

pectedly delayed. landowners should not hesitate to sow in February or early March.

### Literature Cited

1. Campbell, T. E.  
1970. Spring sowing of longleaf pine reduces risk of seedling clipping. J. For. 68: 658-6739
2. Campbell, T. E.  
1971. Cottontail rabbits clip young longleaf pine seedlings. USDA For. Serv. Res. Note SO-130.2 p. South. For. Exp. Stn., New Orleans, La.
3. Derr, H. J., and Mann, Jr., W. F.  
1959. Guidelines for direct-seeding longleaf pine. USDA For. Serv. Occas. Pap. 171. 22 p. South. For. Exp. Stn., New Orleans, LA.

TABLE 2.—Deviations of monthly precipitation from 19-year means recorded on individual study areas

Month	Year of study					
	1964	1965	1967	1969	1970	1971
	..... Inches .....					
May .....	-2.25	-2.24	+ 3.45	+ 0.24	-0.34	+ 2.34
June .....	-2.59	-1.15	-2.37	-1.46	+ .59	-1.02
July .....	-1.72	-1.25	+ 2.76	+ .53	+ 2.03	-.38
August .....	-1.51	-1.27	+ 1.16	-3.26	-.85	-1.48
September .....	+ .62	+ 3.69	-3.25	-2.87	-1.62	+ .43
October .....	-2.40	-2.96	+ 3.30	-1.14	+ 6.76	-1.74
Total	-9.85	-5.18	+ 5.05	-7.96	+ 6.57	-1.85

# Eraser fir seed storage and germination—some new data

by

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samples of this seed have been sent to the Department of Seed Investigations, New York State Agricultural Experiment Station, Geneva, N.Y. for testing. Results of their germination tests are shown in table 1.

Literature Cited:

1. Forest Service  
1948. Woody-Plant Seed Manual. USDA Misc. Publ. 654. 416 p.
2. Speers, Charles F.  
1967. Insect infestation distorts Fraser fir seed tests. Tree Planters' Notes 18: 19-21.

The tests indicate that Fraser fir with a 6 to 8 percent moisture content can be stored in closed containers for 13 years or more with little loss in germinative capacity.

The Woody-Plant Seed Manual (1) indicates that some species of true fir seed are rather perishable and cannot be stored at low temperatures in airtight containers for more than 3 or -1 years, while other species will retain their viability for as long as 5 years if stored at temperatures of 36°F or lower.

The data on Fraser fir, *Abies fraseri*, in the Seed Manual is minimal. This is probably due to "southern balsam's" formerly minor importance as a solely mountaintop-protection species. With the recent advent of a rapidly expanding million-dollar Christmas tree industry in the Southern Appalachians, and Fraser fir as the premium tree, increasing attention is being given to the investigation of some heretofore unrecorded characteristics of the species.

We started collecting Fraser fir seed in 1960 and have continued to collect cones in each year when there was a good crop. Following the 1960, 1965, and 1969 bumper crop years, we placed seed with a 6 to 8 percent moisture content (2) in tightly closed glass jars or polyethylene bags and stored it at 0°F. At intermittent intervals,

TABLE 1.—Germination of Fraser fir seed with a 6 to 8 percent moisture content after storage in tightly closed containers at 0°F.

Seed year	Germinative capacity				
	Initial	1967	1969	1971	1973
	Percent				
1960 .....	58 <sup>1</sup>	52	47		47
1965 .....	60	60	65		61
1969 .....	67			61	65

<sup>1</sup>Test conducted by the Eastern Tree Seed Laboratory, USDA Forest Service, Macon, Ga. All other tests conducted by the Department of Seed Investigations, New York State Agricultural Experiment Station, Geneva, N.Y.