LONGLEAF SEEDLING PRODUCTION AT HAUSS NURSERY

Philip Wilson

Abstract. -- High quality longleaf pine seedlings can be successfully grown on bare root nurseries with the use of good seed from correct seed sources, proper sowing dates, cultural practices, fertilization regimes and correct handling of seedlings. Integrated nursery management of longleaf seedlings is the key to quality longleaf seedlings.

Keywords: Pinus palustris, seed source, insect and disease control, cultural practices, processing.

Introduction

Longleaf pine, Pinus palustris, has been produced at the Alabama Forestry Commission's E.A. Hauss Nursery since 1952. The first crop was 30,000 and the largest crop was 2,855,000 with a grand total being produced of 26,094,000. The Hauss Nursery is located on a sandy loam soil with 16% clay and was a good natural longleaf site before conversion to nursery ground. The nursery consists of 400 acres of land and 12,000 units of bed space with four deep well pumps capable of pumping a total of 1800 GPM of water to 34 nursery compartments. The nursery has naturally abundant Pisolithus tinctorius and Thelephora spp. fungi.

Seed and Sowing

The geographic seed source for Alabama Forestry Commission nurseries is southwest Alabama and southeast Mississippi. Seed is purchased on competitive bid for fall sowing of longleaf seedlings. Seed are sown between October 15-30 at densities of 12-15 per square foot with a Whitfield sower with modified drop chutes. Stratification periods of up to 15 days are utilized if deemed necessary by germination test. Seed are covered with 1/2 inch of chopped longleaf pine straw and germination occurs immediately and is complete within 3 weeks.

Insect and Disease Control

Fumigation is used to control charcoal root rot, Macrophomina phaseolina, and rhizoctonia blight, Rhizoctonia solani. In the spring of the year Daconil 2787 and Benomyl (Benelate - 50 wp) are sprayed on a monthly schedule as a preventative protection for rhizoctonia blight and brownspot. Kelthane is used as necessary for insect control.

Cultural Practices

Longleaf pine seedlings are top pruned repeatedly during the growing season with a piano wire type cutter. When the seedlings reach a stage of being too tough for this cutter they are cut with a bush hog cutter.

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Horizontal root prunning is done on October 15 and again on November 15 with a Fobro root prunner.

Fertilization of longleaf pine seedlings is accomplished with a regular schedule of low amounts of ammonium nitrate and muriate of potash on a rotating bi-weekly basis. As the season progresses ammonium nitrate is phased out of the schedule and top dressing is done with only muriate of potash.

Harvesting, Grading, and Shipping.

Harvesting of longleaf pine seedlings is accomplished with a Grayco harvester or a hand crew, depending on the weather. The Grayco harvester can harvest 200,000 seedlings a day as opposed to a hand crew which can harvest 160,000 seedlings per day. Due to the fatigue factor the Grayco harvester is much preferred above hand lifting. Seedlings which are lifted are placed in plastic tubs, on covered trailers, and moved to the grading shed for immediate processing.

Seedlings are culled according to Wakeley's Morphological grades of southern pine seedlings. Packaging is accomplished in bale with 500 seedlings placed root to root. Moisture addition and retention is accomplished with a hydro gel product introduced under high pressure to groups of 100 seedlings.

Shipment of longleaf pine seedlings is accomplished in refrigerated vans to Alabama Forestry Commission district offices where the seedlings are stored in cold storage units or they are stored at the nursery under cold storage. Customers may take delivery from Alabama Forestry Commission district offices or directly from the nursery.

CONCLUSION

Longleaf pine is a species which requires regimentation and scheduling during the propagation process. When given fertilization, proper cultural practices and, above all, proper care in lifting and transplanting, longleaf seedlings can give excellent survival and disease free growth.

