Reforestation Reference Material

Introduction:
Over 5,000 products we use every day come from trees grown on tree farms, timber company lands, state and national forests. Some of these products are obvious such as lumber, but others such as paper, photographic film, imitation vanilla flavoring, and rayon are not as evident. It takes a tree, 100 feet tall and 21 inches in diameter to supply just one person in the United States with the products they use from trees for one year. It takes 60-80 years to grow a tree 100 feet tall. It is very important that we replant trees that have been harvested or destroyed by fire, insects, disease or blow downs if we are to continue to have an adequate timber supply.

Trees are very important for other reasons besides the products they provide. They clean the air, buffer noise, give wildlife homes and sources of food, protect the soil from erosion, protect the watershed, and give us oxygen.

There are over 2 million acres planted in trees each year in the United States. Private landowners plant 90% of these acres. The Southern States plant 80% of the total – making them the largest tree planting region in the U.S. Georgia is the top tree planting State. The top ten states are:
Georgia
Mississippi
Alabama
Florida
Texas
Oregon
Louisiana
Washington
Arkansas
North Carolina
Virginia

There are programs available to landowners to assist them both financially and with technical help regarding tree planting. Some of these programs include:
USDA Tree Planting Programs:
- Cost-Share Programs for Landowners:
  - FLEP (Forest Land Enhancement Program)
  - EQIP (Environmental Quality Incentive Program)
- Reserve Programs:
  - ACEP-WRE (Agricultural Conservation Easement Program - Wetland Reserve Easement)
  - CRP (Conservation Reserve Program)

There are many ways to reproduce a forest. These include:
1) Planting Wild Seedlings
2) Direct Seeding
3) Planting Nursery Grown Seedlings

a. Bareroot
b. Containerized

Planting Wild Seedlings

This process includes digging up and transplanting wild seedlings growing in the woods in a natural state. This practice is uneconomical and inefficient in a forest situation. It could be used for planting hardwood trees like persimmon or crabapple around food plots.

Direct Seeding

Sowing tree seeds (instead of planting seedlings) to establish stands of trees. This method can be effective and successful when performed under the proper conditions.

Advantages of Direct Seeding

1) Direct seeded pines grow as well as planted pine seedlings at the same age.
2) Large areas (over 500 acres) can be seeded by hand, airplane, cyclone spreader, or grain drill. A helicopter can sow up to 2500 acres per day and an airplane can sow up to 1500 acres per day.
3) Establishment cost for the stand is usually lower than planted seedlings. Cutover sites can be regenerated for ½ - 1/3 the cost of planting seedlings provided the seeds fall on mineral soil so it can germinated and grow.

Factors Affecting Direct Seeding Success

1) Vegetative Cover – This often keeps seed from reaching the mineral soil which interferes with germination. Prescribed burning of some planting areas is the normal method used to reduce excessive vegetation. This is usually done in the spring preceding seeding. Sometimes the entire area is disced; in other instances, only the grass rough is disced at 8 to 10 foot intervals and the seed is planted with a grain drill or cyclone spreader. Undesirable hardwood species must be controlled in direct seeded pine stands. This needs to be done before or soon after the seeding. Sprayed herbicides, injected herbicides or prescribed fire will help rid the land of the undesirable hardwoods. Pines are intolerant to shade and will not live many years if hardwoods deprive them of sunlight. Also, the hardwoods are competing for soil moisture that the pine seedlings need to survive drought situations.
2) Soil Moisture – This affects germination of seed and the growth of the seedlings. An insufficient amount of moisture following direct seeding will result in a high mortality rate of the seedlings. Seedling mortality is highest during the summer months, when seedling roots are to short to reach the available moisture. Seedlings should be established when climatic conditions are conducive to adequate soil moisture.
3) Birds and Rodents – These consume the seed for food; therefore, seeds must be treated with a bird and rodent repellent before being broadcast. A spreader-sticker, or a latex-sticker, which repels birds and rodents, is added to the seeds, and the seeds are then coated with aluminum flakes to aid their movement through the sowing equipment. Most seed dealers will apply repellents to the seeds for a nominal fee or sell seeds that are already coated.

