

Field Test of
Cof. 2

(Research Note) No. 28

Endrin-Treated Douglas Fir Seed

by

Edward F. Hooven

Research Biologist



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Oregon Forest Lands Research Center

Dick Berry, Director

Corvallis, Oregon

Field Test of Endrin-Treated Douglas Fir Seed . . .

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This experiment was undertaken to provide more information concerning effectiveness of treating Douglas fir seed with Endrin for control of seed-eating mammals.

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The experiment involved three 10-acre plots, broadcast seeded at the rate of half a pound of Douglas fir seed an acre. Two plots were seeded with Endrin-treated seed and one with untreated seed. The plots were located in the Tillamook burn of northwestern Oregon.

Endrin was applied in powder form at the rate of 1 percent of the weight of the seed. Aluminum powder was added to permit ready identification of treated seed.

A census of small animals was taken prior to seeding in January 1955. Reduction in numbers of mice and shrews was abrupt and decisive. Indications are that the reduction in mice and shrews is continuous for some time after the original application.

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In June 1955 an examination of each plot for seedlings was made. Of 100 one-milacre samples per experimental plot an average of 51 percent were stocked on the treated areas and 13 percent on the untreated area. A firebreak seeding (not a part of the original experiment) sown with tetramine treated Douglas fir seed produced 43 percent on 100 one-milacre sample plots.

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..... by
Edward Hooven

INTRODUCTION

The effect of the small mammal population on the success of natural or artificial seeding is one of the factors of paramount importance in forest regeneration. During the last fifteen years many candidate rodenticides or repellents have been investigated by cooperating state, private, and federal agencies in the Pacific Northwest in attempts to prevent small mammals from destroying tree seeds. Wheat treated with a rodenticide has been used with some success. Excellent results have been obtained by applying tetramine directly to tree seeds. Tetramine, however, is not manufactured commercially and has not been available in Oregon for other than experimental work.

During the summer of 1954 Endrin, (Hexachloroepoxy-octahydroendo, endodimethanonaphthalene) another candidate rodenticide, was recommended by the Wildlife Research Laboratory, U.S. Fish and Wildlife Service, Denver, Colorado, under the code name WRL-2.

The purpose of this experiment was to test, under forest conditions, Douglas fir seed treated with Endrin. The primary objectives were to determine its effectiveness in controlling the small seed eaters for a sufficient length of time to permit establishment of a satisfactory stand of trees.

EXPERIMENTAL PROCEDURES

Plot Selection and Description

Three 10-acre plots were established in December 1954. One was seeded with untreated Douglas fir seed for control observations. Two were seeded with Endrin-treated Douglas fir seed. The three plots were located in an area burned by the 1933, 1939, and 1945 Tillamook fires and had been logged for salvage material after the fire in 1945. Another large fire had occurred on the area in 1951, followed by additional logging. Exposure was to the northeast and southwest. The elevation was approximately 2,300 feet. Treated Plot No. 1 had little debris on the ground and no standing snags, while Treated Plot No. 2 was heavily covered with debris and scattered standing snags. The control plot was also heavily covered with debris left from the felling of snags for a firebreak.

Vegetative cover consisted principally of bracken (Pteridium aquilinum), trailing blackberry (Rubus vitifolius), pearly everlasting (Anaphalis margaritacea), fireweed (Epilobium angustifolium), salmon-berry (Rubus spectabilis), Oregon grape (Mahonia nervosa), and willow (Salix, spp.). Bracken was the major herbaceous plant, followed next in importance by the trailing blackberry.

Seed Treatment

Endrin is a chlorinated hydrocarbon of considerable mammalian toxicity. The rodent-active agent employed to protect the seed is 50 percent wettable Endrin powder and the balance inert ingredients. It is finely micronized to increase dispersal in water. The powder is applied at the rate of 1 percent by weight of the seed. The adhesive is an aqueous preparation of 1 percent methyl cellulose and 3 percent Throplex solids. It must be handled with caution. Aluminum powder is added to produce a distinctive coloration permitting ready identification of the treated seed.

A tumble drum or mixer of approximately 3 cubic feet was used for mixing.

