

OFF SEASON PLANTING

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Summer planting of bare-root slash pine was started in Florida in August of 1958 by McGregor who was working with the Southeastern Forest Experiment Station at Olustee, Florida.

This first planting was so successful it stimulated additional plantings the next two summers. The results of the first three summer plantings are summarized as follows:

<u>Date planted</u>	<u>Survival</u>	
	<u>Percent</u>	<u>Date</u>
8-20-58	85	7-6-60
12-15-58	74	7-6-60
7-28-59	96	7-7-60
12-15-59	97	7-7-60
7-12-60	87	5-15-61
12-15-60	87	5-15-61

All seedlings were grown in the regular seedbeds at the Olustee Experimental Nursery. The seed were sown in March and seedlings lifted and planted on the dates indicated. Summer planted seedlings were lifted from the bed, placed in a bucket, and carried directly to the field and dibble planted. Baling or storage of the seedlings was not incorporated into this study.

No summer planting was done in 1961 or 1962, but was resumed in 1963. Dr. McGregor recommended that future studies include baling and storage of seedlings, and handled, as nearly as practical, under production conditions. This is where the Florida Forest Service came into the picture. Mr. Lawrence Wilhite, U. S. Forest Service Research Forester, Olustee, Florida, contacted us regarding the production of seedlings for summer planting. We discussed the problems involved and agreed to fertilize a small area extra heavy to produce plantable size seedlings by July. The seedlings were approaching plantable size by mid-July but were extremely succulent: however, it was agreed to begin planting anyway. The following table summarizes the results.

Table 1.--Survival percent^{1/} of 1963 bare-root slash pine seedlings
planted in the flatwoods near Olustee

Storage time	Date planted						
	8-1	8-15 ^{2/}	8-29	9-12	9-26	10-10	12-12
	----- Percent -----						
None	89	6	86	92	87	85	98
Refrigerated 3 days	87	7	79	89	82	88	97
Non-refrigerated 3 days	79	11	70	88	69	86	97
Average	85	8	75	90	79	86	98

1/ Survival data taken in March 1965.

a/ Seedlings planted on 8-15, soil too wet to firm the soil around the roots of the seedlings.

These seedlings were planted in furrows in the flatwoods near Olustee, Florida, when actually they should have been planted on the level or on beds.

Storage conditions were as follows:

None -- seedlings were lifted, baled, and carried to the woods and planted that day.

Refrigerated 3 days -- seedlings were lifted on Monday morning, baled, and stored in a regular refrigerator for 3 days and planted on Thursday.

Non-refrigerated 3 days -- seedlings were lifted on Monday, baled, and stored on regular seedling storage racks at the nursery for 3 days and planted on Thursday.

These plantings were so successful that it was decided to plant seedlings on different sites. Mr. W. W. Hood, Forester for the State Armory Board at Camp Blanding, agreed to provide an extremely dry site (deep sand) and an intermediate site, and the flatwoods at Olustee would be planted again to serve as a check. Also, site preparation was varied. Tables 2 and 3 give the results for the 1964 plantings.

Table 2.--Survival percent^{1/} of bare-root slash pine seedlings planted
in 1964

Storage	Date planted						Average
	7-2	8-6	9-3	10-2	11-5	1-15	
----- Percent -----							
<u>PLANTED IN FURROWS (Olustee flatwoods)</u>							
Refrigerated 3 days	54	76	67	99	100	100	83
Non-refrigerated 3 days	84	80	65	97	99	100	83
Average	69	78	66	98	100	100	85
<u>PLANTED ON BEDS (Olustee flatwoods)</u>							
Refrigerated 3 days	89	93	84	92	99	100	93
Non-refrigerated 3 days	94	92	86	81	99	100	92
Average	91	93	85	87	99	100	93

^{1/} Survival data taken in March 1965.

Table 3.--Survival percent^{1/} of bare-root slash pine seedlings planted in

1964

Planted in	Storage	Date planted					Average
		7-9 ^{2/}	8-13	9-16	10-8	1-21	
		----- Percent -----					
Shallow furrow	Refrigerated 3 days	60	95	95	95	100	90
Deep furrow	Refrigerated 3 days	63	98	97	97	100	91
Average		62	97	96	96	100	90
Shallow furrow	Non-refrigeration 3 days	38	94	85	96	100	83
Deep furrow	Non-refrigeration 3 days	54	96	90	96	100	87
Average		46	95	88	96	100	85

^{1/} Survival data taken in March 1965.

^{2/} All seedlings planted on 7-9 were planted poorly due to the planter not being properly adjusted for a deep sand site. Also, the seedlings were small and very succulent.

The intermediate site turned out to be a wet weather pond, and became inundated during a hurricane in which more than 12 inches of rain came in about 36 hours. Therefore, this site was abandoned.

The summer planting program had reached the point to plant under production conditions. Mr. Hood at Camp Blanding agreed to plant 5,000 seedlings the first and third Tuesdays of July and September and each Tuesday in August. Mr. R. A. Bonninghausen, Chief, Forest Management, Florida Forest Service, agreed to plant 5,000 seedlings the second and fourth Tuesdays of July and September and each Tuesday in August.

Seed were sown in early March at Andrews Nursery to produce seedlings for this study. The seedlings were a little small and succulent for the first 2 or 3 planting dates, but matured nicely for the balance of the study. Tables 4 and 5 give the results of the 1965 plantings.