Note: Seed stratification is needed on all species of pines except longleaf. The stratification process involves exposing the seeds to cold to help them overcome the dormancy prior to planting. Stratification improves the percent and speed of germination. Only seeds with at least 80 percent germination should be used.

Guidelines for Direct Seeding

1) Use seed treated with a bird, mammal, and insect repellent.
2) Use seeds that have been stratified for 45 to 60 days in moist conditions at 36 to 40 degrees F.
3) Sow seeds in early spring after an inch or more of rain.
4) Broadcast .5 to .8 pound of seed per acre.
5) A survival check should be done at the end of the first and second growing season.

Planting Nursery Grown Seedlings

Over 1.6 billion seedlings were produced and shipped by tree nurseries. Georgia is the leading state in producing nursery grown seedlings. Nursery grown seedlings include bareroot and containerized seedlings.

Advantages of Nursery Grown Seedlings

1) Most certain method of acquiring a good stand of trees.
2) Close control of stocking rate
3) Uniform stands
4) Erosion control
5) Time to maturity is less

Disadvantages of Nursery Grown Seedlings

1) Higher investment cost
2) Seedling survival

Planning the Planting Operation

1) Sources of Seedlings
   a. Georgia Forestry Commission
   b. Private Nurseries

2) Species Selection – This is a critical step in tree planting. Maximum growth and yield in the plantation are possible only if you select the right species for the particular planting site and geographic location (Table 1). Planting the wrong species on a site results in poor survival, poor growth, and low product yield. Geographic location limits species choice.

   Species selection also influences products produced. Longleaf pine may be preferred if high quality sawlogs and poles are the product objective. If maximum fiber yield is required, loblolly or slash pine could be favored.

Loblolly pine is usually planted, with limited acreages of shortleaf pine, slash pine, and longleaf pine planted on appropriate sites.

Table 1. Species-Site Selection Guide

Species	Suitable Planting Range	Soils	
Loblolly Pine	Piedmont & Coastal Plain	Preferred:	Deep surface layered soils with plenty of moisture but poor surface drainage and fine textured subsoils.
		Poor:	Deep, well-drained sandy soils of the Coastal Plain and eroded Piedmont soils with clay subsoil exposed or near the surface. In the Coastal Plain, productivity decreases as surface drainage increases.
Slash Pine	Coastal Plain	Preferred:	Spodosols with depth to a clay layer greater than 20" from the surface. Hardpans that restrict root growth and downward water movement are common.
		Poor:	Deep, excessively well-drained sands and very poorly drained soils.
Longleaf Pine	Coastal Plain	Preferred:	Generally found on well-drained to moderately well-drained light-colored sandy soils that are acid and low in organic matter. With proper weed control, longleaf is well adapted to more productive loamy soils.
		Poor:	Growth on poorly drained and excessively drained soils is slow.
Shortleaf Pine	Northern Piedmont and Mountains	Preferred:	Fine sandy loams or silt loams with indistinct profile development, friable subsoil, and good internal drainage.
		Poor:	Heavy clay soils or eroded soils with clay subsoil at or near the soil surface.

Loblolly Pine (*Pinus taeda*)

Loblolly pine is the leading commercial timber species in the Southern United States. A mature tree can reach a height of 90-110 feet and 24 to 30 inches in diameter. Loblolly Pine is a major source of lumber and provides a large percentage of the wood used for paper.

Pine tip moth can be a problem in young stands, damaging the terminal shoot growth. Older trees are not seriously damaged by this pest. Pine bark beetles cause extensive

damage to weak, overcrowded, slow-growing stands. Good management practices reduce the risk of pine beetle attacks.

RR3 Loblolly: This variety was available for the first time in 2004-05. They are third-cycle seedlings combining rust resistance and fast growth. These seedlings receive 63% less infection than unimproved loblolly. They will yield an estimated 21% more volume at rotation age.

Rust Resistant Loblolly: These second-cycle seedlings are derived from trees selected for resistance to fusiform rust infection. Fast growth is a secondary consideration. These seedlings show 50% less infection than unimproved seedlings. Some growth improvements can be expected.

Livingston Parish Loblolly: Livingston Parish, LA is known to produce fast-growing, rust resistant planting stock suitable for GA's upper coastal plain.