Seeding Method

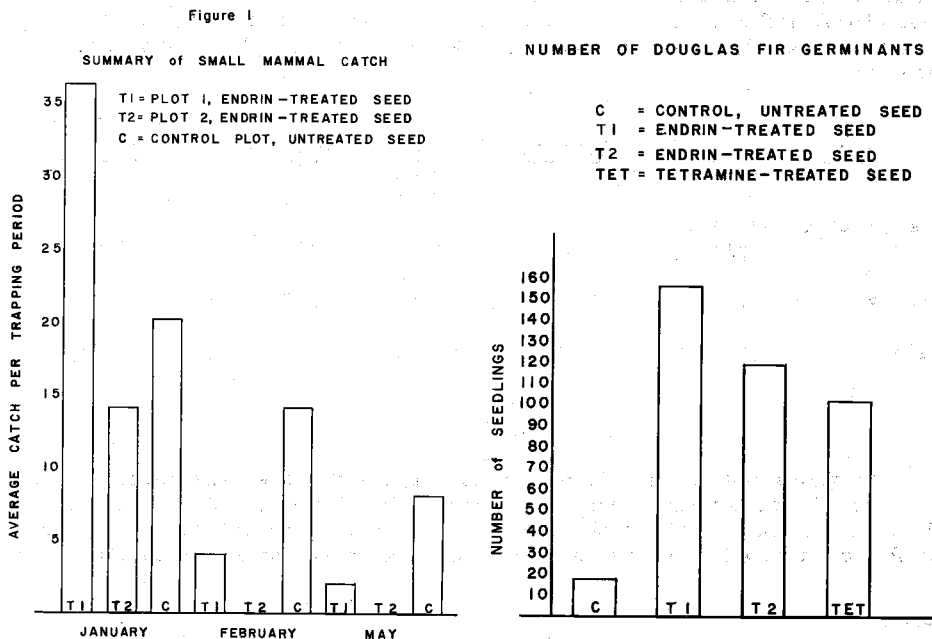
Seeding was started on January 30 and finished on January 31, 1955. Two of the plots, Treated No. 1 and Treated No. 2, were sown with seed that had been treated with Endrin. The "control" was sown with untreated seed. Seed was applied with a hand broadcasting seeder at the rate of one-half pound per acre.

Rodent Census

A census of small mammals was taken prior to and after seeding. Sherman live traps, 3 x 3 x 10 inches, were used, spaced 66 feet apart. Traps were set for three successive nights during each trapping period. This technique was identical to that employed on previous projects. (Hooven 1955, 1956). Any mammal trapped was marked in the ear with a small numbered metal tag and released at the point of capture. A record was kept of sex, eartag number, trap number, species, and estimated age.

A survey was conducted for germinants during June 1955. One hundred milacre samples were examined on each 10 acre plot. Samples were off-set 3 feet in a systematically determined direction from the stakes

Figure 2



marking the trap locations. A survey of 100 milacre samples was also made on an adjacent area that had been sown with tetramine-treated seed.

RESULTS

Mammal Census

Results of the census of small mammals are shown in Tables I, II, and III (Appendix) and are graphically summarized in Figure 1. Total catch varied among the plots. Trapping prior to application of the Endrin-treated seed resulted in a catch of 47 small mammals on Treated Plot No. 1 with 19 caught on Treated Plot No. 2. The same trapping procedures resulted in a catch of 26 small mammals on the control plot. Trapping was irregular because of the sporadic occurrence of snow storms and below freezing temperatures. Trapping results indicate that Endrin was not only successful in eliminating the original population but also any migrants that invaded the area. This is borne out by the trapping results. In May only two mammals were captured on Treated Plot No. 1 and none on Treated Plot No. 2. Six deer mice and 9 shrews were captured on the control plot.

Sampling for Seedlings

The plots were examined during June 1955 for seedlings. Figure 2 illustrates the results obtained on the three experimental plots, plus additional information gathered from a firebreak seeding project that had been sown with tetramine-treated Douglas fir seed during the same year.

<u>Treatment</u>	<u>Control</u>	<u>Endrin-Treated</u>		<u>Tetramine-Treated</u>
		<u>Plot No.1</u>	<u>Plot No.2</u>	
Number of One-Milacre plots	100	100	100	100
Number of Seedlings	17	156	119	101
Milacre Plots Stocked	13	60	42	43

DISCUSSION

On plots sown with Endrin-treated Douglas fir seed the reduction in numbers of mammals was abrupt, especially the white-footed deer mice. Treated Plot No. 1, which originally had a large population, was reduced to 2 deer mice and 7 shrews when trapped six weeks later. Both mice were

newcomers to the plot. By early May the mouse population was still 2 mice, one of which had entered the area since the last trapping period. Treated Plot No. 2 produced nothing when trapped in February and May. The population of 5 deer mice and 13 shrews were caught on the control plot in April. Six deer mice and 9 shrews were caught in May. Although the mammals trapped were fewer than usually caught on similar areas, there were enough to consume a large amount of seed.

