NURSERYMEN'S MEETING 1964

The meeting was called to order at 8:15 a.m., August 19, 1964 by the Chairman, Mr. F. LeRoy Sprague. Mr. Howard E. Ahlskog, Forest Supervisor, was unable to be present at the meeting, and the Welcome Address was given by Mr. Reid Jackson. Announcements of coming events and procedures were made by the Chairman. Mr. Charles Ohs, Vice Chairman, conducted the day's proceed ings; the speakers presented their reports as follows:

I. Panel Discussion on Seeding.

A. Mr. Lyle Hojem, Washington State Department of Natural Resources, Panel Chairman. Subject: Production of Larger Douglas Fir Seedlings by Fall Sowing.

PRODUCTION OF LARGER DOUGLAS FIR SEEDLINGS BY FALL SOWING

by
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Introduction

As an administrator you might think it strange that I'm talking to you about the production of larger seedlings. However, as an administrator I do have an interest in supplying the planter with the best possible planting stock to fit the individual need.

Reforestation efforts in the State of Washington have progressed to the more severe planting sites, which have increased problems in survival because of plant competition, soil moisture, and animal damage. This, in turn, has caused a demand for bigger, more sturdy nursery stock. The demand for larger stock has raised the production of 2-1 Douglas fir transplants at the Webster Nursery from about 500 M in 1959 to better than 4 MM in 1963. Transplants are expensive trees to plant and as an administrator, planting costs are of major concern to me. Therefore methods and techniques to reduce the high cost of 2-1 and 2-2 transplants were discussed by nursery and refor- estation personnel in 1961 and from these discussions came the idea to try fall sowing.

I won't attempt to discuss the advantages and disadvantages of fall sowing vs. spring sowing from the production standpoint, since you are more aware of this than I am. What I want to do is present some differences in growth that we have found between fall sown and spring sown seedlings pro- duced at the Webster Forest Nursery.

Results

We tried our first fall sowing during November, 1961. In order to determine what growth differences we could expect between fall sown and spring sown seedlings, four seed sources from each sowing date were selected and measured at the end of the first growing season. This was done for 1-0 seed- lings in 1962, and again in 1963. The 1963 measurements, however, included

one more sowing date, early spring sowing (April). The results of these measurements (Table I and II) show a large size advantage in favor of fall sown seedlings. The fall sown 1-0 from 1961 were twice as tall, had twice the stem diameter, almost three times more absorbing roots (as measured by a root titration technique1), and weighed over four times as much as spring sown seedlings. This same trend was found in the 1963 measurements with the early spring sown seedlings intermediate in growth between the fall and spring sown stock.

Samples of the fall sown and spring sown 1-0 seed sources were transplanted in 1962. We felt that fall sown 1-0's would make good transplant stock because of their large size. The spring sown 1-0's were transplanted in order to make some size comparisons.

Growth measurements were made at the end of the second growing season on 2-0 and 1-1 seedlings (Table II). Fall sown 2-0 seedlings were still larger than spring sown stock. The average fall sown tree was 11 cm taller in height and 1 mm larger in stem diameter. Fall sown seedlings were also twice as heavy as spring sown stock and produced 75% more absorbing roots.

Measurements of 1-1 stock also reflected the size advantage of fall sown seedlings over spring sown stock (Table II). The average fall sown 1-1 was approximately 10 cm taller, 2 mm larger in stem diameter, twice as heavy, and produced about 12% more absorbing roots than the spring sown 1-1.

At the same time that the 1-1 stock was measured we also selected some 2-1 seed sources to measure. In comparing seedling size between 2-1 and 1-1 stock (Table III) we found that fall sown 1-1 stock was quite comparable to 2-1 stock. Spring sown 1-1 stock was quite a bit smaller. Fall sown 1-1 seedlings were about 6 cm taller, about 3/4 mm larger in stem diameter, and about one gram heavier than 2-1 stock. So in effect we have produced a somewhat larger transplant in one less year.

Conclusions

The conclusions that can be made from this study are:

1. Fall sowing has produced a much larger seedling than spring sown.

2. Fall sowing has Produced a larger 1-0 than early spring sowing, which in turn is larger than a spring sown seedling.

3. Fall sown 1-1 stock was larger than 1•1 spring sown stock.

4. Fall sown 1-1 stock was comparable to 2-1 stock.

5. The use of 1-1 stock in lieu of 2-1 stock should reduce the cost of transplants because of savings of one year's time in the nursery.

