

# NURSERY PRACTICES IN TENNESSEE

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## Key Words

Bareroot nursery, conifer production, hardwood production

Tennessee is a hardwood state; 87% of the state's 13,000,000 forested acres are hardwood. The remaining 13% are Pine or Mixed Hardwood-Pine forest types. There are approximately 1,000,000 more forested acres today than there were in 1950. Most of this increase is related to abandoned hillside farmland. Tennessee has two nurseries: one near Jackson in West Tennessee; the other in Tennessee's southeastern most county, near Chattanooga. Between the two, 25,000,000 conifer and 3,500,000 deciduous 1-0 bareroot seedlings are grown. The East Tennessee Nursery near Chattanooga grows the conifers while the West Tennessee Nursery grows the deciduous seedlings.

Deciduous seedling sales the last five-year have been very good. Reforestation deciduous seedling sales have increased from 500,000 in 1995 to 2,500,000 in FY 2000. Non-reforestation deciduous seedlings have remained at less than 500,000 during the same period. This increase in deciduous seedling sales is due to high stumpage prices during this period. As stumpage increases, reforestation interest increases. Water quality concerns are another reason for the increase in deciduous seedling demand. Carbon sequestration has had a positive impact. One individual last week ordered \$100,000 worth of hardwood seedlings for this purpose. Federal wetland reclamation programs are still another reason for the increase.

## HARDWOOD SOWING AND CULTURING

Our hardwood seedlings are generally fall sown. The first step is to level the ground prior to bed

building. The second step is to broadcast-sow grass (wheat, rye or oats) at two bushels per acre. The third step is the bed building. It covers the grass seed while preparing the ground to be sown with tree seed. Using the hardwood sower developed and built on site ("nutty buddy"), hardwood seed is sown in four drills. The grass germinates and forms a mat which provides the following: over-winter bed stabilization, bed insulation, squirrel barrier, crow barrier, spring mulch.



Figure 1. Nuttall oak seedlings at 2 days.

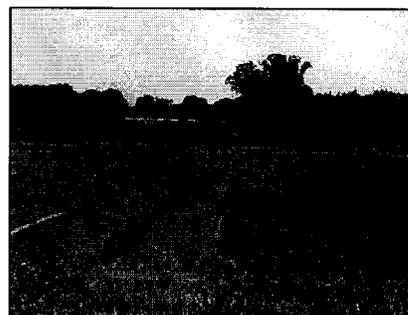


Figure 2. Grass three weeks after sowing. Seedlings present, but cannot be seen.

The grass is oversprayed with Roundup on February 15 the following spring. This kills the grass in anticipation of March germination. We usually use a 2% Roundup solution at 30 gallons per acre. The "nutty buddy" is a ground driven machine. Four rotating disks turn through the seed hopper retrieving and sowing seed. The chain drive that turns these disks has interchangeable sprockets with which we can alter sowing density. The rotating disks are interchangeable to allow the use of different sized disks for different sized seed.

### CONIFER SOWING AND CULTURING

We use two sowers for our pine seedlings. The Oyjord® sower sows eight "single rows" per bed. The Summit precision sower sows eight "double rows" per bed. The precision sower is characteristically slower than the Oyjord®. We use it for our higher germination seed and, as time allows during our sowing window, our lower germination seed. As the sowing window closes, we will use the Oyjord® sower.

The precision sower allows us to sow at approximately 20% greater density, produces less than 1% cull, and provides a very uniform crop. The last two years, we have experimented with the use of live grass (wheat, rye, and oats) as mulch on our spring sown pine crop. Pine bark mininuggets have traditionally been used. But this year, we used it on only 50% of our pine crop. The other 50% was sown using the live grass as mulch. We initially used grass for the following reasons:

- 1) Grass is less expensive. Mulch at \$13/yd results in a \$30,000 annual cost, while grass at \$5/bushel at 2 bushels/acre results in a \$400 annual cost.
- 2) Grass is easier to apply. Mulch requires a manure spreader crossing each bed, having to be refilled every other bed. Grass, sown before the beds are made, uses a very fast broadcast sower and requires fewer refills.

The grass germinates before the pine seed and we let them grow in tandem until the grass starts to drape over the seedlings. Poast® readily kills the rye and oats. Wheat seems to be more difficult to kill and it wasn't until we applied Goal that we had a burn that killed the wheat. Last year, we experimented with six beds allowing the grass to



Figure 3. Top pruned loblolly pine at 10 weeks in bark mulch.



Figure 4. Loblolly seedlings emerging through deadened grass mulch (seven weeks old).

drape over the seedlings for about a month longer than we otherwise would have before we applied a pesticide. On three other beds, we did not kill the grass at all. The seedlings finished the year on all nine beds with no obvious negative effect on seedling quality or quantity. This year (2001), the dead grass continues to stabilize the beds and provide a thatch-like mulch. We observed that seedlings growing amidst the live grass were more vibrant and just as developed as same aged seedlings growing in traditional pine bark mininugget mulch.



Figure 5. Comparison of 9 week old loblolly mulch regimes. Grass on left, bark on right (same density per regime). Loblolly (Grass Mulch) appears to be 7 to 10 days behind Loblolly (Bark Mulch).

There were several unanticipated positive and negative findings in using grass as mulch for pine culturing.

#### **Positive results of grass mulch**

- The grass provided a lateral shade for the seedlings that seemed to be beneficial.
- We had no trouble with mulch floating away.
- The grass helped to retard weed growth.
- The grass will emerge through a Goal pre-emergent treatment (2 qt/a) but is greatly diminished (more plant vigor than density of grass stems). An alternative might be to plant more than 2 bushels per acre.
- The thatch that resulted from the dead grass made a good mulch that has lasted well past crown closure.
- Of the three grasses (wheat, rye, and oats) used in the spring sowing of pines, all provided the desired results but the wheat seemed harder to kill with Poast®.
- Our survey of mulch versus grass inside the same seedlot resulted in the same bed density.
- An observation from our use of the grass approach last year found that the quality of the seedlings at the time of lifting was identical under both mulching regimes.

#### **Negative results of grass mulch**

- As of July 26, 2001, the "grass" seedlings appeared to be approximately 10 to 14 days behind the mulch seedlings in development. We theorize that the decomposition of the grass root system has made nitrogen less available to the seedlings.

#### **CHANGES IN THE NURSERY**

It was interesting to me to consider the things that have changed in the last five years at our nursery. In the last year, we have incorporated a "run-off" management system. In consultation with the NRCS and the Tennessee Valley Authority, we have built three ponds connected to each other and to lagoons, all for the purpose of catching and filtering runoff from our beds.

In terms of actual nursery operations and management, we now contract the delivery of our seedlings to the various drop points across the state rather than doing it ourselves. We now contract the stratification of our pine and poplar seed. We contract the lifting and packaging of our seedlings. We have gone from 15 full time and 20 seasonal to 5 full time and 2 seasonal employees. Our annual revenue has risen from \$450,000 to \$966,000. We are building a greenhouse to start producing some containerized seedlings. We no longer use a belt lifter to lift our seedlings. We now accept credit cards as payment. Thirty-five acres of seedling production have been added. We have joined the NC State Loblolly Tree Improvement Cooperative. We have hired a second tree improvement specialist.

The landowners in Tennessee are becoming better stewards of the land. This new ethic has made a tremendous difference in not only increased tree planting but in all aspects of forest management.