THE EFFECT OF AIR DRYING OF CONES UPON SEED GERMINATION

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Some seed extractories use well-ventilated but unheated drying sheds to reduce the moisture content of cones and to force them to open. Full cone opening may be delayed for a considerable period if cool or wet weather occurs during the drying. Often, this drying period is also prolonged because temporary cone storage becomes necessary when the quantity of cones received is greater than the capacity of the cone processing plant. The interval between cone collection and extraction may be as long as 3 to 4 months.

Previous experiments[2] have demonstrated that seed will deteriorate during exposure to variations in temperature and moisture after extraction from the cones. In the air drying or temporary storage of nonserotinous cones, such as slash (Pinus elliottii Engelm.), loblolly (P. taeda L.), and longleaf (P. lambertiana Dougl.) pines, the seed is exposed to all atmospheric variations when the cone brackets are open. There is a possibility that considerable deterioration of the seed occurs from the time of cone collection until the cones are air dried sufficiently to permit extraction.

In 1956, the Region 8 Tree Seed Testing Laboratory and the Florida Forest Service worked on a cooperative study to determine the effect of prolonged air drying of the cones upon seed germination. Florida collected the cones and the germination tests were made at the Region 8 laboratory. All the cones were collected from a single slash pine tree in each of two counties. One-half of the cones was kept by the collectors and subjected to the usual air-drying methods. The remainder of the cones were immediately shipped to the seed laboratory where they were placed in wire baskets in front of an air conditioner. The temperature was maintained by the air conditioner at 72° F. In 4 days, the cones had opened and the seed was immediately tested for germination. The cones had opened in the Florida air-drying shed at the end of 6 weeks and the seed was sent to the laboratory for germination tests.

In 1957, the Stuart Nursery at Pollock, La., cooperated in a similar study. Cones collected from single trees of longleaf and loblolly pines were handled in the same way. Two weeks of air drying were required by Stuart.

The results of the 1957 and 1958 studies are given on the following page.

The Florida tests showed no deterioration as a result of prolonged air drying. However, considerable loss occurred with the air drying of the Stuart longleaf and loblolly cones.

The deterioration of seed in open storage while waiting for extraction and cleaning will vary with species. As an illustration of this, the data for figure 1 was taken from the records of the 1959 testing season of the seed laboratory. Presumably, the date of receipt of the sample at the seed laboratory is an approximate indicator of the time of extraction of fresh seed. Late sample receipt means late extraction at the nursery. Slash and longleaf pine cones are usually collected in September, while loblolly is collected in October.

[1] Operated in cooperation with the Georgia Forestry Commission, Georgia Forest Research Council, and Southeastern Forest Experiment Station.

[2] Crocker, W. Life Span of Seeds. Bot. Rev. 4:235-274. 1938.
Barton, L. V. Relation of Certain Air Temperatures and Humidities to Viability of Seeds. Contrib. Boyce Thompson Inst. 12:85-102. 1941.

The most sensitive seed to air storage of cones is longleaf, with loblolly next, and slash the least sensitive. Since the effect on longleaf can be quite pronounced, it points up the importance of handling longleaf extraction at the earliest possible moment. The potential loss from delayed handling of slash may not be as great as with longleaf and loblolly. The comparative sensitivity of these species should be considered in the extraction schedule.

TABLE 1.--Germination of stratified and unstratified seed from air-dried cones

	Slash pine		Loblolly pine		Longleaf pine
	Unstratified	Stratified	Unstratified	Stratified	Unstratified
1956 Collection by Florida					
County No. 1					
	Percent	*Percent*	*Percent*	*Percent*	*Percent*
Extracted by Region 8 laboratory.....	89	86			
Extracted by Florida....	96	90			
County No. 2					
Extracted by Region 8 laboratory.....	97	94			
Extracted by Florida....	92	95			
1957 Collection by Stuart Nursery					
Extracted by Region 8 laboratory.....			89	90	67
Extracted by Stuart Nursery.....			84	71	57

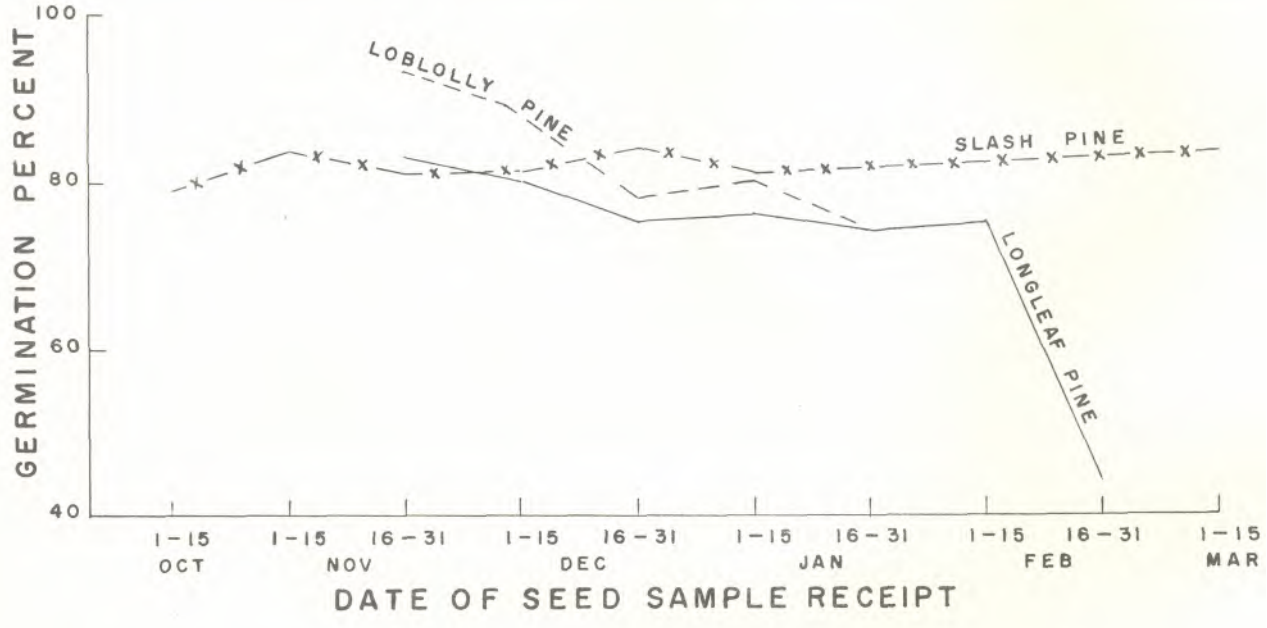

Figure 1.--Seed germination as related to time of extraction--date of sample receipt approximates date of extraction