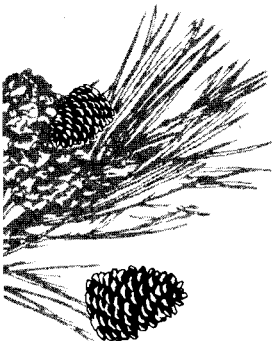





Managing the New Trend in Pine Seedlings

A landowner's guide to large-diameter seedlings

Bigger is better. That's what the forest industry believes about the diameter of a pine seedling.



New research indicates that a seedling with a large-diameter root collar can produce more wood in a shorter time than its average to smaller counterparts. The root collar is where the base of the stem ends and the roots begin. Until recently, the standard minimum root collar diameter has been about 3.2mm. Now, the industry standard is moving up. International Paper has increased its minimum standard to 3.8mm or more in diameter. And the trend is in the direction of even larger seedlings — sometimes up to 5.5mm or more for special site conditions.

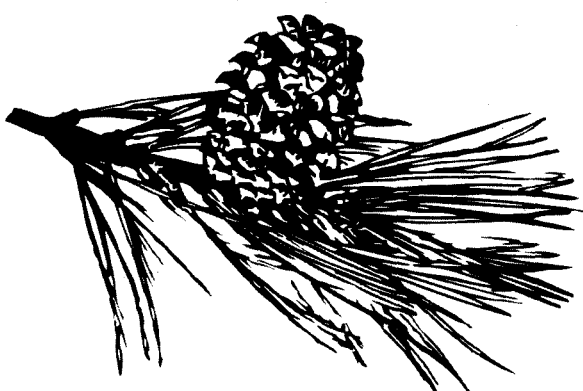


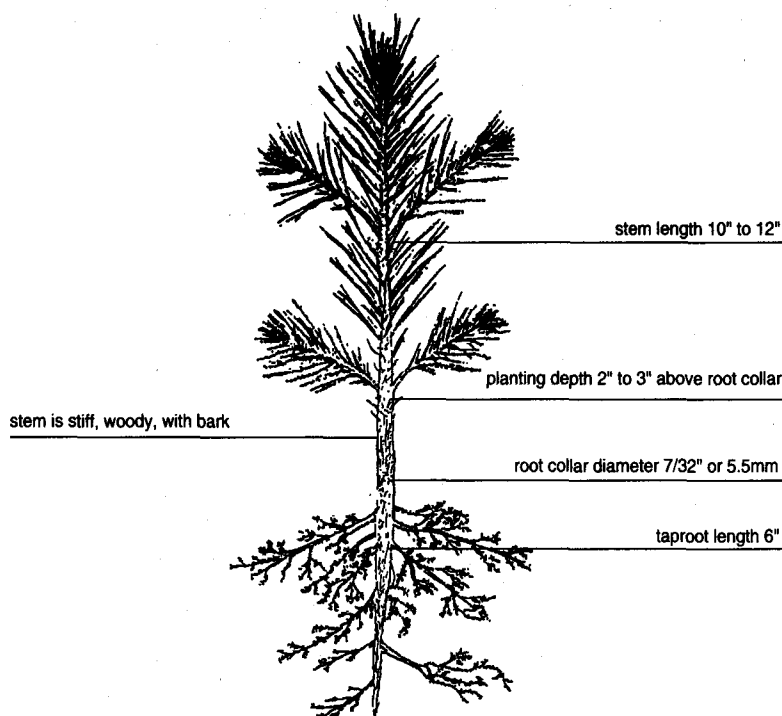
To produce these bigger trees, nurseries are changing their cultural practices to grow seedlings further apart in the nursery beds (low-density seedbeds). This additional elbow room allows a seedling's root system to enlarge and root collar size to increase.

Larger seedlings offer advantages to landowners, but they do require special attention to such details as handling, storage, planting depth and technique.

