FREEZING TEMPERATURES AFFECT SURVIVAL OF PLANTED LOBLOLLY AND SLASH PINE SEEDLINGS

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During the 1961-62 shipping and planting season, Louisiana was subjected to unusually low temperatures for an extended period of time. From January 9 through 14, statewide temperatures ranged from 32° to 0° F., during which time both tree planters and nurserymen had seedlings frozen in bales.

Because of lack of available information on expected survival, the following study was initiated. Regularly baled slash and loblolly seedlings were placed in cold storage at three temperature perature levels: 34°, 20°, and 0° F. After initial storage of 48 hours one bale of each species at each of the three temperatures was removed from cold storage and allowed to thaw gradually at air temperature. From each of the bales 100 slash and 200 loblolly seedlings were taken at random and outplanted according to standard field practice. The same process was repeated after 1, 2, 3, and 4 weeks of cold storage. Each treatment was then counted at 30-, 60-, and 90-day intervals after planting, with the 34° treatment as the control.

The results as shown below indicate that less than 48 hours of freezing may not appreciably lower seedling survival; a freeze of 1 week can materially reduce survival; and freezing beyond 1 week reduced survival to almost zero.

Length of storage and temperature	Survival of seedlings 90 days after planting	
	Slash	Loblolly
48 hours:	*(percent)*	*(percent)*
0	65	87
20	98	96
34	99	99
1 week:		
0	8	30
20	4	50
34	99	94
2 weeks:		
0	1	0
20	5	2
34	100	99
3 weeks:		
0	0	0
20	8	5
34	99	98
4 weeks:		
0	0	0
20	1	2
34	99	97

The data indicate that both slash and loblolly seedlings, which had been subjected to temperatures of 20^0 F. for 48 hours, could be outplanted with the expectation of good survival. Both species showed a very poor survival rate when subjected to 0^0 and 20^0 temperatures for longer than 48 hours. Cold storage at 34^0 for as long as 4 weeks had no adverse effect on survival.

Hodges' data (Tree Planters' Notes 47, August 1961) indicated that 48 hours' exposure to temperatures of 20^0 F. reduced loblolly and slash survival to almost zero. The present study revealed that slash and loblolly seedlings could be subjected to temperatures of zero and 20^0 for 48 hours with only slight loss of survival.

Tree planters and nurserymen who are anticipating subfreezing temperatures and have baled seedlings on hand should protect them. Baled seedlings should be stored in buildings or at least covered with plastic or canvas tarpaulins.

Special care should be exercised in thawing bundled seedlings because the root systems can be severely damaged by careless handling.

Of note is that an average of 96 hours was required for all bales of each treatment to thaw completely.

The authors believe unprotected slash and loblolly seedlings that have been subjected to temperatures of 20^0 F. and below for more than 48 hours should be discarded. The expected survival would not justify the time, labor, and equipment necessary in the outplanting operation.