FERTILITY STANDARDS FOR
HAUSS NURSERY

ph	P	K	CA	MG
	lbs/acre	lbs/acre	lbs/acre	lbs/acre
5.5	26-34	166-246	1000	90-194

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	SUMMARY SEEDLING PRODUCTION - STATE DISTRIBUTION												
2													
3	CROP	SLASH	LOBLOLLY	LONGLEAF	SHORTLEAF	SPRUCE	SAND	SCOTCH	MONTEREY	VIRGINIA	YELLOW	RED	ARIZONA
4	YEAR	PINE	PINE	PINE	PINE	PINE	PINE	PINE	PINE	PINE	POPLAR	CEDAR	CYPRESS
5													
6	1952-53	5116850	2256000	30000	0	0	0	0	0	0	0	0	0
7	1953-54	7650700	0	0	0	0	0	0	0	0	0	0	38000
8	1954-55	9800600	0	0	0	0	0	0	2101	0	0	0	0
9	1955-56	14575275	0	0	0	0	0	0	0	0	0	0	0
10	1956-57	18101400	6513000	6675	0	0	0	0	0	2900	0	0	0
11	1957-58	26753250	9615000	0	0	0	0	0	0	0	0	0	0
12	1958-59	50214375	10030500	1583300	515000	0	40000	0	0	1000	0	500	0
13	1959-60	37372400	13703550	326875	0	40050	6000	1000	0	65500	0	0	0
14	1960-61	17746250	1831000	0	0	1000	0	0	0	0	0	0	0
15	1961-62	14367500	1396700	11025	38025	66150	41000	0	0	0	0	0	0
16	1962-63	16033750	1983300	140500	77100	11500	52000	0	0	0	24500	214225	0
17	1963-64	11141750	2891500	594800	127650	0	0	0	0	0	3575	0	0
18	1964-65	8446436	2247500	177900	379500	38875	72250	0	0	0	81200	0	0
19	1965-66	9492200	1426000	256800	0	0	15500	0	0	0	8125	0	0
20	1966-67	10857965	2386610	389385	0	0	17500	0	0	0	0	0	0
21	1967-68	6599116	4590931	366011	2241	0	4025	0	0	0	21516	27891	0
22	1968-69	3338525	3460187	220925	17000	0	0	0	0	0	15050	0	0
23	1969-70	4553325	5622200	193725	0	0	0	0	0	0	0	0	0
24	1970-71	1470950	3943650	391000	0	0	19750	0	0	0	1800	7925	0
25	1971-72	3712350	2231400	0	0	0	0	0	0	0	0	0	0
26	1972-73	3519200	6082650	41000	0	0	0	0	0	0	0	0	0
27	1973-74	3523500	2713450	127500	0	0	0	0	0	0	0	0	0
28	1974-75	5915425	4393000	259350	0	0	0	0	0	0	0	0	0
29	1975-76	3958180	3892500	199150	0	0	0	0	0	0	0	0	0
30	1976-77	4056250	7832428	23500	0	0	0	0	0	0	0	0	0
31	1977-78	4713979	3860000	670000	0	0	0	0	0	0	0	0	0
32	1978-79	2253000	3959000	446000	0	0	0	0	0	0	0	0	0
33	1979-80	1563000	4525000	66650	0	0	0	0	0	0	0	0	0
34	1980-81	1967000	6159250	446025	0	0	0	0	0	0	0	0	0
35	1981-82	2470000	10809000	578000	0	0	0	0	0	0	0	0	0
36	1982-83	3746000	9976500	721250	0	0	0	0	0	0	0	0	0
37	1983-84	1832000	9842500	490000	0	0	0	0	0	0	0	0	0
38	1984-85	1349000	10701700	1316000	0	0	0	0	0	355250	0	0	0
39	1985-86	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

