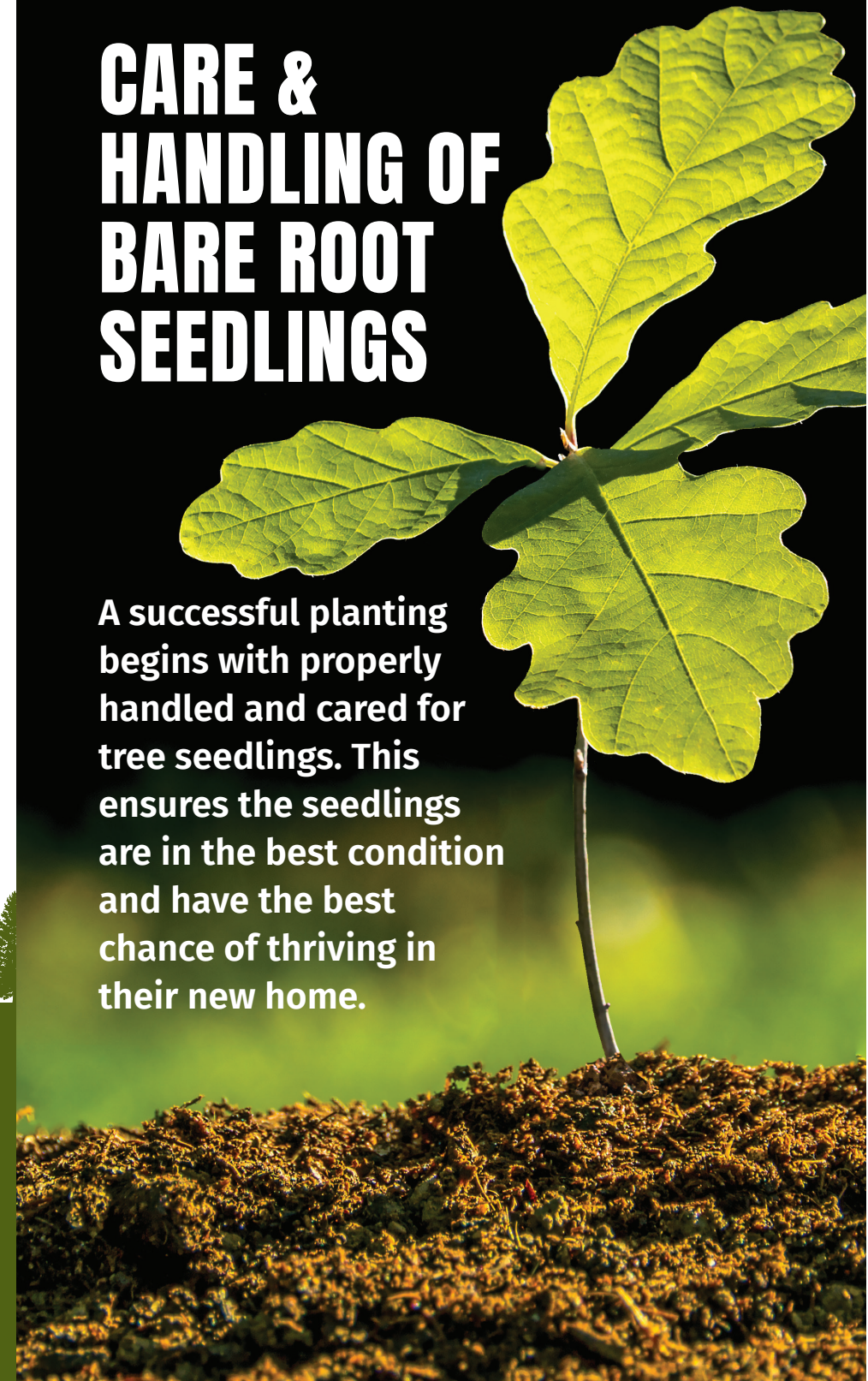


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CARE & HANDLING OF BARE ROOT SEEDLINGS

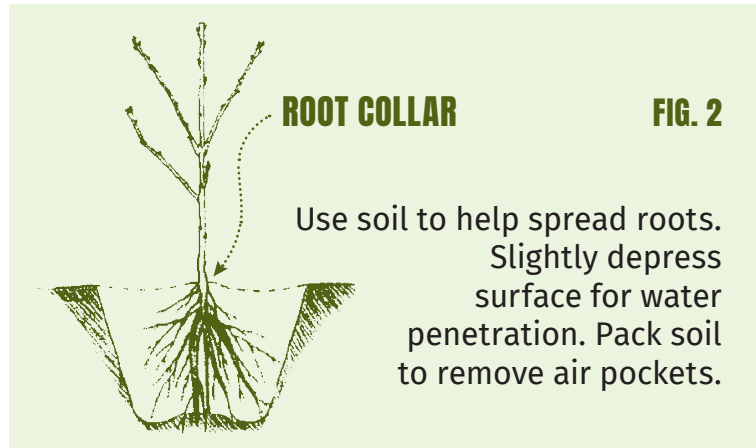
A successful planting begins with properly handled and cared for tree seedlings. This ensures the seedlings are in the best condition and have the best chance of thriving in their new home.



