A TEST TO DETERMINE ACCEPTABILITY OF SAWDUST AS A SEED BED COVER

H. Knight

Research Division, B. C. Forest Service
Victoria, B. C.

Nurseries that use the broadcast method of seeding often have difficulty finding a suitable cover for the seed.

Many materials for a seed cover are recommended. Sand is favored (references 1, 3, 4, 5, 6, 9, 12, 13, 14, 15). Other materials mentioned for use as a seed cover are soil, type not specified (7, 11, and 16); humus (3, 8, and 13); loam (6, 8, and 15); grit and fine gravel (4); sawdust (2, 6, 8, and 10); and various organic mixtures.

The East Kootenay Nursery in the southeastern part of British Columbia started using river-washed sand as a seed cover. However, this sand was not always a good medium as it often contained lumps of calcareous material. This material, if allowed to accumulate, could cause seedling nutritional disorders. Consequently, a satisfactory substitute for the sand was sought. That led to the following trial where sawdust was used for a seed cover on ponderosa pine seed.

METHOD

A Latin square was laid out on four, 4-by 50-feet nursery beds (fig. 1). Each bed was divided into four subplots, 4 by 12. 5 feet. The seed was broadcast (approximately 5, 000 sees per subplot) on to prepared beds and pressed into the soil with a metal roller. The following four treatments were applied as a seed cover: Sawdust, covering depth 1/4 inch; sawdust, 1/2 inch; sawdust, 3 /4 inch; and sand (control), 1/4 inch.

In each subplot a sample area 3. 5 by 2 feet was marked out for germination and survival counts. This provided a 14 percent sample. These areas were positioned at random and set up after the seed was covered. The sawdust used was a mixture of ponderosa and lodgepole pine, douglas-fir and western larch.

RESULTS

The first and second year's results are combined and the data appears in table 1.

TABLE 1

GERMINATION AND SURVIVAL OF PONDEROSA PINE BY FOUR COVER TREATMENTS

Treatment and Subplot No.	Total Germination 1/	Survival	Seeds surviving per 100 seeds sown
Sawdust, 1/4 inch	(Percent)	(Percent)	(Numbers)
4	49.0	84.0	
7	48.1	81.1	
11	56.0	85.7	
16	31.7	74.4	
Mean	46.2	81.3	37.8
Sawdust, 1/2 inch			
1	52.7	82.1	
5	54.9	83.6	
10	59.3	87.1	
14	52.0	81.9	
Mean	54.7	83.7	45.5
Sawdust, 3/4 inch			
3	40.9	85.3	
8	63.3	81.1	
12	47.1	85.8	
15	53.0	90.8	
Mean	51.1	83.7	43.6
Sand, 1/4 inch(control)			
2	37.9	59.2	
6	60.4	80.4	
9	74.6	46.8	
13	36.6	47.7	
Mean	52.4	58.5	30.9
Difference for significance at			
1 percent	24.7	21.6	
5 percent	16.3	14.3	

1/ On the basis of 5,000 seeds per subplot there were approximately 700 seeds sown to each sample area and this figure was used as a basis for calculating the germination percent.

The highest total germination was in the 1/2-inch sawdust treatment. This was 54. 7 percent. This was followed by the 1/4-inch sand (control), 52.4 percent; 3/4-inch sawdust, 51. 1 percent; and 1/4-inch sawdust, 46. 2 percent.

The seed had a 51 percent germination in the laboratory, but apparently germinated better under three of the four treatments in the nursery. This resulted in overcrowding which seemed to reduce the size of the seedlings. However, no nutritional-deficiency symptoms were evident.

The delayed germination was estimated to vary from 5-30 percent of the total germination.

The highest survival was in the 1/2-and 3/4-inch sawdust treatments, viz., 83. 7 percent. This was followed by 1/4-inch sawdust, 81. 3 percent; and 1/4inch sand (control), 58.5 percent. All the sawdust survival differences were highly significant when compared to the sand.

The mortality was higher in the sawdust treatments than in the sand during the second year. For example, the 1/4-inch sawdust had 20 percent of the total mortality the second year, the 1/2-inch sawdust 25 percent, the 3/4inch sawdust 22 percent, while the sand had only 8 percent. These figures are in direct proportion to the delayed germination numbers.

The figures for the number of seeds surviving per 100 seeds sown, which are provided to give a broader picture of survival, show the same trend as the percent survival.

Observational results show that sawdust will remain in place equally as well as sand. There were no wind-blown bare spots on the 3/4-inch sawdust treatments, and many on the 1/4-inch sawdust and sand treatments. There was no serious soil cracking under the 3/4-inch and 1/2-inch sawdust treatments. Soil cracks 1 /2 inch across at the surface were common on the 1/4inch sawdust and sand treatments. It would seem that the 3/4-and 1/2-inch sawdust applications provide a further service as a mulch.