Improved Loblolly: These are first-cycle seedlings. Piedmont loblolly will provide some growth improvement in the northern part of the state. Coastal loblolly should be planted in South Georgia and will yield 10-12% more volume and significant rust resistance.

Slash Pine (*Pinus elliottii*)

Mature trees can reach 60 – 100 feet in height and averages 2 feet in diameter. In virgin forests the species was found on low sites with an abundance of moisture because of its relative sensitivity to fire. With the advent of fire control slash pine has invaded drier sites. It quickly seeds disturbed sites and its rapid juvenile growth make it very aggressive on abandoned land. Slash pine is a valuable source of wood for the timber and pulp industries and its copious gum production is valued in the naval stores industry.

Premium Slash Pine: These are 2-cycle seed orchard selections. Fast growth and resistance to fusiform rust combine to provide 29% more volume than unimproved sources. Premium Slash is recommended for the entire natural range of slash pine.

Rust Resistant Slash Pine: Selected for their high resistance to fusiform rust. Rapid growth is a secondary consideration in this variety. They show 50% less infection than unimproved seedlings. Well-suited for sites where fusiform rust is known to be severe.

High Gum Slash Pine: Produces twice as much gum as wild sources. Grows well and is moderately resistant to fusiform rsut.

Improved Slash Pine: These are first cycle selections which provide an economical alternative for South Georgia plantings. They grow faster than unimproved sources and have some rust resistance.

Longleaf Pine (*Pinus palustris)*

Longleaf is perhaps the most distinctive of the southern yellow pines. Its long, clear bole, open crown, long needles clustered at the ends of the branchlets, and large silvery buds identify longleaf from a distance. It is a medium to large tree, 80-120 feet in height and 24-30 inches in diameter. It grows best on deep, well-drained, acid, sandy soils, although it can tolerate a variety of sites. Longleaf pine is very intolerant of shade. Its first few years are characterized by little or no above ground growth. A dense tuft of needles is all that appears above the soil surface. This "grass stage" continues until the root system is sufficiently established to support rapid above ground growth. Trees in the grass stage are surprisingly resistant to fire damage, as are the thick-barked mature trees. Longleaf produces valuable lumber and is one of the two species with major roles in the naval stores industry.

Shortleaf Pine (*Pinus echinata)*

Shortleaf pine grows naturally in the mountains, piedmont, and upper coastal plain. It reaches an average height of 80-100 feet and 2-3 feet in diameter. It has a clear, well-formed bole, and a small narrowly pyramidal crown. It is generally found on dry upland soils which are neither highly acidic nor strongly alkaline. The species may be less tolerant than loblolly pine, but young trees will endure suppression for many years and yet respond quickly to release. Shortleaf pine is considered slower growing than the other southern pines, and is generally disfavored where other pines are well adapted. It is the most common species regenerated in the northern and western parts of its range and is a valuable timber and pulp species. Shortleaf pine seeds are eaten by squirrels and birds and very mature trees with red heart disease are favored nesting sites for the red-cockaded woodpecker.

Virginia Pine (*Pinus virginiana*)

A small to medium sized tree that reaches 40-70 feet in height and 12-18 inches in diameter. Virginia pine grows naturally in the upper piedmont and lower elevations of the Appalachian Mountains. Though it occurs on a wide variety of sites, from heavy clays to dry rocky soils, its best development occurs on well-drained loams. It grows poorly on sandy soils. Virginia pine has a shallow root system and is susceptible to wind throw and damage from ice and snow. The species is valued as a source of pulp and its seeds are eaten by birds, squirrels, and other wildlife. Its growth is inferior to the other southern pines and it should not be planted commercially below the upper piedmont. The branches of virginia pine commonly extend to the ground making it valuable as a Christmas tree, and, at close spacing, it makes an excellent hedge or screen.

Table 2 provides a quick comparison of traits of the major southern pines.

