

GROWING LARGE QUANTITIES OF CONTAINERIZED SEEDLINGS

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Abstract: --The sowing of large quantities of longleaf pine (*Pinus palustris* Mill.) seed into trays depends on the quality of the seed and the timing of seed sowing. This can be accomplished with mechanization. Seed quality is accomplished by using a gravity table. Tray filling can be accomplished by using a ribbon-type soil mixer and an automated tray-filling machine. Without automation, it would be economically unfeasible to sow and grow large quantities of quality seedlings.

INTRODUCTION

Nursery managers have a window for sowing longleaf pine (*Pinus palustris* Mill.) seeds of about 40 days, no matter if you are growing 100,000 or 4,000,000 seedlings. Growing container stock is one of the most labor-intensive cultural practices there is in the industry compared to bareroot seedling production. Seeds sown too early can have the germination delayed due to low soil temperatures, which in turn allow pathogenic activity during this dormant stage. Seeds sown too late can suffer with poor germination due to fluctuations of heat and pathogenic activity as well as activity from birds, squirrels, rats, fire ants, and raccoons.

Sowing large quantities of trays.

There are three ways to accomplishing the sowing of longleaf seeds within the limited sowing window. These can be used alone or in conjunction with one another.

Automation - Soil and amendments can be custom blended in soil mixers and tray filler machines, and seeding can be done by automation.

Hand labor - Custom blended premixed soils can be purchased so that filling and seeding of each individual tray can be done by hand.

Extended hours - Sixteen to 24-hour days, double shifts, or split shifts can be used in order to fill and seed the trays within the time window.

Our nursery uses a combination of all these sowing methods in order to accomplish this task. 1

SEED QUALITY

Using the best seeds available when they are available can make the job a lot easier. Using high-germination rated seeds; i.e., 90% to 95%, is better than using seeds germinating in the range of 50 to 75 percent. We have been using a gravity table in order to separate the heavier seeds

from the lighter seeds, hence increasing our chances of a better germination rate.

SOWING PROCEDURES

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Seed handling -- Seeds are taken from our seed freezers where they have been stored at an average temperature of about 8 °F. They are then placed in burlap bags and put in a water soak for 24 hours. After this, they are transferred to plastic bags and placed in the cooler at an average temperature of about 50 °F for a period of about 7 days. After 7 days of storage time, they are then dried to touch in order to facilitate machine planting. (Wet seeds do not flow in the planters too well.)

Soil mixing - Custom blended soil (Verlite Corporation - Forestry Mix) is placed in a Boulden and Lawson soil blender where it is fluffed. Fertilizer and soil acidifiers are mixed in at the following rates:

Soil--Six bags (24 cubic feet_ of Verlite Forestry Mix® (50% Canadian peat, 30% Polystyro® beads, and 20% coarse grade vermiculite).

Fertilizer -- 4 pounds Miester 17-6-10, 9-month formulation with minors (HelenaChemical Co.)

Soil acidifier -- 2 pounds (Southern Agriculture Chemicals)

These are mixed together and water is added; then this mix is transferred to the tray-filling machine.

Tray filling -- Can Am # 3 trays are brought in from the storage area where they are placed in the tray filling machine (Boulden and Lawson flat filler model #13304)® where they are filled, the soil is compacted and rolled to a depth of about 1/2 inch, and the trays are palletized.

Sowing -- The soil filled trays are sown by hand and placed in two automated seeding machines from The Old Mill Company.

Topping -- The sown trays are then transferred to a topping

table where a mixture of two-thirds coarse grade vermiculite® and one-third Perlite® is poured over the trays and the excess screened off. This mixture is prewet in order to cut down on the amount of dust that both products give off. The perlite is used as an extender in order to offset the high cost of the vermiculite. The trays are then stacked onto trailers to be transported to the fields, where the seeds germinate and grow in full sun light.

CULTURAL PRACTICES

Herbicide applications -- From about two to four days after sowing, the first application of Goal® herbicide is applied before germination. This pre-emergent application is applied at a rate of two-quarts per acre. At approximately 10 to 15 weeks after germination, a lighter dosage of Goal herbicide is applied at approximately 6.4 ounces per acre. This is applied at biweekly intervals for the duration of the active weed growth period.

Fungicide -- Fungicides are primarily applied on an as needed basis. However, Captan® fungicide is applied approximately 6 weeks after sowing to help combat some of the dampening off and root-rot fungi. This is applied one time using the bench treatment according to labeled directions.

Thinning and transplanting -- After the Cam Am trays have been sown, bulk seeds are put in 2- by 4-foot plywood trays with the soil mix, in order to have transplant stock that is about the same age as the germinated stock. Approximately 9 weeks after germination, all the trays are picked up out of the field and brought back inside the building in order to be thinned and transplanted.

The planting tool of choice is a butter knife with a sharpened V groove ground into the point. This inexpensive planting tool aids the planter in the elimination of Jrooting of the containerized stock. Thinning and transplanting should be completed by August 1.

Normally you can expect about a 15% loss of stock, so every

effort to maximize stocking will help you in lowering your losses. Some people may elect to go ahead and accept up to 20% loss, but when you are dealing with large quantities, even a 10% loss out of 4,000,000 is 400,000 seedlings. Therefore, every effort is taken to ensure as close to 100% stocking as possible.

Supplemental feeding and PH control -- During the growing season you may find that your pH will start to rise, particularly if the irrigation water is high in lime. Weekly applications of sulfur WP are applied at a rate of approximately 22 pounds per acre. We are currently looking into the possibility of acid injection in order to help reduce water pH. Along with the pH problem, you will run into a nutritional problem. To help combat this problem we use liquid fertilizers and chelated iron at these times and rates:

Week 10 after sowing: Peters 9-45-15 is used at a rate of 11 pounds per acre. This formulation is used to help promote rapid root development, particularly in the newly transplanted stock. In August a balanced 20-20-20 fertilizer with minors is used on a weekly basis to promote a richer greening effect.

SHIPPING

Shipping usually starts around November 1. Many people would like to plant before freezing weather, allowing the seedling to harden off before colder temperatures set in. Trays are taken out of the field and the seedlings are extracted from the tray and placed in a 1-1/9-bushel waxed produce box. After 125 seedlings are placed in the box, the boxes are loaded onto refrigerated trucks for shipment throughout the State of Florida. On a standard refrigerated 40-foot trailer, approximately 120,000 to 130,000 seedlings can be shipped. This is more economical than leaving the seedlings in the trays and shipping the tray to the planting sites.