	N	O	P	Q	R	S
1						
2						
3	CROP	BALD	BICOLOR	SWEET-		TOTAL
4	YEAR	CYPRESS		GUM		
5						
6	1952-53	0	0	0		7402850
7	1953-54	0	0	0		7688700
8	1954-55	3800	3334800	0		13141301
9	1955-56	0	2028800	0		16604075
10	1956-57	0	552200	0		25176175
11	1957-58	0	0	0		36368250
12	1958-59	5725	0	0		62390400
13	1959-60	0	0	0		51515375
14	1960-61	0	0	0		19578250
15	1961-62	0	0	0		15920400
16	1962-63	0	0	0		18536875
17	1963-64	0	0	0		14759275
18	1964-65	0	0	0		11443661
19	1965-66	1975	0	0		11200600
20	1966-67	9125	2500	0		13663085
21	1967-68	9435	0	0		11621166
22	1968-69	0	0	0		7051687
23	1969-70	3012	0	0		10372262
24	1970-71	5225	0	0		5840300
25	1971-72	3190	0	0		5946940
26	1972-73	0	0	0		9642850
27	1973-74	0	0	0		6364450
28	1974-75	0	0	0		10567775
29	1975-76	0	0	0		8049830
30	1976-77	0	0	7750		11919928
31	1977-78	0	0	0		9243979
32	1978-79	0	0	0		6658000
33	1979-80	0	0	0		6154650
34	1980-81	0	0	0		8572275
35	1981-82	0	0	0		13857000
36	1982-83	0	0	0		14443750
37	1983-84	0	0	0		12164500
38	1984-85	0	0	0		13721950
39	1985-86	0	0	0		10411800
40	1986-87	0	0	0		30550600
41						
42						
43		41487	5918300	7750		612355364

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	SUMMARY SEEDLING PRODUCTION - CONTRACT DISTRIBUTION												
2													
3	CROP	SLASH	LOBLOLLY	LONGLEAF	SHORTLEAF	SPRUCE	POND	VIRGINIA	SWEET-		PROGENY	MISC.	TOTAL
4	YEAR	PINE	PINE	PINE	PINE	PINE	PINE	PINE	GUM	SYCAMORE	TEST		
5													
6	1959-60	11912000	2676000	0	0	0	0	88500	0	0	0	0	14676500
7	1960-61	11239000	2815000	0	0	10000	0	0	0	0	0	967	14064967
8	1961-62	10357500	3061500	0	0	34000	0	0	125000	0	0	0	13578000
9	1962-63	3065500	3869500	0	53500	0	0	0	218950	0	0	0	7207450
10	1963-64	4146900	1449000	205000	83000	0	0	0	410000	0	0	0	6293900
11	1964-65	2651500	3162500	55500	0	0	49500	0	359500	23000	0	0	6301500
12	1965-66	3230138	3580500	429500	0	0	0	0	151500	22000	0	0	7413638
13	1966-67	4732660	5531000	132500	0	0	0	0	107000	84350	0	0	10587510
14	1967-68	2960600	7481720	0	159875	0	0	0	0	64000	0	0	10666195
15	1968-69	7174150	10798500	47500	0	0	0	0	0	0	0	0	18020150
16	1969-70	8343250	9937500	0	0	88500	0	0	0	0	44500	0	18413750
17	1970-71	7023000	13196000	0	1100	0	0	0	23700	30100	0	0	20273900
18	1971-72	7673500	10216000	0	7000	0	0	0	0	0	0	0	17896500
19	1972-73	7236500	8332500	853500	0	20000	0	0	0	0	0	0	16442500
20	1973-74	7404250	5225500	374200	0	0	0	0	0	0	16900	0	13020850
21	1974-75	7578500	11204000	52950	0	0	0	0	0	0	39500	0	18874950
22	1975-76	6203050	10798720	70750	0	0	0	0	85454	130800	0	0	17288774
23	1976-77	3395919	7757588	0	0	0	0	0	64815	0	0	0	11218322
24	1977-78	4422000	7940250	1713450	0	0	0	0	77625	137250	0	53600	14344175
25	1978-79	4930000	8165000	0	0	0	0	0	0	0	0	0	13095000
26	1979-80	4520750	9527750	800500	0	0	0	0	74550	77775	0	10500	15011825
27	1980-81	3598000	8060500	807225	0	0	0	0	18585	20775	0	0	12505085
28	1981-82	5288000	6294750	1398225	0	0	0	0	32250	70625	0	39692	13123542
29	1982-83	3220250	10993000	881950	0	0	0	0	90125	54250	0	1550	15241125
30	1983-84	657500	6082750	1569250	0	0	0	0	10375	1200	0	3100	8324175
31	1984-85	1824250	7837050	1538875	0	0	0	0	41950	0	0	0	11242125
32	1985-86	968250	5260550	703925	0	0	0	0	16875	264	13000	0	6962864
33	1986-87	1430000	6388500	0	0	0	0	0	9300	457	0	38000	7866257
34	1987-88	316000	3606000	0									
35													
36	TOTALS	147502917	201249128	11634800	304475	152500	49500	88500	1908254	716389	113900	147409	363867772
37													
38													
39		35000 YELLOW POPLAR DELETED FROM REPORT											