Results shown in Table III for the untreated plot cannot indicate to what extent climatic conditions may have reduced the number of mice and shrews on the area, nor the reduction of those caught because of restrictions on their movements. Snow fell sporadically until May 1955. This was a handicap because an inch or more of snowfall seriously interfered with the workings of the traps.

Results of the stocking surveys indicate that Douglas fir seed treated with Endrin should produce approximately the same number of seedlings as does Douglas fir seed treated with tetramine. Endrin has the advantage, however, of being available at low cost in sufficient quantities for operational project use.

LITERATURE

- Hooven, Edward F. A Field Test of Tetramine Treated Douglas fir Seed. Research Note No. 21, Oregon State Board of Forestry, Salem, Oregon. 1955.
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- Midsummer Baiting to Control Seed-Eating Mammals. Research Note No. 22, Oregon State Board of Forestry, Salem, Oregon. 1955.
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- Field Test of Tetramine Treated Douglas fir Seed. Research Note No. 29, Oregon State Board of Forestry, Salem, Oregon. 1956.

APPENDIX

TABLE I

SMALL MAMMAL CATCH PER TRAP NIGHT (100 traps)

WITH ENDRIN-TREATED SEED

	Treated No. 1								
	Dec. Jan. 1954-1955			February 1955			May 1955		
	31	1	2	15	16	17	5	6	7
<u>Peromyscus m.r.</u>									
Caught per trap night	24	33	34	2	2	2	2	2	2
Tagged per trap night	24	13	10	2			1		
Total tagged		47			2			1	
<u>Microtus thomasi</u>									
Caught per trap night	5	5	6						
Tagged per trap night	5	1	4						
Total tagged		10							
<u>Sorex, spp.</u>									
Caught per trap night					5	2			
Total caught*						7			

* All shrews were found dead when traps were examined.

TABLE II

SMALL MAMMAL CATCH PER DAILY VISIT (100 trap nights)

Sown with Endrin-treated seed January 30, 1955

Treated No. 2

	December 1954			February 1955			May 1955		
	21	22	23	15	16	17	5	6	7
<u>Peromyscus m.r.</u>									
Caught per daily visit	9	14	14	-	-	-	-	-	-
Tagged per daily visit	9	5	1	-	-	-	-	-	-
Total tagged	15								
<u>Microtus oregoni</u>									
Caught per daily visit		1	2						
Tagged per daily visit		1	2						
Total tagged		3							
<u>Sorex, spp.</u>									
Caught per daily visit			1						
Total caught*		1							

* All shrews were found dead when traps were examined.

TABLE III

SMALL MAMMAL CATCH PER DAILY VISIT (100 trap nights)

Sown with untreated seed January 27, 1955

	Control									
	December 1954			February 1955		April 1955		May 1955		
	14	15	16	16	17	19	26	3	4	5
<u>Peromyscus m.r.</u>										
Caught per daily visit	16	15	-	10	15	-	5	6	4	4
Tagged per daily visit	16	1	-	6	6	-	3	2	-	-
Total tagged	17			12		3		2		
<u>Microtus thomasi</u>										
Caught per daily visit	2	4	-	1	1	-	-	-	-	-
Tagged per daily visit	2	4	-	-	-	-	-	-	-	-
Total tagged	6									
<u>Sorex, spp.</u>										
Caught per daily visit	2	1	-	-	1	3	10	6	1	2
Total caught*	3			1		13		9		

* All shrews were found dead when traps were examined.

Forest Lands Research Center

... Its Purpose

Develop the full potential of Oregon's timber resource by:

increasing productiveness of forestlands with improved forest practices.

improving timber quality through intensified management and superior tree selection.

reducing losses from fire, insects, and diseases--thus saving timber for products and jobs.

Keep development of the forest resource in harmony with development of other Oregon resources.

... Its Current Program

Seed production, collection, extraction, cleaning, storage, and germination.

Seedling production, establishment, and survival for new forests.

Growth and development of trees, quality of growth, and methods of thinning and harvesting to grow improved trees.

Study of forest fire behavior and fire weather to prevent fires.

Insect pests and their control, to save trees.

Disease control and prevention in Oregon forests.

Mammal damage and the controls, to help regrowth.

Soils and their relationship to growth.

Development of improved forests through selection and breeding.