

FIELD PERFORMANCE OF CONTAINER-GROWN SALIGNA EUCALYPTUS SEEDLINGS NOT AFFECTED BY PACKING/STORAGE TREATMENT

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Bareroot saligna eucalyptus (*Eucalyptus saligna*) seedlings for reforestation are grown at the Hawaii Division of Forestry Nursery and shipped throughout the State. Seedlings of this species do not undergo a dormant period and, therefore, cannot be stored. Bareroot seedlings must be planted within 1 or 2 days from the time they are lifted or survival and growth rates are greatly reduced. Consequently, they cannot be packed and held over the weekend for planting on Monday. With Mondays reserved for packing seedlings, tree planting can only be accomplished 4 days per week.

Saligna eucalyptus seedlings have been grown in tube containers and successfully outplanted. However, these seedlings were shipped in the containers, which were not removed until the time of planting. The seedlings were not stored.

To make possible a 5-day planting week, a method was sought that would allow storage of packed container-grown seedlings for 3 or 4 days without loss of survival and growth potential. A wax-lined cardboard box was chosen for packing the seedlings. The cardboard insulates the seedlings from exposure, and the wax prevents deterioration of the box. The cardboard boxes are strong and can be palletized for easy handling. The effects on survival and growth rates of packing

and storing techniques were studied in the test reported here.

Materials And Methods

Saligna eucalyptus seedlings were grown in containers known as Hawaii Dibbling Tubes.¹ The 15-inch tall, 5-month-old seedlings were watered, removed from the tubes, and packed in the wax-lined cardboard boxes. Seedlings were packed horizontally with tops overlapping the roots toward the box ends. Each packing box was designed to hold 200 seedlings, but the test required that only 60 seedlings (one treatment) be placed in each box. To simulate conditions within a fully packed box, a piece of cardboard was taped over the top of the seedlings.

The lengths of time the seedlings were left in boxes were 1, 2, 3, and 4 days. The sealed boxes were placed in a shaded area. Temperatures inside the boxes were taken periodically each day. The control seedlings (0 days in the box) were also packed horizontally, but the box was left open.

Once the control seedlings were placed in the box, seedlings of all treatments were taken to the

field and planted. Thus, the seedlings were packed in cardboard boxes for up to 4 days without sacrificing survival and growth rates in the field.

field and planted. Thus, the seedlings were packed on different days, but planted on the same day. Planting was done using a dibble.

The sequence of packing seedlings in boxes for 0, 1, 2, 3, and 4 days and planting was carried out at two different times. Therefore, there were 10 treatments combinations—5 packing x 2 planting dates, May 14 and 28, 1976. For planting, the 10 treatments (plots) were arranged in a randomized block design with four replications. Each plot contained 15 seedlings.

The planting tests were most conveniently scheduled during the hot, dry time of the year at Waimanalo, Oahu, Hawaii. Because seedlings would not normally be planted under these adverse conditions, they were irrigated. Seedlings in the first planting were irrigated 2 to 3 times per week; those in the second planting were irrigated 2 to 3 times per week; those in the second planting were irrigated only 1 to 2 times per week. The reduced irrigation was intended to determine the effects of increased moisture stress on survival and growth rates.

Seedlings in each treatment combination were examined at the time of planting and biweekly for 2 months. Seedling height was recorded to the nearest 1/2 inch. Vigor and any evidence of dieback were also recorded.

¹A dibbling tube is a single-cell container, 3.4 cubic inches in volume, and measuring 5 inches long and 1 1/8 inch inside top diameter (12.7 cm long, 2.9 cm diam., 55.7 cm³ vol).

Table 1. — *Field performance after 2 months of saligna eucalyptus seedlings stored in cardboard boxes*

Planting date and days stored	Survival ¹	Height growth	High vigor	Dieback
	<i>Percent</i>	<i>Inches</i>		<i>Percent</i>
May 14				
0	100	2.9	97	1.7
1	98	2.8	97	3.4
2	95	3.6	96	7.0 ³
3	98	3.2	97	1.7
4	100	3.0	92	1.7
May 28 ²				
0	97	2.0	79	5.0
1	98	2.5	91	3.0
2	100	2.4	80	0.0
3	95	2.1	68	0.0
4	98	2.3	80	2.0

¹Basis of 60 seedlings per treatment.

²Reduced irrigation regime.

³Seedlings in one plot were unintentionally subjected to moisture stress.

Results And Discussion

Saligna eucalyptus seedlings that were kept for up to 4 days in sealed cardboard boxes looked as fresh as control seedlings when removed for planting.

Temperatures within the boxes varied between 28° and 32° C and were within $\pm 1^\circ$ C of outside temperatures.

Results of the field plantings indicate that survival, height growth potential, and stem dieback of

seedlings (table 1) are not appreciably affected by storage for 4 days under test conditions. Seedling performance was more affected by soil moisture conditions than by packing treatments. Survival was 95 percent or higher for all seedlings, regardless of length of storage or planting time. After 2 months, there were no significant differences (5 percent level) in seedling height growth or vigor between treatments for either planting. However, seedling height growth and vigor were significantly greater (5 percent level) for seedlings in the first planting than for those in the second planting, apparently because the first planting was more frequently irrigated. Stem dieback was minimal for seedlings in all treatments in both plantings.

This method of handling container-grown *saligna eucalyptus* appears to meet all the requirements. Sealing the boxes fulfills State Department of Agriculture regulations for shipping plant material between islands. Seedlings can be easily handled, and can be stored in boxes for at least 4 days without sacrificing survival or growth rates. The desired aim of a 5-day work week for the tree planting program can thus be achieved.