GEOTECH APPLICATION TECHNIQUE USED AT MBI NURSERY
1986-1988

I. Test application of Geotech - spring, 1986 in cooperation with Auburn Nursery Coop

General info obtained:

1. Geotech alone gave positive improvement in quality and number of plantable seedlings over controls with no mulch.

2. Geotech applied on beds and then mulched with a mixture of bark, sawdust, and wood slivers gave best results in test.

3. Trials by MBI where the mulch (as above) was applied and then oversprayed with Geotech gave as good results as #2 above. In fact, a positive element seemed to be the Geotech helped hold the mulch in place better than #2 above thus enhancing the value of mulch i.e. modified heat, held moisture, and encouraged mycorrhizal development.

II. Application Geotech 1987

The entire crop (64 acres) was sprayed with Geotech over mulch. The rate of Geotech used was 28 gallons per acre in a 12 to 1 mixture of water and Geotech. The mechanics of mixing were simply pouring a 55-gallon drum of Geotech into the spray tank holding 600 gallons of water. No problems were encountered with mixing; however, the Geotech solution is "gooky" so that good "clean up" of spray equipment is essential following use. Equipment left overnight without thorough cleaning gave problems toward stoppages and pump operation.

General results obtained from use of Geotech on 1987 crop were:

1. The Geotech stabilized the beds to the extent that a good portion of the mulch stayed in place all year. This helped hold moisture, helped moderate soil temperature, and lowered chlorosis during the growing season.

2. Less sluffing of bed shoulders occurred thus reducing losses of seedlings from outside rows.

3. Overall cull percent dropped from 8 percent in 1986 to 6.3 percent in 1987 as determined from massive sampling of the crops as seedlings were processed. As Geotech was used in 1987 and was not used on the crop in 1986; most of the 1.7 percent difference is

assumed to be attributable to the influence of Geotech. This amounts to over $17,000 savings from the value of 600M+ seedlings from a 36MM crop, as the Geotech, plus application costs, amounted to approximately $10,000. The Geotech overpaid for its cost with plantable seedlings by about $7,000.

4. The overall quality of seedlings in 1987 was improved over the 1986 crop. Especially, the root systems and mycorrhizae were much improved. These improvements are hard to evaluate but they obviously added to the overall value of the seedling crop.

5. The shoulders of the beds were stablilized to the extent that very little loss of seedlings occurred from the shoulder rows.

6. Observations of the 1988 crop indicates that Goal applied before Geotech application may have extended preemergence weed control.

7. Good soil moisture enhances penetration of surface creating a thicker more durable crust.

III. Equipment used in application of Geotech:

1. The Geotech Sprayer

The solution of Geotech and water is of a heavy, tacky consistency and the relatively high rate to be applied required a high capacity applicator, higher than the normal sprayer used in the test in 1986. Hence, a search for such a piece of equipment was begun. The "scrounging" instinct that most nurserymen seem to possess led to a used water trailer in Woodlands that had a capacity of 700 gallons. A 45gpm high volume pump driven by a 5hp gasoline engine was purchased. By-pass, pressure regulators, manifold, and separate hoses for each 6-foot segment of the booms were assembled. An additional boom with nozzles aimed at the shoulders of each bed was mounted behind the first boom thus applying Geotech twice as heavily on shoulders as across the center of the beds.

2. Loading and Mixing Equipment

The tank had a capacity of 700 gallons. A fork lift lifted a 55-gallon drum of Geotech and poured it into the tank already containing approximately 600 gallons of water. This gave approximately 655

gallons total solution at about a 12 to 1 water to Geotech mixture. The Geotech mixes readily with water with only minor problems encountered with occasional nozzle clogging.

NOTE: The worst problem encountered was leaking from the open-topped drums as shipped to MBI, when drums were turned over to pour Geotech into the spray tank leakage (and in one instance the top came off) occurred around the tops. Please Mr. Borden ship Geotech in regular closed-top drums.

Walt Chapman
July 19, 1988