Table 2. Pine Species Trait Comparison

Trait	Pine Species Ranking (High - 4, Low - 1)			
	Loblolly	Slash	Longleaf	Shortleaf
Fusiform Rust Resistance/Tolerance	3	2	4	4
Susceptibility to Southern Pine Beetle	3	2	1	4
Susceptibility to Littleleaf Disease	3	3	1	4
Drought Resistance	2	1	3	2
Cold Tolerance	3	1	2	4
Resistance to Ice Damage	3	1	2	4
Tolerance to Poor Drainage	3	4	2	2
Fertility Requirement	4	3	2	2
Resistance to Stand Stagnation	2	1	2	3

Ordering Seedlings

Once the species has been decided upon, order the seedlings from either a state or private nursery. Plan ahead to allow for adequate time for site preparation and to insure availability of seedlings. The Georgia Forestry Commission begins taking applications for seedling orders on July 1 for the following planting season.

Several decisions must be made before ordering seedlings, such as number of seedlings and delivery date. The following steps will help determine the number of seedlings to order.

1. Determine the Acreage of field by actual field measurement or estimates from maps or other records.

2. Determine spacing of seedlings. Most pine plantations are established with 600 to 700 seedlings per acre. A minimum of 600 seedlings per acre may be required for participation in some federal assistance programs. Research has proved that 600 to 700 planted trees per acre is best for landowners that are managing for multiple products, such as pulpwood, chip-n-saw, sawtimber, and poles. Seedlings are planted at different spacings to achieve the desired density. Wider spacing is sometimes used for better stand access for fire control and harvesting equipment. Table 3 compares various spacings to the number of seedlings per acre.

3. Determine the number of seedlings required for any spacing by using this formula: 43560/desired spacing = number of seedlings per acre
   Number of acres to be planted X number of seedlings = total number of seedlings

a. Multiply desired spacing in feet and divide that product into the number of square feet per acre.

b. For example, how many seedlings would be needed to plant 12 acres with a spacing of 6 X 12 feet?

6 feet X 12 feet = 72 square feet
43560 square feet per acre / 72 square feet = 605 seedlings per acre
605 X 12 = 7260 total seedlings needed

c. Making allowance for cull seedlings. Often times some seedlings will have to be culled because they are too small or damaged during shipping. A 10% cull factor is usually used and is added to the total number of seedlings needed. Determining a 10% cull factor for the above problem.

10% cull factor: 7260 total seedlings X .10 = 726
726 + 7260 = 7986 seedlings needed to plant
Note: The number to be ordered should be rounded up to the nearest whole thousand because seedlings are shipped in bundles of one thousand. 8000 seedlings should be ordered.

Table 4. Seedlings Per Acre by Spacing

Spacing (feet)	Number of Seedlings		Spacing (feet)	Number of Seedlings
6 X 8	907		8 X 9	605
6 X 9	806		8 X 10	544
6 X 10	726		8 X 11	495
6 X 11	660		8 X 12	453
6 X 12	605		9 X 9	537
7 X 7	888		9 X 10	484
7 X 8	777		9 X 11	436
7 X 9	691		9 X 12	403
7 X 10	622		10 X 10	435
7 X 11	565		10 X 11	396
7 X 12	518		10 X 12	363
8 X 8	680			

Planting Season

1. Plant seedlings within a 2-week period of receiving them.
2. Plant when soil is moist.

3. Plant bare-root seedlings during cooler temperatures as they are more conductive to seedling survival and healthy growth. This is usually after November 1 if soil moisture is plentiful – optimum time is December 1 to March 1.
4. Containerized seedlings can be planted as early as October if soil moisture is adequate.