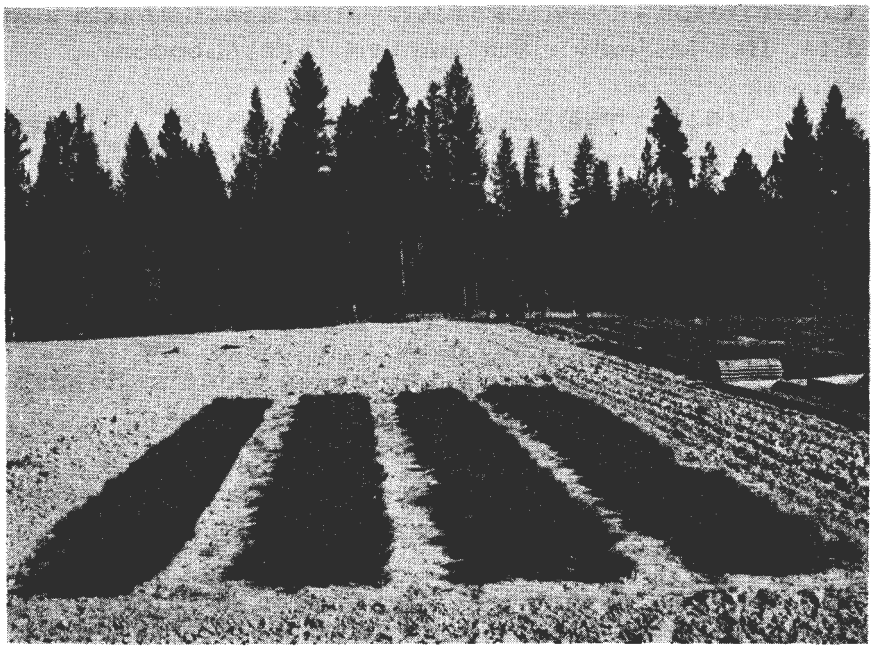

Figure 1. Plot layout after two growing seasons. There are four treatments in each bed arranged as a Latin square.

CONCLUSIONS

1. The results from this study would suggest that sawdust has a use as a seed cover in the nursery, and that wider application should be made on a further exploratory level using 1/2 to 3/4-inch treatment.

2. The Woody Plant and Seed Manual (16), states that ponderosa pine seed ordinarily germinate satisfactorily without pretreatment. The evidence in this experiment showed that delayed germination was high and, therefore, stratification should be tried to improve germination and reduce the number of cull seedlings.

REFERENCES

(1) Brewster, D. R., and J. A. Larsen, 1925. Studies in Western Yellow pine nursery practice. Jour. Agr. Res. XXXI (12): 1101-1120.

(2) Buckland, D. C., 1947. Investigations on the control of Fusarium top-blight of Douglas fir seedlings. Division of Botany and Plant Pathology, Science Service, Canada Dept. of Agric., Victoria, B.C.

(3) Dengler, A., 1925. Uber Die Wirkung Der Bedeckungstiefe Auf Das Auflanfen Und Die Erste Entwicklung Des Diefernsamens. (The Effect of depth of cover upon the germination and early development of pine seed). Zietschrift Fur Forst-Und Jagdwesen. Vo. 57: 385-408. U.S. Forest Service, Translation 204.

(4) Forestry Commission, 1946. Forestry practice. Fourth edition Bull 14, Her Majesty's Stationery Office, London.

(5) Hawley, R.. C., 1947. The practice of silviculture. Fifth edition. John Wiley and Sons Inc., New York.

(6) Kummel, J. F., D. A. Rindt, and Thornton T. Munger, 1944. Forest planting in the Douglas fir region, U.S.D.,A. Forest Service, Portland.

(7) McKinnon, F. S., 1946. Growing coniferous trees in British Columbia, B. C. Forest Service, Publ. T 14.

(8) Murphy, F. T. 1949. Evergreen trees from seed to transplant. Penna. State College Extension Service. Circ. 330.

(9) Olson, D. S., 1930. Growing trees for forest seedlings in Montana and Idaho, U. S. D. A. Circ. 120.

(10) Perry, G. S., 1929. Forestry in Sweden. Published by the author. Mont Alto, Pa., Pennsylvania State Forestry School.

(11) Pettis, C. R. 1909. How to grow and plant conifers in the Northeastern States, U. S. D. A. Forest Service, Bull. 76.

(12) Shaw, S. B., 1930. Forest nursery and planting practice in the California pine region. U. S. D. A. Circ. 92.

(13) Steven, H. M., 1928. Nursery investigations, Forestry Commission Bull. 11.

Her Majesty's Stationery Office, London.

(14) Tillotson, C. R., 1917. Nursery practice on the National Forests. U. S. D. A. Bull. 479.

(15) Tourney, J. W. and C. F. Korstian, 1948. Seeding and planting in the practice of forestry. Third edition. John Wiley and Sons Inc., New York.

(16) United States Department of Agriculture, Forest Service, 1948. Woody plant and seed manual. Mis. Pub. 654.