SEEDLING PREPARATION

It is preferable to make the planting hole large enough to accommodate the seedling's entire root system. However, sometimes pruning may be necessary for seedlings with extremely long roots. Prune conservatively because seedlings may not survive if they do not have sufficient root area to absorb water. Always prune with a sharp tool such as hand pruners or garden shears. Prune in a cool place where seedlings are out of the wind and sun. Handle roots as little as possible.

In general, seedlings can have their roots pruned 8 inches below the root collar. The root collar is the point on the main stem identified by a change in color or slight swelling in the stem (see Fig. 2). Larger seedlings (3-year-old or transplanted seedlings) require a larger root system, so do not over-prune these. When you are done, re-moisten the seedlings and re-seal them in the original packaging.



PLANT SEEDLINGS PROPERLY

CORRECT PLACEMENT AND DEPTH

It is critically important to properly place the seedling in the planting hole or slit.

- Plant a seedling by placing the root collar at the soil line or no more than 1/2 inch deeper. The root collar is a spot located just above the roots identified by a change in color or slight swelling of the main stem (see Fig. 2).
- Make the planting hole or slit deep enough to accommodate the seedling's root system. The roots should hang freely in the planting hole and not be bent or twisted.
- Pack the soil firmly around the seedling to maintain good root-to-soil contact and eliminate air pockets.

PLANTING METHOD

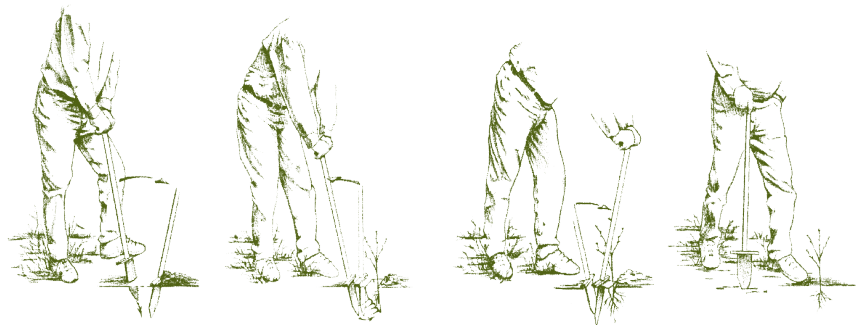
Hand planting is necessary in rough terrain, when the seedlings are too large for machine planting, or when planting within an existing forest. A shovel or planting bar are the most common hand planting tools. Two basic methods of hand planting are slit planting and wedge planting (see Fig. 1 and 3).

Carry seedlings in a planting bag or bucket along with wet burlap or other material to keep the roots moist (do not cover roots with water).

An inexperienced tree planter can hand plant 300 to 500 seedlings per day. Machine planting is well suited for large orders, planting on even ground, and planting hardwoods with large root systems. Consult your local DNR forester for more information.

SLIT METHOD

FIG. 1



Insert planting bar at an angle, then push forward to an upright position.

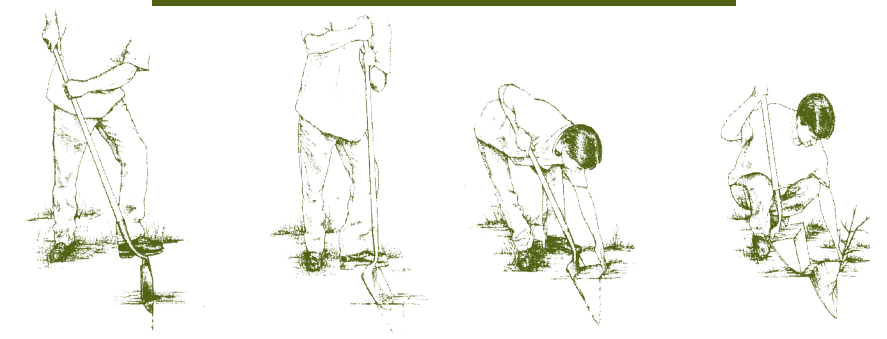
Place seedling at correct depth. Vertically insert bar 2" from seedling. Pull bar back, firming soil at bottom of hole.

Push bar forward, firming the remainder of the hole.

Fill remaining hole. Step on soil around seedling to firm.

WEDGE METHOD

FIG. 3



Insert a shovel vertically into soil.

Insert shovel at an angle to create a wedge of soil.

Lift out soil wedge.

Place seedling against vertical side of hole, replace soil wedge, then step on wedge to firm.