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STRATIFICATION HARMFUL TO SOME LOBLOLLY AND SLASH PINE SEED

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Seed dormancy plays an important role in nursery practices. The most critical time in the nursery operation is the germination period when high winds, heavy rains, unseasonable cold weather, and damping-off can cause serious losses. The primary aim of stratification is to shorten the germination period by overcoming seed dormancy. To accomplish this most nurserymen are willing to sacrifice some of the total germination.

Loblolly (Pinus taeda L.) and slash pine (Pinus elliottii Engelm.) seed sometimes have an inherent dormancy at maturity. Subsequent handling in seed extraction and storage may accentuate this dormancy, which cannot be detected by visual examination. The exact nature of dormancy is not known but there are apparently no racial differences in dormancy in either species. Seed samples sent to the Seed Testing Laboratory come from all parts of the range of both species and attempts to correlate seed dormancy and geographic source have been unsuccessful.

Since the first application by Barton 2 in 1927 of cold, moist stratification to break dormancy of southern pine seed, this practice has become generally used. All seed lots of a species are usually stratified or not stratified, as decided by the nurseryman according to his past experience.

However, Wakeley 3 has reported that stratification of all lots of a species has resulted in no benefit with some lots and actual loss of germination with others. He has recommended that only those seed lots be stratified that show a beneficial response as determined by paired germination tests of stratified and unstratified seed.

1 / In cooperation with the Southeastern Forest Experiment Station, Forest Service, U. S. Department of Agriculture, the Georgia Forestry Commission, and the Georgia Forest Research Council.

2 / Barton, L. V. Hastening the Germination of Southern Pine Seed. Jour. Forestry 26: 774-785. 1928

3 / Wakeley, P. C. Planting the Southern Pines. U. S. Dept. Agr. Monog. 18, 233 pp., illus. 1954.

In an attempt to demonstrate the wisdom of preliminary, paired germination tests, 67 lots of loblolly pine seed and 26 lots of slash pine seed, both stratified and unstratified were tested in 1956. In 1957, 74 lots of loblolly pine seed and 41 lots of slash pine seed were similarly tested. The seed was stratified in wet peat moss for 30 days at 34-38°F. The mean germination percentage was determined by tests of 100 seed replicated eight times on a medium composed of half sand and half vermiculite.

The effects of stratification were classified as follows (table 1):

Benefited- -Increased germination 6 percent or more or decreased the number of days to reach maximum germination by 6 days or more.

Injured--- Decreased total germination by 6 percent or more or increased the number of days to reach maximum germination by 6 days or more.

Unaffected--Change of less than 6 percent in total germination or less than 6 days to reach maximum germination.

Table 1. --Effect of stratification upon the germination of loblolly and slash pine seed

Species and year tested	Seed lots tested	Effect of Stratification		
		Benefited	Injured	Unaffected
	<u>Number</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>
Slash pine:				
1956	26	15	35	50
1957	41	<u>15</u>	<u>66</u>	<u>19</u>
Average		<u>15</u>	<u>54</u>	<u>31</u>
Loblolly pine:				
1956	67	48	7	45
1957	74	<u>65</u>	<u>9</u>	<u>26</u>
Average		57	8	35

Over the 2 year period 57 percent of the loblolly lots and 15 percent of the slash lots benefited by stratification. An average of 54 percent of the slash and 8 percent of the loblolly were injured. A decision to stratify or to not stratify all lots of either species is not justified, especially in view of the chronic short-ages of the seed of both species. The most efficient use of available supplies requires a stratification decision based upon individual lot characteristics. The need for stratification can only be determined by comparative tests of unstratified and stratified seed.