

Stratification of *Juniperus scopulorum*

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Stratification of *J. scopulorum* seed in moist peat at 38-41 ° F. for 5 to 6 months prior to sowing in mid-July improved germination, resulted in more uniform seedbeds, and produced better seedlings with less cull percent.

The time and method of sowing Rocky Mountain juniper (*Juniperus scopulorum*) seed has been described by Meines (1) who covered the sowing of stored as well as freshly collected seed. This study deals with the sowing of stored seed in mid-July at the Bessey Nursery, Nebraska National Forest.

In the spring of 1971 the author had two lots of *J. scopulorum* seed from Wasta, South Dakota that had been in stratification since December 1970. Both lots were stratified in moist peat at 38-41° F. Neither lot was imbibed and ready to sow in April 1971. One lot was sown anyway in April 1971 to support my suspicions that it would not germinate following sowing. In August 1971 there was still no germination and the area was plowed up in September 1971.

The remaining lot was held in stratification and sown in mid-July 1971. To complete the sowing requirements, dry seed from storage (same seed lot as the stratified seed) was sown at the same rate adjacent to the stratified seedbeds. An adjustment for moisture uptake during stratification was made on the stratified seed sowing rate. The entire *J. scopulorum* sowing was mulched with fumigated wheat straw and then

covered with shade frames to hold the mulch in place. Germination of *J. scopulorum* seed usually occurs in early spring when temperatures are 58-61° F. At Bessey these temperatures occur from mid-March to mid-April with the normal being March 25th-April 5th.

In April 1972 the mulch was removed when germination was approximately 50 percent completed. Germination was evaluated by spot counts made in early May. It was obvious that the seed stratified from December to July had a higher germination percent than the dry seed sown at the same time and at the same rate. The September 1972 inventory illustrated this as follows:

Treatment	Tree percent ¹
stratified seed	45
dry seed	21
cut test potential	60

¹ Tree Percent = 1-0 inventory ÷ viable seed sown

The "fly in the ointment" is that the number of viable seed in a seed lot of *J. scopulorum* is not determined by a seed test. The seed laboratories haven't worked out the methods needed to accurately test *J. scopulorum*. As a result, the number of viable seed per pound is determined by the nurseryman via a cutting test, or better yet, an X-ray. In this study the number of viable seed as it appears under "Treatment" was determined from a cutting test.

The results obtained by stratifying *J. scopulorum* seed prior to July sowing were encouraging enough to warrant additional experimentation. Using the same seed lot, the test was repeated with stratification commencing January 1, 1972, and sowing

in mid-July 1972. The September 1973 inventory indicated a tree percent identical to that obtained in September 1972 (stratified seed tree percent = 45). No dry seeds of the same lot were available for a comparison sowing.

Another lot of Wasta, South Dakota *J. scopulorum* seed was obtained from Big Sioux Conifer Nursery in Watertown, South Dakota. The test was run again. However, due to refrigeration problems, we didn't get the seed into stratification until February 1, 1973. The stratified seed was sown in mid-July 1973 with dry seed of the same lot sown at the same rate as a check. All seedbeds were mulched with fumigated wheat straw and covered with wooden shade frames to hold the mulch in place. Results from the September 1973 inventory were as follows

Treatment	Tree Percent
stratified seed	34
dry seed	16
cut test potential	76

Starting in 1975, it has become standard practice at Bessey Nursery to stratify all *J. scopulorum* seed prior to sowing in mid-July. Seedbeds of stratified seed germinate more uniformly and more rapidly once germination begins. As a result, the seedbeds are more uniform and have a lower cull percent when the 2-0

seedlings are lifted for shipment. The significant reduction in cull seedlings and in the amount of seed needed to produce a given number of seedlings makes stratification of *J. scopulorum* seed a worthwhile procedure.

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Results and Discussion

Class 1 seeds germinated 66 percent compared to less than 16 percent for the other classes (table 1). The poor germination of Class 2 seeds was not expected because the seeds appear to be essentially normal, both on X-rays and when the seeds are cut. The low germination for seed classes other than Class 1 suggests that when seed physiology studies are contemplated, only seeds in Class 1 should be used. The data also suggest that cutting tests to determine percent filled seed in low-quality seed lots such as these may be in error by as much as 100 percent or more. Also included in table 1 are the percentages of seed in each seed class in the original sample, based on X-ray analysis.

Table 1.—Percent germination and distribution for white ash seed quality classes

Class	Percent Germination	Percent of Total Seed in Sample ¹
1	66.0	10.8 (range = 8-12)
2	15.8	17.4 (17-18)
3	11.6	32.2 (30-36)
4	2.6	12.3 (10-16)
5	0.0	5.1 (4-6)
6	7.5	6.7 (6-7)
7	0.0	15.5 (14-16)
		100.0

¹ Average of three replicate 250-seed samples.

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Questions that remain unanswered are:

1. What is the optimum duration of the stratification treatment?
2. Are there other treatments that will produce even better germination?

As a means of partially answering question number 1, seed will be stratified starting in November 1975 for July 1976 sowing.

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