Seedling Storage and Care

1. Seedlings are often packed in open-end bales, kraft-polyethylene line (K-P) bags, and wax-coated boxes to protect seedlings during transport and storage.
2. Proper storage conditions must be provided before planting to maintain seedling quality.
3. Plant seedlings as soon as possible after lifting.
4. DO NOT STORE nondormant seedlings lifted early of late in the planting season; plant them immediately.
5. Plant bareroot longleaf seedlings within 1 week of lifting.
6. Protect Seedlings from:
    a. Direct Sunlight – Seedlings should be transported under a light colored tarp if hauled during the day. It is best to arrange transportation at night if long-distance hauling is required. Allow for ventilation under the tarp and around the seedlings to prevent heat buildup. There should be at least 12" of air space between the tarp and the top of the bag, box or bale.
    b. High Temperatures – Temperatures above 80°F causes a mold to develop on the seedling roots, initiating decay. This mold may be detected by the presence of fungal hyphae (spider-web-like strands around the seedling roots) and a musty smell when the package is opened.
    c. Freezing Temperatures – If seedlings freeze, let them thaw out before attempting to separate and plant. Frozen seedlings can be immersed in cool water for short periods of time to speed thawing. DO NOT soak them for more than 1 hour. Freeze damaged root systems will appear limp and discolored, and the root tips will fall off when handled. Discard freeze damaged seedlings. Longleaf seedlings are likely to be killed if frozen.
    d. Wind – To prevent water loss from open-end bales, avoid exposing the bales to wind during transport.
    e. Do not transport seedlings in truck beds containing fertilizer, chemicals or fuel residues.
7. Cold-storage facilities – Dormant seedlings packaged in bales, bags or boxes can be kept for 8 – 12 weeks in cold storage at temperatures of 33°F to 36°F and a relative humidity between 85 and 95 percent. Relative humidity is less important to bagged seedlings. Baled seedlings may require periodic watering to prevent them from drying out during long storage times. Excess water should be drained to prevent damage and decay. Seedlings in K-P bags and boxes and clay dipped seedlings do not require extra water if the packages have not been opened.

8. Shed Storage (Temperature Range from 38°F to 50°F) – Store the seedlings out of the wind and sun. Baled seedlings can be stored for up to 8 weeks when watered every 2 to 3 days. Seedlings in unopened bags and boxes should not be stored over 4 weeks without cold storage. Bagged and boxed seedlings are damaged by the heat that builds up inside the containers through respiration. The seedlings vigor is reduced as the temperature climbs. If the temperature rises above 50°F in the storage shed, seedlings should be removed and planted within 3 to 5 days.
9. Air Circulation – Bales, boxes and bags should not be stacked over 2 high without providing 2-4" of air spacers for air circulation and support to prevent crushing.
10. Heeling Seedlings – Seedlings can be removed from their packages and placed in shallow shaded trenches. The roots should be covered with moist soil and watered frequently. Seedlings need to be removed from the trenches before active root growth begins. Expanding white root tips indicate active root growth.

Grading Seedlings

1. Seedlings should be graded before planting to eliminate ones that are too large or too small to be planted. It also eliminates seedlings that have roots and stems that are broken, crushed, have bark missing, roots or needles stripped off, stem swellings indicating fusiform rust, or otherwise damaged.
2. Seedlings can also be selected for particular planting sites. Short, stout seedlings with dense fibrous root systems should be planted on sites with shallow, droughty soils. Taller seedlings with well-developed root systems are preferred on sites with herbaceous weed competition that is uncontrolled.
3. Seedlings should be graded in a cool, high humidity area protected from the sun and wind before they are taken to the field to be planted. Dip the roots in water, clay, or one of the synthetic gel root dips to keep them from drying out. Clay dipped seedlings can stand brief periods of exposure with minimal root damage. Graded seedlings should be placed back in their original containers with sufficient moisture, or place them in buckets or tubs with water to keep them from drying out while transporting them to the field. Seedlings should not sit in the water for more than 1 hour.
4. Grading Standards – Stem length is less important than stem root-collar diameter and root system development.
   Keep Seedlings – Thick Sturdy stems 6 to 12 inches long, well developed root system 6 to 8 inches long with 5 to 7 or more lateral roots that are at least 3 inches long.
   Cull Seedlings – Root systems less than 5 inches long and with less than 3 strong lateral roots.

5. Root Pruning – Planting Crews should not prune roots during the planting operation. This leads to the roots being stripped off and to poor survival. If some seedlings have excessively long root systems, over 12 inches, pruning should be done with scissors, shears, hatchet or machete. Make a

single cut, removing as little of roots as necessary to keep the pruned root system in balance with the top.

Seeding Care in the Field

1. Take only as many seedlings to the planting site as can be planted in a day.
2. Store seedlings in the shade at planting site.
3. Open only package at a time for the planters.
4. Planters should carry seedlings in bags or buckets.
5. Never carry seedlings with their roots exposed while planting.
6. Cover roots in the bag or bucket with moist material such as clay, or synthetic gels

Planting Bareroot Seedlings

The key to successful planting is the ability of the root system of the newly planted seedling to begin quickly taking up water and nutrients. Seedlings should be planted in moist mineral soil where moisture is immediately available.

