

SITE PREPARATION OF A SANDY NURSERY SOIL

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INTRODUCTION

The success of sowing, germination, and consequent seedling development depends to a great extent on soil preparation (May 1985). Most nursery managers prepare land for sowing in a similar fashion; however, each individual nursery uses techniques that work best in their particular situation. Different methods of site preparation are required depending on soil texture and the type of crop grown the previous year. For example, site preparation methods differ following pine seedlings or cover crops and whether the soil is heavy or light textured. Light sandy soils are desirable because they allow seedbed preparation, lifting, and other work to be carried out under wet conditions without unacceptable levels of soil compaction or puddling damage. The following discussion will address site preparation methods on a sandy nursery soil in north Florida.

NURSERY LOCATION / SOILS

The nursery is located in Madison County near Lee, Florida. Seedling production, which began in 1953, has continued for thirty-three years, and over 750 million pine seedlings have been produced at this location. Annual production is approximately 40 million seedlings, including four species: loblolly pine, slash pine, longleaf pine, and sand pine. Cover crops presently grown include corn, sudan-sorghum, and winter rye. Irrigation water for 120 acres of seedbed area is from three deep wells, and the irrigation system is nonmobile with permanent riserlines.

The nursery soils are Lakeland Series which are excessively drained and nearly level to gently sloping. Sand content of the nursery soil exceeds 90 percent, and available water holding capacity, organic matter content, and natural fertility are low. The natural vegetation consists of longleaf pine, turkey oak, and bluejack oak. This soil is very susceptible to leaching of plant nutrients.

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PRELIMINARY STEPS FOLLOWING COVER CROP

Typically a sudan-sorghum cover crop is grown prior to the first pine seedling crop in a 2:2 rotation. The cover crop is not mowed during the growing season but, allowed to mature and become woody or lignified. Finally in late August the sorghum is cut with a shredder mower. This mower pulverizes the cover crop and leaves the shredded material in place directly behind the mower, as compared to a rotary mower which windrows cover crop debris. This allows for uniform incorporation of cover crop residues, a very important consideration on sandy, low organic matter nursery soils.

After mowing, cover crop residues are turned under to a depth of 8 to 10 inches using a moldboard plow. Plowing is completed in time to allow 30 to 40 days for cover crop decomposition prior to fall fumigation. The permanent irrigation system creates problems when a moldboard plow is employed because the land can only be worked in one direction, ie, parallel to the riserlines. Plowing in one direction year after year can produce unlevel field conditions if care is not taken. After moldboard plowing the land is disked to cut up and incorporate any remaining exposed cover crop debris.

After plowing and disking the field is left in good condition for cover crop decomposition prior to fumigation. During the decomposition period two operations may be performed depending on the condition of the field: (1) land leveling and (2) subsoiling. Land leveling operations are accomplished with a "byonic blade", a double-bladed land leveling implement which is pulled diagonally across the field to eliminate high areas and depressions. This implement does not require great operator skill and does a good job alleviating unlevel areas around permanent riserlines and field borders. Subsoiling is done with a chisel plow by removing three of the seven shanks. The remaining four shanks are pulled 20 to 22 inches deep on 18 inch centers.

Fumigation is usually completed by late September to early October. If adequate rainfall does not occur prior to fumigation, ie, during the cover crop decomposition period, the land will be irrigated to facilitate decomposition. Immediately before fumigation the field is chiseled 10 to 12 inches deep with a seven shank chisel plow and then harrowed with a leveling harrow. Fumigant dosages typically range from 200-350 pounds per acre of Dowfume MC-33. Fumigation tarps are usually left in place for three to four weeks before removal. After tarp removal the land will remain fallow during the winter. No winter cover crop is sown on these fumigated areas because cool late spring temp-

eratures hinder cover crop decomposition, and the residues could increase the potential for damping off problems on the subsequent seedling crop.

PRELIMINARY STEPS FOLLOWING FINE SEEDLINGS

In areas where seedlings will follow seedlings, land preparation must begin promptly after harvesting the seedling crop. Oftentimes the interval between completion of lifting and sowing the next pine seedling crop is only 2 to 3 weeks.

The first land preparation step in this situation involves working the field with a leveling harrow, which will iron out any soil surface irregularities left from the lifting operation. If necessary the field is then subsoiled to a depth of 20 to 22 inches. This step is usually undertaken to alleviate compaction problems created by seedling harvesting under adverse soil conditions. Following subsoiling the area is worked with a chisel plow to loosen the soil in the rooting zone.

Next preplant fertilizers are applied with a 10 foot Gandy fertilizer spreader. Fertilizer treatments are based on soil analysis and usually consist of 150 to 200 pounds per acre of muriate of potash or 400 to 500 pounds per acre of 0-10-20. Nitrogen containing fertilizers are sometimes used preplant, but usually only K or P+K fertilizers are added due to loss of N through leaching. Preplant fertilizers are then incorporated with a leveling harrow, which creates a smooth uniform surface ready for seedbed preparation.

SEEDBED PREPARATION

Seedbed preparation is the final step prior to seed sowing, and quality work is essential to achieve uniformity of germination and subsequent seedling growth.

The first task in seedbed preparation is to level the soil surface with a leveling harrow. This eliminates small depressions and creates a uniform soil surface of good tilth. It is beneficial to run the harrow as straight as possible for it will simplify the next step, plowing alleyways. Two middle buster plows attached to a rear mounted tool bar are used to plow shallow seedbed paths on 74 inch centers. This step is usually completed several days before sowing. Very shallow alleyways (2 to 3 inches) are plowed at first so that slight crooks can be

straightened out when the alleyways are plowed for the final time. No strings or marking devices are employed, and straight seedbed are dependent on operator ability alone.

Just prior to sowing, the seedbed alleys are plowed for the final time to a depth of 6 to 8 inches. Next, the beds are shaped or "pulled down" with a Whitfield bed builder. This operation is performed immediately ahead of the seed sower in order to attain a fresh, moist seedbed surface. Finished seedbeds are elevated only 3 to 4 inches above the alleys. Seedbeds are kept low because standing water is no problem on this site, and low seedbed prevent shoulder erosion problems.

The soil surface is kept moist at all times during the sowing operation. The areas being sown are irrigated frequently during the day to maintain a moist seedbed surface. This prevents the seed from desiccating on the seedbeds, thus ^{aiding} germination; and it also facilitates counting seed to check sower calibration.

A Stanhay seeder is used to sow the nurser^y. This sows eight drills approximately two inches wide and creates an undulated seedbed surface. With the seed sown in shallow depressed drills, the chance of seed being moved about or washed off the seedbeds is lessened as compared to flat seedbed surfaces. Immediately after sowing, the beds are mulched with pine bark.

If the seedbed shoulders erode during the growing season, they are reformed with alley plows.

LITERATURE CITED

May, Jack T. 1985. Seedbed Preparation. In Southern Pine Nursery Handbook, C. W. Lantz, ed. USDA For. :env., p. 4-1 to 4-9.