Reforestation: Bareroot and Container Pine Seedlings

Producing and planting pine seedlings came into commercial use in the early 1940's. Between 1985 and 1990, annual South wide production and planting of bareroot pine seedlings ranged from 1.2 billion to 1.5 billion, and loblolly accounted for about 80% of all pine seedlings planted in the southern United States. Genetically improved seed, effective seed collection and storage techniques, intensive production, and advanced methods of seedling care and handling have made it possible to produce seedlings with high survival rates and vigorous early tree development.

The first step in producing pine seedlings is collecting cones. Carefully controlled cone collection, cone and seed processing, and storage can greatly increase the viability of pine seedlings. Once harvested, the cones are stored 3-7 weeks to dry so they will open. After extracting the seed from the cones, they are dewinged, cleaned, sized, and tested for viability. Before the seed can germinate, they have to undergo stratification (pre-chilling) to break the seed from its inherent dormancy. After the seed has been stratified, it is treated with a bird repellent and a chemical fungicide before being sown in nursery beds or container trays in the spring. There are generally two types of pine seedlings grown for commercial, large-scale plantings: bareroot and container.

Bareroot Pine Seedlings:

Bareroot seedlings are sown in seedbeds and are intensively managed during the growing process. They will be watered, weeded, fertilized and pruned. Bareroot seedlings are also conditioned throughout the growing season to improve size, shoot-to-root ratio, and physiological adaptability. In East Texas seedlings are normally lifted from December 15 through February 15 and graded on stem characteristics that indicate seedling quality. The ideal physical characteristics for a seedling include:

- a balanced shoot-to-root ratio (about 2:1),
- stem height 7-12 inches,
- root collar diameter at least 7/32 of an inch,
- fibrous root system about 6-8 inches long,
- winter buds present,
- at least a few secondary needles,
- no disease or injury present

Once graded, seedlings are packaged in heavy cardboard boxes or polyethylene lined kraft bags in quantities of 1000 and stored on racks in large refrigeration units at temperatures from 32 to 360 F. Fully dormant seedlings can be safely stored for 6-8 weeks under proper conditions.

Bareroot seedlings can be planted either by hand or by machine. The art of planting is easily learned, but planting is tedious, and so it is frequently done incorrectly. Incorrect seedling handling and planting can result in poor survival or misshapen root systems. The cost of planting bareroot seedlings is influenced by the intensity of site preparation, size and shape of the regeneration area, site topography, type of planting method, etc. The less vegetation or debris left on a site, the easier (and cheaper!) it is to plant, either by machine or by hand.
The planting period coincides roughly with the dormant period of the seedlings. This is usually from December 15th to March 15th in East Texas, although local and yearly environmental conditions can alter dormancy. In actual practice, the beginning of and ending of planting season is often governed by the amount of moisture in the ground during late fall and early winter and by spring temperatures above 75 degrees.

Cost of Bareroot vs. Container Seedlings:

There is a cost difference between bareroot seedlings and container seedlings. Bareroot pine seedlings typically cost between ½ and ⅓ the price of container seedlings. Labor costs to plant bareroot seedlings can also be less than containerized seedlings. Some container costs can be offset if landowners plant fewer container seedlings per acre expecting a greater percentage to survive.