Why bigger can be better

The advantages of large-diameter loblolly pine seedlings are many, according to research on seedlings ranging in size from 3.8mm to more than 7mm, and summarized by Dr. David South, Auburn University:

- A higher incidence of survival when conditions are less than ideal. On poor sites, where survival is risky, planting large-diameter seedlings usually increases survival by 4 to 10 percent.
 - More wood volume from faster growth. Large-diameter stock can increase the per-acre volume production at age 10 to 20 years by as much as a 429 ft³/acre (5.7 cords/acre) per mm increase in root collar diameter. When planted properly, these seedlings can result in an advancement of stand development by one year. A two-year advancement is possible if seedlings are planted in wet soil during October or early November.
 - Competes better with weeds. Initial research shows that large-diameter stock competes better with weeds and other vegetation.
 - Greater return on high-site soils. The value of the additional wood produced from the large-diameter seedlings ranges from \$50 to \$139 more per thousand seedlings than the average diameter seedlings on higher-site land. This equals \$25 to \$75 per acre at 500 trees per acre. The real internal rate of return (net of inflation, net of real timber price increases and before taxes) could exceed 30 percent on the incremental cost of large seedlings.
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Below the collar counts

The secret of the large-diameter seedlings lies in their root structure. They have more stored food reserves, more and stronger first-order lateral roots, a greater root-to-weight ratio and greater root-to-growth potential.

Existing roots are important because they take up water until new growth takes over. Total water uptake is dependent on the size of the root system. And the greater the root system, the greater the root-to-soil contact.

Interestingly, seedling height does not increase just because diameter and root volume do. A good stem height range to work with remains about 10 to 12 inches if the root system is about six inches. This will give you a balanced root-to-shoot ratio.

Success starts with selection

Choosing the right large-diameter seedling means choosing a species that is well adapted to the local climate and soils and resistant to local diseases. SuperTree Seedlings begin as offspring of the finest parentage in the South, hand-selected and bred for fast growth, straightness and disease resistance. The seedlings are cultured so that they produce a vigorous root system and are carefully lifted to retain both a good root-to-weight ratio and fibrous roots.

Practicalities of storage, handling

For the most part, storage, shipping and careful handling of seedlings at the planting site are no different than the care and attention required by standard-diameter seedlings.

(For more information, please ask your local county extension office for Management Bulletin R8-MB39 "A Guide to the Care and Planting of Southern Pine Seedlings," produced by the U.S. Department of Agriculture Forest Service Southern Region.)

Seek contractors with the willingness to learn

Because the large-diameter stock is somewhat new to the South and Southeast, it will be harder to find tree planters with experience. But many tree planters are open to learning and adapting their practices to this new trend. Questions to ask of tree planters:

- *What is the vendor's experience with large-diameter stock? Shovel-planting?*
- *Will the vendor sign a contract?*
- *How are crews handled and supervised?*
- *How will the site be prepared?*
- *Does the vendor have access to cold storage for seedlings?*
- *Can the contractor provide references and take the landowner to previous plantings?*
- *How will the contractor care for and handle seedlings on site?*
- *How are seedlings transported by the contractor to the planting site?*
- *How will the contractor verify trees planted per acre and planting quality?*

However, since large-diameter seedlings require more room in the shipping boxes — as much as 20 percent more — there will be more boxes to contend with, both at the storage and planting sites. Planning between landowner and tree planting contractor to accommodate the increased boxes will be necessary.

Planting options for large-diameter seedlings

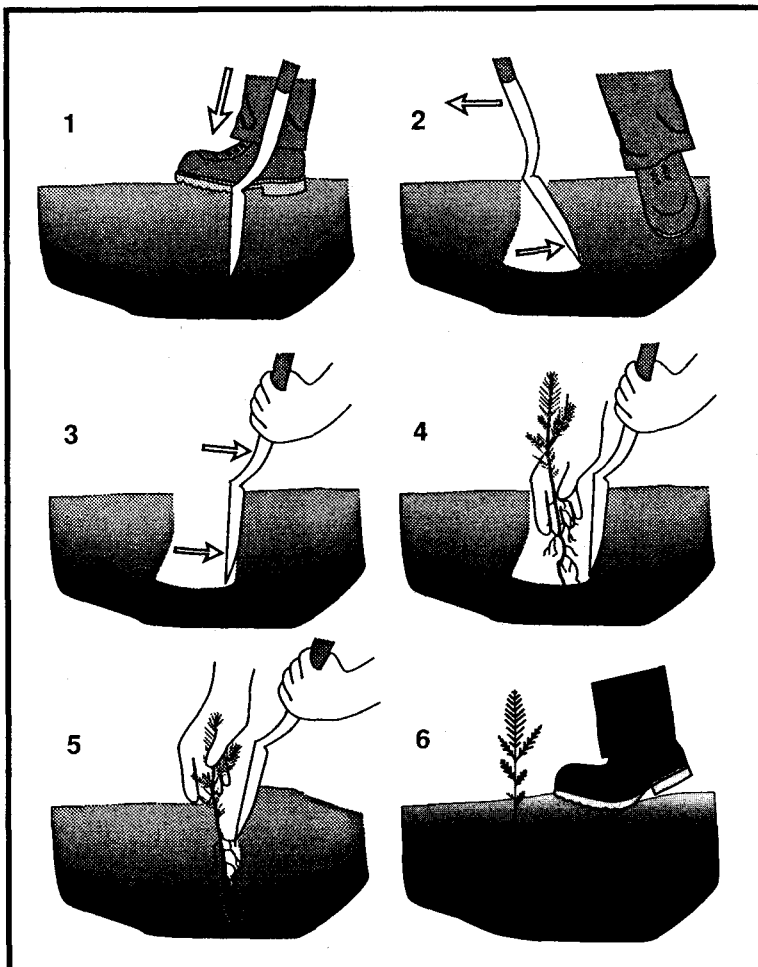
Depending on the site, either hand or machine planting can be used with large-diameter stock. Large, level open tracts are most efficiently planted by machine. Smaller or irregularly shaped tracts, or sites that require little preparation, and rocky sites are more easily hand-planted. Mechanical planting is necessary when preparing shallow soil for planting. In shallow soils, mechanical equipment is used for ripping the soil and getting the ground ready for planting.

