

POLYETHYLENE BAG STORAGE VERSUS STRATIFICATION IN SAND AS A PREGERMINATION TREATMENT FOR WHITE AND LOBLOLLY PINE

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Ever since Barton (1928) pointed out the feasibility of stratification as a means of breaking dormancy of pine seeds, different methods and media have been sought to simplify and improve pretreatment methods. Standard methods include mixing seed with sand of different textures or storing in peat or other moist media. Recent work has indicated that equally satisfactory results can be obtained by storing smaller lots of moistened seed in polyethylene bags (Hosner et al., 1959; Lehto, 1960; Malac, 1960).

This paper describes the results of storing larger lots of seed in polyethylene bags as contrasted to stratification in sand.

Procedure

Similar 25-pound lots of white and loblolly pine seed were presoaked for 48 hours in tapwater, then placed in polyethylene bags, a coarse sand mixture, and a fine sand mixture. The coarse sand contained 98.9 percent by weight of individual particles larger than 0.25 mm. in diameter. The fine sand contained 10.3 percent of particles larger than 0.25 mm. in diameter.

The white pine seed lots were stored for 90 days and the loblolly pine seed lots for 66⁰ days prior to germination tests. All lots of seed were stored at temperatures of 36-41F. During the storage period an attempt was made to maintain an even moisture distribution in the polyethylene bags by systematically turning the bags weekly. The sand and seed mixtures were simply maintained in a moistened condition.

At the end of the storage period, a composite sample of individual subsamples, taken from different parts of the container, was made. This composite sample was thoroughly mixed and four random samples of 100 seeds each were taken for germination tests. Similar samples were taken from the untreated master seed lot. The latter were used as checks. The germination tests were made in sand flats in a greenhouse.

Results

The results of the germination test for each species and treatment are shown in table 1. Analyses of variance and the Q and D tests described by Snedecor (1961) were used to test for differences among treatments. There were no significant differences for total germination for either species among the treatments. All treatments for white pine gave significantly better results than the check, but the loblolly pine check was not significantly different from any treatment. There were no significant differences among the treatments for the number of days required to reach 90 percent of total germination. However, all treatments gave significantly better results than their respective checks.

Discussion

The present results with larger seed quantities support the earlier work with smaller quantities indicating that storing moistened seed in polyethylene bags gives

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TABLE 1.--Germination percentages and number of days required to attain 90 percent total germination following four pregermination treatments¹

Treatment	Total germination		Time required to reach 90 percent total germination	
	White pine	Loblolly pine	White pine	Loblolly pine
	Percent	Percent	Days	Days
Polyethylene bag.....	83.0]	45.8]	21.0]	14.8]
Coarse sand.....	81.5]	43.2]	22.0]	14.5]
Fine sand.....	83.2]	51.8]	20.5]	14.0]
Check.....	40.8	38.8]	28.8	21.2

¹ Each figure represents a mean of four.

Any two means not enclosed by the same bracket are significantly different at the 1% level. Nonbracketed means are nonsignificant.

results as satisfactory as those from conventional stratification in sand. However, care must be taken to prevent the seeds from becoming too dry. Scotch pine seeds, run concurrently with the present test, showed significantly poorer germination results following drying of seed in the upper part of the bag. Consequently, with large lots of seed, mixing at least once every week is suggested to maintain even moisture distribution and to prevent heating or drying.

As a further check of germination, seedling counts in the nursery beds of loblolly pine were made at the time of the lifting. Results indicate that with satisfactory germination the number of seedlings per linear foot of nursery bed was slightly higher from lots of seed stored in polyethylene bags than from lots stratified in sand.

Conclusions

The results of this study indicate that germination from larger quantities of loblolly pine and white pine seeds stored in polyethylene bags can be as satisfactory as that from similar seed lots stratified in sand. However, care must be taken to maintain an adequate moisture level and moisture distribution in the bags during storage. Periodic turning will help maintain better distribution of moisture and also prevent possible deleterious effects of heating or drying.

Literature Cited

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