

# Stratification Reduced Germination of Ponderosa Pine Seed Collected in New Mexico and Southern Colorado<sup>1</sup>

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**Abstract.**--The 1983 seed year produced extremely low unstratified germination percentages for ponderosa pine (*Pinus ponderosa*, Rocky Mountain form) on Bureau of Indian Affairs administered lands in New Mexico and Southern Colorado. Stratification reduced this percentage in nearly every case and did not reduce the germination time.

## INTRODUCTION

Cones collected on Bureau of Indian Affairs administered lands in New Mexico and Southern Colorado in the fall 1983 yielded

the average amount of clean seed per bag, much larger seed, and extremely low unstratified germination. Excessive mold was noted on every sample, but seed surface fungicide treatments did not increase germination. X-rays indicated full seed.

Twenty-two samples representing all areas of collection were retested in early 1985. A germination comparison of unstratified, and stratified for 30,45,60,75 and 90 days was done at the National Tree Seed Lab in Dry Branch, Georgia and compared to unstratified, and stratified germination for 31,45 and 55 days done at Bureau of Indian Affairs Greenhouse Facility located in Albuquerque, New Mexico.

## DISCUSSION AND RESULTS

The 871 half full burlap sacks of ponderosa pine cones collected from October 12, 1983 through December 8, 1983 throughout New Mexico and Southern Colorado yielded 514.8 lbs. of clean seed. The yield per bag was about average, but the approximately 11,000 seeds per pound was much better than the normal of 14,000 seeds per pound. The average unstratified germination was approximately 35 percent as

compared to the normal unstratified germination of between 85 and 90 percent.

Initial testing was performed at the National Tree Seed Lab in Dry Branch, Georgia in 1984.

Excessive mold was noted on every sample. Dipping in neither bleach nor captan at the recommended rates improved germination. There was no correlation between germination percent and date of collection.

TABLE 1, details the results from stratified and unstratified germination tests from the 1985 test at the National Tree Seed Lab.

**TABLE 1, NATIONAL TREE SEED LAB  
GERMINATION COMPARISON**

ACCESSION NUMBER	Germination (%)					
	Stratification (days)					
	Unstratified	30	45	60	75	90
83B01	46	29	37	40	35	36
83B02	55	34	32	38	25	37
83B04	29	14	16	20	17	17
83B06	24	4	6	12	11	11
83B07	49	23	25	25	30	29
83B08	33	14	15	17	15	14
83B09	14	6	5	5	8	7
83B10	47	21	19	26	27	29
83B11	41	26	19	3	25	27
83B12	27	17	20	21	21	18
83B14	24	14	6	10	8	9
83B15	54	48	41	39	48	50
83B16	27	21	13	22	19	23
83B17	42	39	33	36	34	36
83B22	28	14	14	15	16	15
83B25	27	16	16	19	15	17
83B28	49	30	32	33	33	35
83B29	37	31	25	37	29	23
83B30	41	30	28	29	29	32

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83B31	48	35	37	42	42	50
83B32	25	22	27	26	23	29
83B34	70	52	54	51	48	50

The report sheets indicated that the first weeks germination percentages were higher in the stratified samples than the unstratified, however by the end of the second week germination was virtually finished in all samples, stratified and unstratified. With the exception of 83B29 stratified for 60 days, germination was reduced in all cases with stratification.

TABLE 2, details the results from stratified and unstratified germination tests done at the Bureau of Indian Affairs Greenhouse Facility in Albuquerque, New Mexico.

TABLE 2, BUREAU OF INDIAN AFFAIRS  
GERMINATION COMPARISON

ACCESSION NUMBER	Germination (%)			
	Unstratified	Stratified		
		31	45	55
83B01	28	10	11	12
83B02	19	8	12	11
83B04	5	3	1	6
83B06	2	4	3	4
83B07	14	5	7	7
83B08	4	1	1	3
83B09	1	1	1	1
83B10	5	2	0	6
83B11	14	6	8	11
83B12	6	3	2	3
83B14	2	1	1	3
83B15	18	18	15	18
83B16	2	1	2	4
83B17	20	15	11	15
83B22	5	2	1	1
83B25	3	1	3	5
83B28	28	15	11	13
83B29	9	10	7	6
83B30	10	10	6	8
83B31	12	9	6	10
83B32	10	7	3	7
83B34	54	37	28	28

The Bureau of Indian Affairs Greenhouse Facility in Albuquerque, New Mexico is a production greenhouse. Unstratified seed will normally begin cracking 4 days after sowing. The only equipment available for stratification is a refrigerator, which is subject to temperature fluctuations during normal use. Temperatures were maintained between 34F and 38F.

Prior to stratification the seed was soaked for 24 hours and then dipped in captan at the rate of one tablespoon per gallon. Stratification was terminated at 55 days because the seed was beginning to crack.

The reason for the large reduction in germination between the seed lab and the greenhouse can not be explained at this time.

Stratification increased germination over unstratified germination in Accession Numbers 83B04,83B06,83B10,83B14,83B25,83B29 and stayed the same in 83B09,83B15 and 83B30. Germination is so low in all cases, however, that the value stratification is questionable, as is the use of this seed.

#### CONCLUSIONS

This experiment was done in a effort to increase abnormally low germination. Stratification reduced germination in most instances and did not reduce the germination time in those samples tested here.

It should be stressed that the 1983 gemination percentages were usually low, and further research on the value of stratification of ponderosa pine in the southwest should be conducted.