

MOSS NOT NEEDED IN KRAFT-POLYETHYLENE BAGS DURING LOBLOLLY PINE SEEDLING TRANSPORT AND COLD STORAGE

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Kraft-polyethylene bags have proved highly satisfactory for packing and storing loblolly pine seedlings.² However, the amount of sphagnum moss needed in the bags during storage had not been determined. If the amount of moss was reduced from as much as 10 pounds per bag to a 1-pound handful or even to none at all, substantial savings would result. In addition, packaging at the nursery would be speeded up, more seedlings could be hauled in a truckload, and less storage space would be needed before outplanting. To determine how much moss was needed in bags stored in unheated warehouses or in cold storage, this study was conducted.

Method

The Ashe Nursery packed 135 kraft-polyethylene bags, each with 1,000 loblolly seedlings from a single seed source, and shipped them to Oxford, Miss., on January 9, 1964. Forty-five were packed without moss, 45 with a single handful of moss (1 pound wet weight), and 45 with 10 pounds of wet moss. Eighteen bags packed by each method were placed in a cold storage room (30° to 55° F.) and 27 in an unheated warehouse.

After 3 weeks, 50 seedlings from three bags of each of the 6 packing-storage combinations were outplanted. This procedure was repeated after 4, 6, 8, 10, and 12 weeks for those in cold storage, and continued for 14, 16, and 18 weeks for those in the unheated warehouse. (The cold storage facility was not available after April 3.) Once a bag was opened, it was

¹ The author is in charge of the project on management of erosive watersheds, maintained at Oxford, Miss., in cooperation with the University of Mississippi.

² Ursic, S. J. Kraft-polyethylene bags recommended for packing and storing loblolly seedlings. U.S. Forest Serv. Tree Planters' Notes 57: 23-28. illus. 1963.

not used again in the study. Planting dates were January 31, February 6, February 20, March 6, March 20, April 3, April 17, May 1, and May 15, 1964.

Results

Without moss, seedlings were held in cold storage for 12 weeks without adverse effect on first-year survival (table 1). Moss helped the survival of seedlings stored more than 8 weeks in the warehouse, but 1 pound was about as effective as 10 pounds. No moss appears to be needed in the bags if the roots are moist when packed and the seedlings are kept cool (air temperature 60 ° or less).

TABLE 1.--First-season survival of seedlings after packing with different amounts¹ of moss

Storage method and duration (weeks)	Packing method		
	Without moss	1 lb. moss	10 lbs. moss
Cold storage:	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
3.....	95	88	93
4.....	99	99	95
6.....	65	95	58
8.....	97	96	97
10.....	86	79	95
12.....	91	93	71
Warehouse:			
3.....	87	92	94
4.....	95	93	93
6.....	93	86	90
8.....	97	99	92
10.....	73	75	94
12.....	39	35	56
14.....	11	17	37
16.....	3	23	18
18.....	0	0	0

¹ Weights per 1,000 seedlings packed in kraft-polyethylene bags.

Survival of the cold-stored seedlings at the end of the first growing season was significantly better (0.01 level) than that of those stored in the unheated warehouse. During the first 12 weeks survival of the seedlings held in cold storage was 8 percent better than for those stored in the warehouse.

Packing method did not have a significant effect on seedling heights. But, seedlings held in cold storage were 0.13 foot taller (significant at 0.01 level) than those stored in the warehouse.

Bag temperatures in the warehouse were taken periodically from April 5 to May 14. During this time the seedlings got as warm as 85 °inside the bags. After 14 weeks of storage the air temperature averaged 72°. Maximum daytime temperatures were consistently in the 80's. The seedlings began to spoil at these temperatures. First they became moldy, then the tops began to rot. Throughout the storage period there was plenty of moisture in the bags since polyethylene is highly resistant to the passage of water.