

STORING SPRUCE PINE SEEDS

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Spruce pine (*Pinus glabra* Walt.) is a minor southern pine species scattered among hardwoods and other pines along stream banks or rich moist hummocks of the Coastal Plain from South Carolina to northern Florida, and west to southeastern Louisiana. The species is useful for both pulpwood and sawtimber, but little artificial regeneration has been accomplished because of the lack of information on basic seed properties. Cone maturity and seed stratification needs now have been reported (4, 6). Preliminary results of storage tests indicated in 1967 that spruce pine seeds could be more difficult to store than other species of southern pine (3). So, in this study, spruce pine seeds were stored for periods up to 10 years to gain more detailed information.

Methods

Cones for the study were collected in the fall of 1967 in Forrest County, Miss., and seeds were stored at a temperature near freezing and at a moisture content of 6 percent until used for the study. In the spring of 1968, seed lots were cleaned of all empty seeds by air separation. Although flotation in ethanol effectively removes empties, the storability of spruce pine seeds can be reduced if the flotation is done prior to long-term storage (2). The lots were then divided to provide for three replications of 12 storage conditions:

Spruce pine seeds can be stored for 10 years with no loss of viability at 0° F and with moisture contents as high as 15 percent.

Table 1.—Viability of spruce pine seeds after 1, 3, 5, and 10 years of storage¹

Storage conditions		Germination after			
Temperature	Moisture content	1 year	3 years	5 years	10 years
°F		----- percent -----			
0	6	89	91	94	92
	9	92	92	93	91
	12	91	92	94	90
	15	90	92	89	90
25	6	88	88	85	65
	9	90	90	84	56
	12	90	91	83	43
	15	93	83	54	25
34	6	88	82	74	3
	9	86	84	56	2
	12	90	70	36	1
	15	76	34	11	0

¹Initial viability for seeds adjusted to 6, 9, 12, and 15 percent moisture levels was 87, 86, 86, and 87 percent, respectively. The staggered line indicates the storage conditions at which important reductions in viability occurred.

moisture contents of 6, 9, 12, and 15 percent, and temperatures of 0°, 25°, and 34° F. Then, initially and after 1, 3, 5, and 10 years, 200 seeds from each replicate were stratified for 1 month, and then given 28-day germination tests. Germination is expressed on a sound seed basis.

Results and Discussion

Viability of spruce pine seeds held 10 years at 0° F was 4 percentage points higher than when placed in storage (table 1), indicating that seeds of this species store well. However,

those held 34° F were essentially nonviable after the same 10-year period regardless of seed moisture content. At 25° F, germination varied by moisture content, with 12 and 15 percent moisture levels resulting in lower viability than 6 and 9 percent.

The decline in viability of spruce pine seeds stored at 34° F was more rapid than for other southern species, such as longleaf (*P. palustris* Mill.) and sand (*P. clausa* (Chapm.) Vasey) pine (1, 5). Important reductions in viability occurred after 1 and 3 years at 34° F and the higher seed moisture

levels. After 5 years at 25° F, only at 15 percent seed moisture content was there a major loss in viability.

The results are comparable to those of other southern pines in that long-term storage is possible at 0° F. temperatures. Although low seed moisture content is important in preserving viability of all southern pines, moisture content seems less important in storing spruce pine seeds. Recommended storage conditions for spruce and other southern pine seeds continue to be subfreezing temperatures and moisture contents of 10 percent or less.

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