Large open tracts are more suited for machine planting; small or irregularly shaped tracts, sites with minimal site preparation, and rocky terrain are more easily planted by hand. Regardless of the planting method, plant seedlings at the correct spacing and depth so that the roots are not deformed and the soil is firmly packed around the roots. This eliminates air pockets.

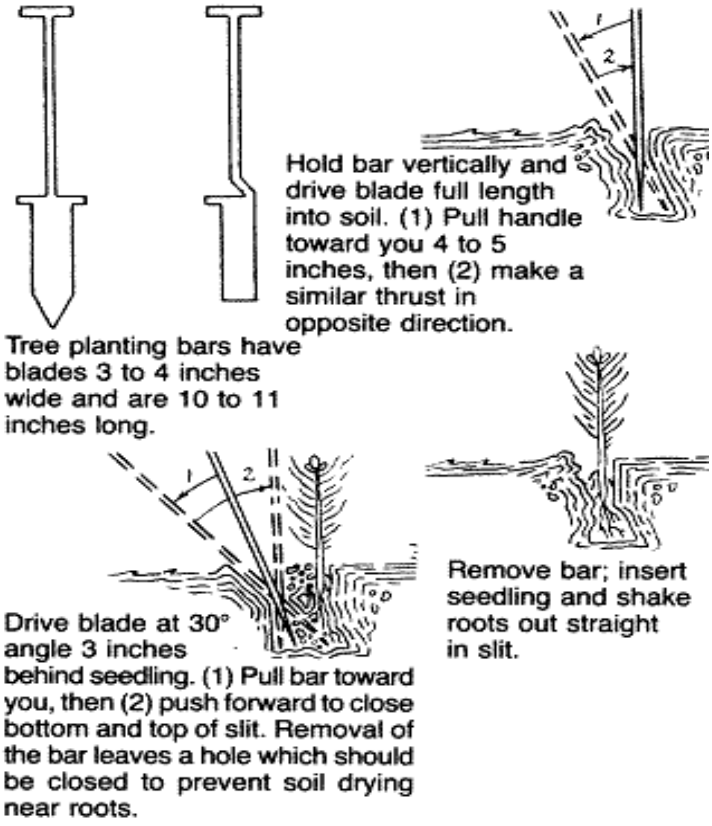
Planting Depth

Dibble bar and Hoedad blades should be 8" – 10" long. A dibble bar or hoedad should not be used when the blade is less than 8 inches. Seedlings should be planted to the depth of the planting bar. Seedlings should be placed in the holes up to the root collar of the seedling. Shallow planting holes results in early seedling mortality, particularly during spring and summer droughts. Subsoiling breaks up hardpans and allows for deeper planting. Improper planting depth can result in "J" or "L" rooting which causes slow seedling growth.

Hand Planting

A good hand-planter can average 1,000 seedlings per day in open sites. Seedlings should be carried in a bucket or planter bag in the field. Seedlings should be placed directly into the bag or bucket from the bale or bag. The seedling's roots should be dipped in a synthetic gel, covered with wet moss or some other material to keep the roots from drying out. The seedlings should be removed from the bag one at a time after the dibble has been used to open the planting hole. Two minutes of exposure to the wind or sun can kill a seedling. Proper packing is necessary to eliminate air pockets around the roots. If a seedling is planted correctly, the needles should break when pulled on with the thumb and forefinger after packing.