Table 4.--Survival percent^{1/} of bare-root slash pine seedlings planted at Camp Blanding in 1965

Date planted	Well planted	<u>Percent</u>	All planted
7-6	76		72
7-20	97		96
8-5	90		87
8-10	84		81
8-17	78		73
8-24	98		95
8-31	81		78
9-7	93		89
9-21	100		99

^{1/} All survival data taken October 5, 1965.

Table 5.--Survival percent^{1/} of bare-root slash pine seedlings planted at Withlacoochee State Forest in 1965

Date planted	: Planted Number	: Seedlings sampled Number	: Survival ----- Percent	: Mortality :(due to cattle) ^{2/} -----
7-13	5,000	300	75	25
7-27	5,000	300	77	19
8-3	5,000	300	67	22
8-10	5,000	280	77	19
8-17	5,000	300	69	12
8-24	5,000	270	59	15
8-31	5,000	300	59	15
9-14	5,000	300	99	1
9-28	5,000	300	98	2

1/ Survival data taken October 11, 1965.

2J Most mortality appeared to be due to poor planting and cattle grazing. Few seedlings showed signs of tip moth damage.

It was decided to include a test in South Florida this year. Mr. Ben Swendsen, Forester for Lykes Brothers, cooperated in this study. The seedlings were planted in Glades County. Table 6 gives the results.

With passed results being usually good, it was decided to encourage a small-scale production planting during the summer of 1966. Several organizations were invited to participate in the study. Orders were received and seed were sown in early-November, 1965, to produce seedlings for the 1966 summer planting. Generally, the seedlings were of good size and stiffness at the beginning planting date. (Tentative planting schedule follows).

Table 6.--Survival percent ^{1/} of bare-root slash pine seedlings planted by Lykes Brothers, Inc. in 1965

Block	Plot	Date planted										Mean
		7-6	7-10	7-17	7-24	7-31	8-7	8-14	8-21	8-28	Percent	
I	Chop	-	80	63	76	61	85	96	99	100		
	Rough	82	89	62	87	90	87	97	98	99		
	WEB	81	89	58	84	84	95	98	97	99		
II	Chop	-	48	-	80	76	90	99	96	100		
	Rough	82	81	71	81	71	95	95	99	100		
	WEB	76	85	61	64	58	85	91	98	100		
III	Chop	-	73	67	71	71	90	89	100	99		
	Rough	68	84	58	76	69	74	89	99	100		
	WEB	55	63	74	60	71	83	88	97	99		
All	Chop	-	67	65	76	69	88	95	98	100	82	
	Rough	77	85	64	81	77	84	94	99	100	85	
	WEB	71	79	64	69	71	88	92	97	99	81	
Average		74	77	64	75	72	87	94	98	100	83	

^{1/} Survival data taken September 2-3.

TENTATIVE PLANTING SCHEDULE

Cooperator	Planting dates	Species	Number
Eglin Air Force Base	June 23, 30 July 7, 14, 21, 28 August 4, 11, 18, 25 September 1, 8	Slash	50,000
Florida State Armory Board, Camp Blanding	August 2-5, 9-12	Slash	200,000
Florida Forest Service (BRSF)	June 23, 30 July 7, 14, 21, 28 August 4, 11, 18, 25 September 1, 8	Slash	40,000
Florida Forest Service (WSF)	June 21, 28 July 6, 12, 19, 26 August 2, 9, 16, 23	Slash Longleaf Sand	100,000 25,000 10,000
St. Regis Paper Company	June 21, 28 July 6, 12, 19, 26 August 2, 9, 16, 23, 30 September 6	Slash	100,000
Container Corporation of America	June 14 July 6, 19 August 8, 16 September 7, 20, 27	Slash Loblolly	50,000 50,000
Owens-Illinois Glass Company	June 14, 21, 29 July 12, 19, 26 August 2, 9, 16, 26	Slash	100,000
Hudson Pulp & Paper Company	July 19-22, 26-29 August 2-5, 9-12, 16-19	Slash	500,000
Avon Park Bombing & Gunnary Range	July 14, 21, 28 August 4, 11, 18, 25 September 1, 8, 15	Slash	20,000
Lykes Brothers	July 1, 15, 29 August 12, 26 September 9, 23	Slash S. Fla.	30,000
International Paper Company	August	Slash	55,000

Plots are being established to determine survival and some cooperators are measuring to determine height growth. Four percent of the seedlings in the study will be sampled.

Off season or summer planting -- Why should we, as nurserymen, be concerned about summer planting? Dividing the sowing and shipping process would require fewer people at any one time, but would require more people all the time. This would permit you to keep well trained employees all year and your requirements at any particular time would not be as great. It is getting harder and harder to get dependable employees for seasonal work. Actually, these people need employment all year long and this would be helping them and at the same time enabling you to have better trained personnel.

Discussion

Q. (Larsen) Were seedlings graded?

A. (Jordan) They were graded this year but not last year. They were graded very closely to Wakeley's grades.

Q. (Bentson) Basically, you are getting a greater rainfall in the summer than the winter?

A. (Jordan) I would say that the peak is in the summer.

Q. (Russell) In order to apply this somewhere else, you would have to look at your own local weather pattern and adjust it to that? Such as, Mississippi has a different rainfall than Florida.

A. (Jordan) We have a study at Eglin Field and at Blackwater River State Forest which are both dry sites. The results still look good, but I don't recommend that anybody go out and plant a million seedlings anywhere. This is still a study. I would recommend that you put in some studies and see what you get in your area.

Q. Are the dry sites sand hills or sandy soils?

A. (Jordan) Eglin AFB is in the sand hills and Florida's State Forest has a sandy soil.