1/ Anderson, H. W. 1963. Soil Fumigation Increases the Root Growth of Forest Nursery Seedlings. Down to Earth 19(2):6-8.

TABLE I SIZE COMPARISON BETWEEN FALL SOWN, EARLY SPRING SOWN AND SPRING SOWN 1-0 DOUGLAS FIR SEEDLINGS

AGE CLASS	SOWING DATE	AVERAGE TOTAL HEIGHT	AVERAGE STEM DIAMETER	AVERAGE ROOT TITRATION VALUE	AVERAGE OVEN DRY WEIGHT OF TOPS	AVERAGE OVEN DRY WEIGHT OF ROOTS	AVERAGE OVEN DRY WEIGHT OF WHOLE PLANT	TOP ROOT RATIO
1-0	Fall Sown	15.6 Cm.	2.28 Mm.	4.8 Ml.	1.05 Gm.	0.49 Gm.	1.53 Gm.	2.18
1-0	Early Spring Sown	13.2 Cm.	1.95 Mm.	3.8 Ml.	0.69 Gm.	0.35 Gm.	1.05 Gm.	1.99
1-0	Spring Sown	9.6 Cm.	1.38 Mm.	2.9 Ml.	0.36 Gm.	0.21 Gm.	0.57 Gm.	1.71

TABU. II SIZE COMPARISON BETWEEN FALL SOWN AND SPRING SOWN
1-0, 1-1, and 2-0 DOUGLAS FIE SEEDLINGS

AGE CLASS	SOWING DATE	AVERAGE TOTAL HEIGHT	AVERAGE STEM DIAMETER	AVERAGE ROOT TITRATION VALUE	AVERAGE OVEN DRY WEIGHT OF TOPS	AVERAGE OVEN DRY WEIGHT OF ROOTS	AVERAGE OVEN DRY WEIGHT OF WHOLE PLANT	TOP ROOT RATIO
1-0	Fall Sown	14.3 Cm.**	2.60 Mm.**	8.72 Ml.**	0.98 Gm.**	0.78 Gm.**	1.76 Gm.**	1.27 NS
1-0	Spring Sown	6.8 Cm.	1.36 Mm.	3.50 Ml.	0.21 Gm.	0.27 Gm.	0.48 Gm.	1.07
1-1	Fall Sown	40.5 Cm.**	7.77 Mm.**	40.0 Ml.*	12.27 Gm.**	5.80 Gm.**	17.83 Gm.**	2.13*
1-1	Spring Sown	30.4 Cm.	5.84 Mm.	33.6 Ml.	5.83 Gm.	3.35 Gm.	9.18 Gm.	1.80
2-0	Fall Sown	26.0 Cm.**	3.94 Mm.*	16.1 Ml.*	2.23 Gm.**	1.56 Gm.**	3.79 Gm.**	1.44*
2-0	Spring Sown	15.0 Cm.	3.02 Mm.	11.8 Ml.	1.02 Gm.	0.94 Gm.	1.97 Gm.	1.07

** Significant at 99% Level.
* Significant at 95% Level.
NS Non-significant

TABLE III SIZE COMPARISON BETWEEN FALL SOWN AND SPRING SOWN 1-1 AND 2-1 DOUGLAS FIR SEEDLINGS

AGE CLASS	SOWING DATE	AVERAGE TOTAL HEIGHT	AVERAGE STEM DIAMETER	AVERAGE ROOT TITRATION VALUE	AVERAGE OVEN DRY WEIGHT OF TOPS	AVERAGE OVEN DRY WEIGHT OF ROOTS	AVERAGE OVEN DRY WEIGHT OF WHOLE PLANT	TOP ROOT RATIO
1-1	Fall Sown	39.6 Cm.	7.77 Mm.	40.6 Ml.	12.11 Gm.	5.92 Gm.	17.70 Gm.	2.06
1-1	Spring Sown	29.4 Cm.	5.74 Mm.	33.1 Ml.	5.49 Gm.	3.40 Gm.	8.88 Gm.	1.69
2-1	Spring Sown	33.5 Cm.	6.99 Mm.	55.1 Ml.	8.55 Gm.	4.69	13.24 Gm.	1.84