

A COMPARISON OF THREE PACKAGING METHODS FOR SLASH PINE SEEDLINGS

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Forest tree nurseries in North Carolina have dipped seedling roots in a clay slurry to prevent root drying since 1963 (Bland 1964, Davey 1964).

This method has replaced the conventional practice of packaging the seedlings in wet sphagnum moss. Notable seedling success has also been obtained in Mississippi by placing barerooted seedlings in Kraft-polyethylene bags (Ursic 1964). Seedlings packed in this manner have been stored up to 8 weeks in a warehouse with no resultant reduction in survival (Williston 1965).

A study was conducted during the 1965-66 planting season to determine the relative effectiveness of clay dip packaging in relation to the conventional method of packaging with sphagnum moss.

On a smaller scale, the packaging of barerooted seedlings in sealed K-P bags was evaluated. Specifically, answers were sought for these questions: (1) How does packaging technique affect the initial survival of slash pine seedlings following outplanting; and (2) How does the length of storage after packaging affect survival?

Procedure

Study seedlings were lifted and processed at Union Camp's Tree Nursery, Bellville, Ga., four different times during the 1965-66 planting season. The dates of lifting were Nov. 23 and Dec. 21, 1965, and Jan. 4 and 11, 1966. At each lifting, three bales of 2,000 seedlings each were packed with sphagnum moss, three bales of 2,000 seedlings each were packed in a clay slurry, and approximately 1,000 seedlings were packed in a K-P bag.

The moss-packed seedlings were processed at the nursery in the conventional manner, using wet sphagnum moss and regular seedling-wrap paper (Union Camp Scutan 502). The clay-packed seedling roots were dipped in a kaolin slurry, covered with an absorbent inner-wrap material (Chicopee Viskon) and then packaged in regular seedling

wrap paper. The K-P packed seedlings were placed, barerooted, in a polyethylene-lined Kraft multiwall bag, the liner sealed airtight, and the Kraft bag stapled closed at the top. The processed seedlings were shipped immediately to three different geographical areas and placed in storage.

All seedlings were stored on outside, shaded racks after reaching the planting areas. No refrigerated storage was used. During storage moss-packed seedlings were thoroughly watered every 3 to 5 days. Clay-dipped and K-P bagged seedlings received no additional moisture after leaving the nursery.

All outplantings were made on Jan. 18, 1966. The three areas of planting were Volusia County, Fla., Long County, Ga., and Burke County, Ga. Seedlings lifted on each of the four dates and packed with either clay or moss, were planted at each of these locations. The seedlings packed in K-P bags were all planted at the Volusia County, Fla., site. All seedlings were machine-planted.

Results

Survival was checked during the week of June 3, 1966. Survival calculations were based on at least 200 seedlings for the clay and moss treatments and 100 seedlings for the K-P treatments. Counted seedlings were selected at random within each treatment at the three locations.

Survival rates are shown in the following table:

Weeks of Storage	Clay Pct.	Moss Pct.	K-P bags Pct.
1	93.4	90.2	88.0
2	91.2	94.4	96.0
4	89.3	89.7	82.0
8	62.5	70.3	85.0

An analysis of the results with clay- and moss-packed seedlings indicated no significant difference

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between the two packing methods. In regard to storage period, 1, 2, and 4 weeks were, not different at the .05 level of probability. Survival between 4 and 8 weeks storage was different at the 0.1 probability level. ²

Seedlings packed in K-P bags survived very well regardless of storage period. As these seedlings were planted at only one location, however, the results could not be compared to the other treatments.

All methods of packing gave satisfactory survival results with up to 4 weeks storage. Survival at 8 weeks storage fell below acceptable limits with clay and moss but remained high with K-P bags.

Considering that clay is as efficient as moss in maintaining seedling viability, it seems to offer certain advantages over moss:

1. Clay-packed bales require no watering after packing for at least 4 weeks.
2. It is unnecessary to have water in the planting machine hoppers or buckets when planting clay-packed seedlings.
3. Clay lends itself more to a mechanized nursery operation than does moss.
4. Clay protects seedling roots before and after planting.

²Based on Duncan's Multiple Range Test.

The performance of the K-P bag packed seedling indicates that this method may have merit, particularly when longer periods of storage are anticipated.

The cost of packaging is approximately \$110 and \$130 per million seedlings for the moss and clay dip methods, respectively. The cost of K-P pack aging varies widely depending on the type of bag and amount of additional wrapping, if any, done at the time of packaging. The cost of the bag alone is approximately \$100 per million seedlings. The utility of the latter two methods, of course, is reflected in increased labor savings after the seedling have left the nursery.

Literature Cited

1. Bland, W. A.
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3. Ursic, S. J.
Packing, shipping, and storing loblolly seedlings in Kraft-polyethylene bags. Proceedings Region 8 Forest Nurserymen's Conference 1964.
4. Williston, H. C.
Moss not needed in Kraft-polyethylene bags during loblolly pine seedling transport and cold storage. Tree Planters' Notes No. 72, August 1965.

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