TABLE 2.—*Comparison of condition of slash pine seed by standard cracking procedure, radiography, and fungal isolations*

Seed lot	Standard test data[1]		Radiographic test data[2]			Isolation frequency of *Fusarium solani*
	Full	Empty	Sound	Seedbug-damaged	Unsound	
	Percent					
A[3]	89	11	39	56	5	8
B[3]	93	7	76	10	14	8
C[3]	91	9	75	14	11	3
D	86	14	84	7	9	2
E	88	12	87	0	13	3
F	97	3	93	2	5	1
G	99	1	98	0	2	0

[1]Determined in standard tests by cracking seed which did not germinate. Data provided by Eastern Tree Seed Laboratory.

[2]Determined by microscopic examination of X-rayed seed and by observation of the same seed on radiographs.

[3]Seed lots in which extensive mold was observed in germination test trays.

3. _____
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Tubeling Propagation of Eucalyptus Appears Successful in Texas Test

by

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2 Spiral wound kraft paper tubes, 10 inches long by 1.5 inches in diameter, wall thickness 0.06 inches, available commercially.

Containerized seedlings offer an attractive alternative to planting barerooted stock in species, such as eucalyptus, which undergo no dormant growth phase. An objective of this study was to investigate the feasibility of planting eucalyptus seedlings in paper tubes (tubelings). The species and hybrids tested were: (1) Eucalyptus tereticormis x maculata. (2) E. camaldulensis Dehn, (3) E. citriodora Hook, (4) E. grandis (Hill) Maiden. (5) E. saligna Sm.

Methods

Plants grown from seed in greenhouse flats during the winter of 1972 were transplanted into paper tubes[2] about 5 weeks after germination. The tubelings remained in the greenhouse until April 4, 1972 at which time they were trans planted to the field. Fifty plants from each of the five species were out-planted in a randomized complete-block design at a spacing of 9 x 9 feet. The planting site had been cleared, burned, and disked prior to out-planting. Tubelings were planted by extracting a core of soil the proper size and depth and inserting the labeling into the hole.

Based on results of elemental analysis of the soil (Nacogdoches series), dolomite lime (1 lb. per tree) and 10-20-10 (.25 lb. per tree) were applied, in a circle 3 feet in diameter, to half the plants of each species.

Final height and survival measurements on the plantation were taken in late September 1972; therefore; frost hardiness was not evaluated.

Results

There were significant differences in survival among species (table 1), E. *grandis,* with 0 survival, and *E. citriodora,* with 79 percent, being the extremes. Rabbit browsing was a major cause of losses. Browsing did not appear to be related to location in the planta-

TABLE *1.-Survival of eucalyptus tubelings at the end of the first growing season*

Species of Eucalyptus	Alive	Survival
	Number[1]	*Percent*
citriodora	39	79
camaldulensis	5	10
tereticormia x malculata	10	20
saligna	0	0
grandis	0	0

[1]Calculated x^2 for test of independance was 91.06 which indicated a significant difference in survival among the species at the .01 level.

lion, but varied widely with species. There was no evidence of browsing on *E. citriodora,* the losses of this species were assumed to he related to drought or inadequate root penetration through the tube into the surrounding soil. If such losses were at a similar level in the other species, preferential browsing evident on plant stems would account for most survival differences.

Figure 1.—Lateral root growth of eucalyptus tubelings examined near the end of the growing season.

All surviving species responded positively to fertilizer application, but only *E. citriodora* had adequate survival for statistical evaluation. The average height increments of fertilized and unfertilized E. *citriodora* plants were 9.76 and 4.43 inches, respectively. This difference was significant at the .05 level of "t."

The tubeling method of propagating eucalyptus appeared successful for the species tested. Vertical taproots of most seedlings extended below the bottom of the tubes at the time of transplanting. Horizontal root growth was not restricted and lateral roots did not remain encased in tubes after transplanting (fig. 1). The long-range effect of tubes on root growth needs further evaluation.

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