Planting using a Planting Bar or Dibble Bar

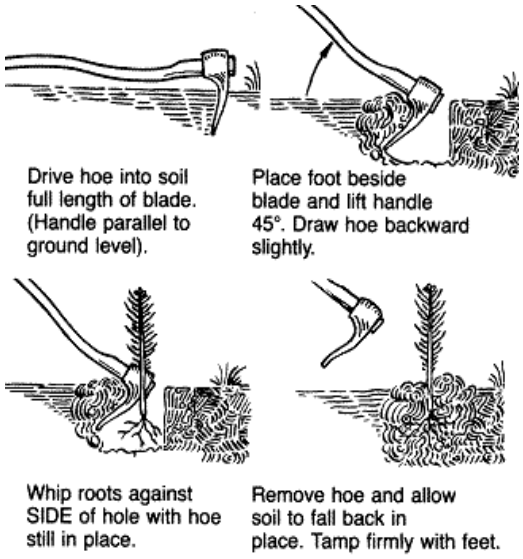


Illustrations Courtesy of University of Missouri

Correct Dibble Planting Technique

1. Hold bar vertically and drive blade full length into soil.
2. Pull handle toward you 4 or 5 inches then thrust in the opposite direction.
3. Remove the dibble and push the seedling roots deep into the planting hole. Pull the seedling back up so the root collar is flush with the ground line. The seedling should not be twisted or spun into the planting hole. Caution should be used to ensure no “J-rooting” occurs.
4. Place dibble several inches in front of the seedling and push the blade halfway in the soil. Twist and push the handle forward to close the top of the slit to hold the seedling in place.
5. Push down to the full depth of the blade and pull back on the handle, closing the bottom of the planting hole, and then push forward to close the top, eliminating air pockets around the roots.
6. Remove the dibble and tamp with "heel" to close second hole.

Planting Using a Hoedad or Mattock



1. Drive hoedad, mattock or pulaski into soil full length of blade.
2. Place foot beside blade and lift handle.
3. Draw handle backward slightly, place seedling in without removing hoedad.
4. Remove hoedad and allow soil to fall back in place.
5. Tamp seedling firmly in with foot heel.

Machine Planting

7,000 to 9,000 seedlings can be planted with a machine per day. Seedlings are planted with machines using two systems: a manual system, where the seedling is placed into a trench by hand, or an automated system, where seedlings are placed in "fingers" that then place the seedling into the planting trench.

Machine Planting Procedures

1. For Safety, tractor and tree planting machine should have protective canopies.
2. Correct tractor should be used with appropriate hp to pull planter. Light duty planters pulled by wheeled tractors in old fields and cropland should be 20 to 100 hp. Rough sites require the use of heavy duty planters pulled by larger tractors with 50 to 350 hp.
3. Hitch arms for 3 pt hitch planter should be same length to assure straight planting line.
4. Tractor should go no faster than 2 – 2 ½ mph.
5. Packer wheels should be adjusted out 4" – 5" for sandy soils and angled in 2"- 3" for clay soils.
6. Coulter should cut at least 9" deep.
7. Foot should open a 9" deep trench.

Planting Conditions

Environmental and site conditions should be carefully checked at planting time. Planting seedlings on bright, sunny, windy days in dry soil can result in dead seedlings. Dry soil is difficult to pack around the seedling. When soils are too wet, especially clay soils, machine planting can result in soil compaction around the seedling and other site damage.

The best planting conditions are when the temperature is between 35°F and 60°F with the relative humidity greater than 40 percent and wind speeds less than 10 mph and adequate soil moisture.

If the temperature is between 70 and 80 with low humidity (less than 40%) and wind speeds above 10 mph, caution should be used when planting. When these conditions exist, planting should be delayed until conditions improve or plant in the afternoon hours when seedlings will be exposed to less environmental stress. DO NOT plant when the temperature is below 32°F or above 85°F.

Planting Container-Grown Seedlings

Seedlings grown in containers are becoming increasingly popular. They were originally developed in the Scandinavian countries and Canada. Container-grown seedlings offers the advantage of extending the planting season over bareroot seedlings. Planting can begin in early October and extend into late spring and even summer if the soil moisture is available. The protected root systems of container-grown seedlings reduce seedling damage associated with the lifting, storage, and planting of bareroot seedlings.

Site Preparation

1. Grasses or weeds should be chemically controlled before planting.
2. Old Fields and pastures should be subsoiled and scalped.

Storage

1. Containerized seedlings should be stored in a well ventilated shaded area.
2. Seedlings should be planted within 1 week after delivery from nursery.
3. DO NOT allow seedlings to freeze.
4. Seedlings can be stored in cold storage between 33° and 40°F for up to one month.
5. Roots must remain moist during storage. Water seedlings as needed to maintain root moisture.

Planting

1. Planting should occur as soon as possible after October 1 when adequate soil moisture is present.
2. Plant root plug even with ground level and never below ground level. <u>If the seedling bud is covered, it will die.</u>
3. Leave ½" of root plug above ground to allow for soil settling if site has been scalped or plowed.

References:

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