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SEED PRODUCTION ON THE VOIGHT CREEK EXPERIMENTAL FOREST, 1950-1953

By

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Information on seed production is vitally important in obtaining good forest regeneration. This is true of young-growth as well as virgin stands of Douglas-fir, but thus far most seed studies have been confined to old growth. Now, with the transition to management and harvest of young stands, we need seed information from these forests, also.

The possible effect of thinnings on Douglas-fir seed production is of particular interest. Experiments with other species have shown a significant correlation between amount of seed produced and stand density. For example, Baker 1/ cites that in Scotch pine the relation between seed production and density is pronounced. According to Croker 2/ the same is true of longleaf pine. In one experiment with longleaf, cone production was almost 4 times as great within 3 years after seed trees were released by thinning.

1/ Baker, Frederick S. Principles of silviculture, p. 206-207. New York, McGraw-Hill. 1950.

2/ Croker, T. C. Early release stimulates cone production. Southern Forest Experiment Station, Southern Forestry Notes 79, May 1952.

The Study

A 70-acre tract in the Voight Creek Experimental Forest was selected as the locale for our first study of seed production in young-growth Douglas-fir. This forest is owned by St. Paul and Tacoma Lumber Company and is made available to the U. S. Forest Service for cooperative research. The 70-acre tract is one block of a thinning study where 0, 18, 34, and 41 percent of the stand (in cubic-foot volume) was removed in 1948. At that time most of the stand was 40 years old, fully stocked, and fairly uniform. Site quality is medium III.

In August 1950, 10 seed traps were installed in each of the 4 thinning treatments to compare effects of heavy, medium, and light thinning on seed production. To eliminate bias, all traps were placed 10 feet north of randomly selected plot centers.

Each year the contents of the traps have been collected on approximately the following schedule: August 28, October 3 and 24, December 11, and April 8. In addition to measurements of annual seed fall, viability of seed, and amount of litter fall, information on the effect of soil type has also been developed.

Results to Date

In 1950, the first year of record, a medium seed crop occurred. The succeeding 3 years were near failures. As shown in table 1, average seed fall over the entire area varied from 2.2 pounds for the 1950 crop to as little as 0.02 pounds for 1953. Cutting tests demonstrated that viability was highest in the year of the best seed crop. The figures given for number of seeds per acre are based on an area of 6 square feet per seed trap (figure 1). In calculating weight of seed, it was assumed that a pound contains 40,000 seed.

Of the 4 years, only the 1950 seed crop was heavy enough to indicate any possible differences among thinning treatments. Seed fall and viability during 1950 for the 4 degrees of thinning are summarized in table 2.

Although the 1950 data are too limited to support definite conclusions, two interesting observations can be made:

1. Seed fall in the heavy thinning was twice as great as the average for the entire area. But the medium and light thinnings did not rate high in seed production, so perhaps not all the increase should be ascribed to thinning.

2. In portions of the tract where the seed crop was light, viability also decreased sharply.

Two soil types occur on the study area: Barneston gravelly loam and Indianola fine sandy loam. A segregation of seed fall on each soil type for the years 1950 and 1951 (table 3) indicates that soil type may influence seed production. Thus far, trees on Barneston gravelly loam have yielded substantially more seed than those on Indianola fine sandy loam.

Several additional years of record during medium or heavy cone crops will be needed to determine if these initial trends are real or illusory.

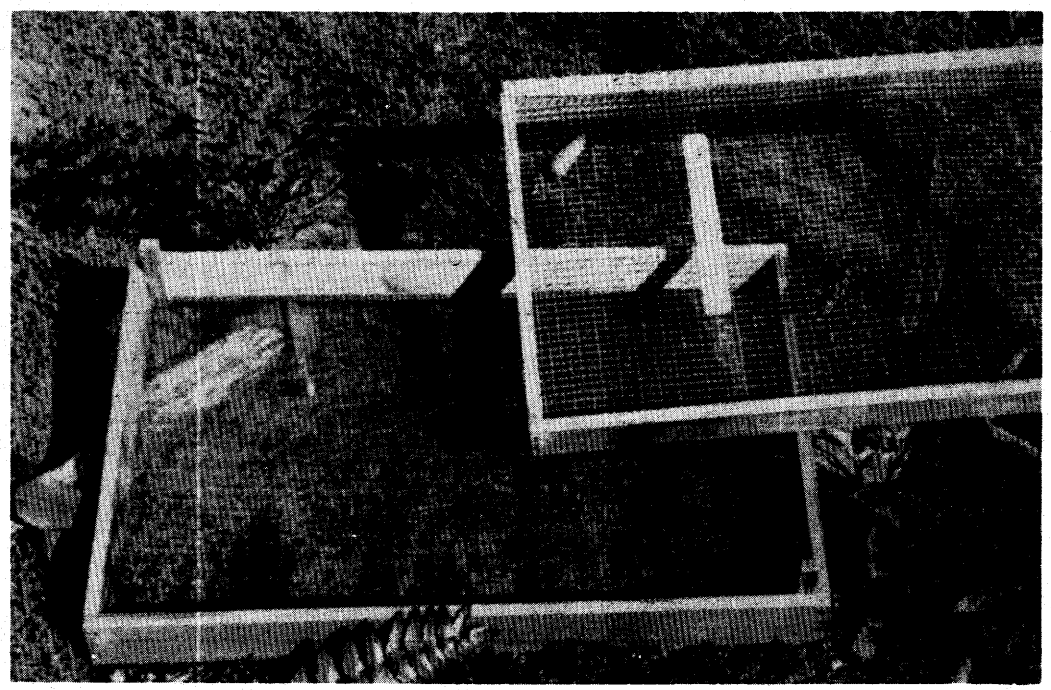

Figure 1.--Closeup of seed trap used in the Voight Creek study. Overall dimensions are 2 by 3 feet, and the trap is about 6 inches deep. Battens on the lid are beveled to provide a full 6 square feet of effective catchment area. It is rigid, convenient for seed collection, and easy to handle.

Table 1. --Average seed fall, by years, for all thinning treatments combined, per-acre basis

Year	Number of seeds	Pounds	Percent viable
1950	87,301	2.20	36.6
1951	13,250	.33	9.6
1952	9,982	.25	None
1953	807	.02	20.0

Table 2. --Seed fall and viability for four degrees of thinning, 1950

Thinning treatment	Total No. seeds in traps	Seed fall per acre		Percent viable
		Number	Pounds	
Heavy	247	179,322	4.5	46.2
Medium	79	57,354	1.4	10.1
Light	66	47,916	1.2	34.8
Unthinned	89	64,614	1.6	34.8
Average	-	87,301	2.2	36.6

Table 3. --Comparison of seed fall on two soil types, 1950-1951

Soil type	Number of traps	Seed fall per acre			
		1950		1951	
		Seeds	Pounds	Seeds	Pounds
Barneston gravelly sandy loam	31	104,216	2.6	15,691	0.4
Indianola fine sandy loam	9	29,040	0.7	4,840	0.1