Importance of using shovels

Hoedads and planting bars are commonly used in the United States to plant 3 or 4mm stock, but research has shown that heavy-duty planting shovels are good tools for hand-planting seedlings with larger root systems, especially in deep, loose sandy soils. In heavy, tight clay soils, a heavy-duty dibble bar can be used.

In spite of the fact that shovels are commonly used to plant seedlings on the West Coast, they are not widely used in the South. This will change once the large-diameter seedlings come on the market full force. Some planters may argue that planting with shovels will take longer and cost more than traditional methods, but International Paper's experience indicates that shovel-planting costs are comparable to using hoedads or dibbles. That's especially true if planting quality standards are the same for each planting tool.

Heavy-duty shovels, made specifically for tree planting, are available through most reforestation equipment suppliers. A shovel blade width of 6½ inches and length of 12 inches is recommended.



1. With shovel turned backwards, work the shovel into the soil.
2. Push shovel away from you to break the soil.
3. Lift and pull shovel back slightly to hold soil away from hole.
4. Place root system carefully in hole and lift seedling slightly to ensure roots are straight.
5. Pull shovel away to allow soil to fall back against roots and grip the root collar approximately two to three inches below the soil surface.
6. Pack soil tightly around roots.



Planting precautions and tips

Although relatively easy to machine plant, large-diameter seedlings may require more attention to plant properly by hand. Some tree planters in the South may be unaccustomed to hand planting stock with large root systems. With large-diameter seedlings, planters must be cautious not to strip roots and must open a hole large enough to accommodate the roots.

Supervision and vigilance on the part of the landowner and contractor is needed so these key rules are followed:

- Do not reduce the root-weight percentage by pruning and stripping roots prior to planting.
- Do not cram the large roots in a shallow planting hole. Shallow planting will reduce survival and will slow early seedling growth.
- The planting hole needs to be about 10 inches deep by five to six inches wide.
- Place the upper portion of the root system two to three inches below the soil surface. This increases survival by 5 to 15 percent, according to Dr. South.
- Pack soil firmly around roots.
- Delay planting if the soil is dry.

Have a written contract

It is good business to wisely select tree planters and to have a written contract detailing all planting specifications, including transport and handling of seedlings, planting dates, spacing and conditions when planting is to be suspended. Sample contracts can be obtained from your county extension office or forestry consultant.

For more information

Ask your SuperTree Nursery representative for more information on large-diameter and standard SuperTree Seedlings. Conveniently located across the South and Southeast, each International Paper SuperTree Nursery operates a toll-free number for customer service.

In Texas and Louisiana, call the Texas SuperTree Nursery at 800/642-2264.

In west Tennessee, Oklahoma, Missouri and Arkansas, call the Fred C. Gragg SuperTree Nursery at 800/222-1270.

In Mississippi, call the Mississippi SuperTree Sales Office at 800/452-3164.

In Alabama and west Florida, call the Alabama SuperTree Nursery at 800/222-1280.

In east Tennessee, North and South Carolina, Georgia and east Florida, call the South Carolina SuperTree Nursery at 800/222-1290.

