

SEEDLING STORAGE IN REFRIGERATOR CARS

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For 2 years foresters on the Yazoo-Little Tallahatchie Flood Prevention Project have been storing loblolly pine seedlings in railroad refrigerator cars during the winter planting season to keep them from overheating or freezing. The seedlings are stored in the kraft- polyethylene bags or Forest Service bales in which they arrive from the nursery. They are held for varying periods before planting, on a first-in, first-out basis.

In 1963, 25,445,000 seedlings were successfully handled at a cost of \$0.22 per thousand. Nine cars were required for an average of 96 days. An added innovation was the moving, by refrigerator car, of nearly 2 million seedlings from the Ashe Nursery near Hattiesburg to Holly Springs in northern Mississippi.

The cars were obtained from the Illinois Central Railroad. Each had 1,972 cubic feet of space and held a maximum of 750,000 seedlings. An average of 2,433 pounds of ice was used per car-week in 1963 at a cost of 1.17 cents per pound. In 1962, when the winter was much warmer, 5,000 pounds of ice was used per car-week. The average cost of the storage racks, which had to be built, was \$166 per car--\$65 to \$104 was for materials. The racks, which can be reused year after year, consisted merely of 1-inch boards cut 8-1/4 feet long (the width of the cars) and supported in tiers on 2 x 4's nailed to the sidewalls. Car and siding rentals were negotiated and may vary from one railroad to another.

The storage cost per thousand depends largely on the number of seedlings stored during the planting season. Nearly 7 million seedlings were stored in one car (mostly for short terms) at a cost of \$0.105 per thousand.

Thermometers were installed in each car, and thermocouples were inserted in bags in four cars to determine the efficiency of the method. Car temperatures ranged from 26° to 60° F.; the average low was 31°, and the average high was 53°. Temperatures in the middle of the bags of seedlings averaged 2° higher than those just inside the bags and 6° higher than the car temperature. Bag temperatures were in the forties two-thirds of the time, and 68° was the highest recorded. High car temperatures were recorded in late March when maximum air temperatures averaged 82°. Bag temperatures were much slower to change than car temperatures.

Cars afford low-temperature seedling storage where cold-storage plants are not available; in some towns they may be cheaper than other commercial facilities. They provide excellent protection against freezing and good protection against high temperatures. On most sidings access for loading and unloading is convenient.

There are some disadvantages. It is difficult to get ice service in very small towns. The inside temperature fluctuates more than is desirable, and salting the ice is necessary when the outside air gets much above 50° F. Uniformity of bags or bales is essential in order to best utilize space. It is difficult to load the cars so that the seedlings stored first can be planted ahead of those newly arrived from the nursery.

The cost can compare favorably with that of other refrigerated storage. It depends on how much ice the car uses and the size of the cold storage room available for rental. Many coldrooms are unnecessarily large and command a high rental for the planting season. On the Yazoo-Little Tallahatchie Project, refrigerator cars were more economical where less than 7 million seedlings were handled at a single point and the only coldstorage facility was larger than car-size. The advantage of the cars was especially notable in the cold winter of 1963.

¹ A project on management of erosive watersheds is maintained at Oxford, Miss., in cooperation with the University of Mississippi. 20 Tree Planters' Notes