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CHANGES IN SMALL-MAMMAL POPULATIONS RELATED TO ABUNDANCE OF DOUGLAS-FIR SEED

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Reforestation of nonstocked forest lands that have resulted from logging, slash fires, or wildfires, is an important problem faced by forest managers in the Douglas-fir forests of western Oregon. The forest manager often relies upon aerial seeding or natural seedfall. Regardless of the method used, one should know what to expect in the way of seed depredation by small mammals. If high populations of small-mammal seedeaters could be predicted, one would know how to plan for the year of seeding, when to anticipate a potentially greater problem that could be caused by small-mammal immigration and, therefore, when to emphasize baiting to decrease populations of seedeating mammals.

Small-mammal populations were observed on study plots near the South Fork of the McKenzie River (T18S, R5E), Lane County, Oregon, from 1965 through 1975. Generally, a direct relation appeared between moderate-to-good cone crops (based on a 1-to-5 relation) and the high populations of small mammals that appeared the next year (Table 1). Although it is difficult to separate the factors that influence the density of a small-mammal population, a causal relation can be assumed if a certain condition is associated with a given response (1).

The yearly total of small-mammal species ranged from 8 to 12 and averaged 10, although 21 species were caught overall during the 11 years of observations. Of these, six species comprised 92 percent of all individuals caught: shrews (*Sorex trowbridgii*, *S. vagrans*) 25 percent, chipmunk (*Eutamias townsendii*) 19 percent, deermouse (*Peromyscus maniculatus*) 30 percent, Oregon creeping vole (*Microtus oregoni*) 12 percent, and jumping mouse (*Zapus trinotatus*) 6 percent).

Douglas-fir is only a small part of the diet of shrews, and they cannot survive on it alone. The other four species eat Douglas-fir seed more readily as part of their diet. Chipmunks especially have a tendency to glean and cache the seeds.

Although the overall number of small mammals increased remarkably, only deermice and shrews showed a definite, constant increase during any year immediately after a moderate-to-good cone crop. The densities of the other seedeaters fluctuated and often did not correspond to the increased availability of seed. Furthermore, a poor cone crop did not always result in a reduction of small mammals the next year. In 1973, for instance, catches indicated a yearly density of 42.1 small mammals per acre despite poor production of seed. Deermouse numbers

Table 1. Relation Between Small-Mammal Population (Density per Acre per Year) and Cone Crop Report.¹

Year	Cone crop rating ²	Deermice		All small mammals ³
		Density	Percentage among small mammals	
			No. %	
1964	1.2	1.8	7	24.2
1965	<u>3.0</u>	2.0	1	25.0
1966	<u>1.2</u>	8.8	22	40.0
1967	1.2	7.0	20	35.0
1968	<u>4.0</u>	3.6	21	16.9
1969	<u>2.0</u>	22.2	41	54.3
1970	1.8	9.4	27	35.0
1971	<u>4.0</u>	3.5	14	24.8
1972	<u>1.6</u>	27.4	45	61.3
1973	1.9	10.4	25	42.1
1974	2.0	13.8	40	34.7

¹Loon Creek Plot 2, which was clearcut in 1967, but slash was not burned.

²Report of annual cone crop for Oregon and Washington with rating from 1 to 5. Underlined rating denotes a moderate-to-good cone crop.

³Yearly total, which includes individuals of all species caught, but does not include recaptures. Trapping schedule was monthly, for a 3-day period, April thru September.

remained high at a density of 10.4 deermice per acre (Table 1), despite a 62-percent reduction of numbers from 1972.

Because of the sharp increase of animals the summer after a good Douglas-fir cone crop, any control attempts would be quickly nullified by immigrating seedeaters from surrounding areas. Therefore, one should not depend upon seed for reforestation at that time. A better procedure to follow for aerial seeding would be to estimate the quantity of the expected cone crop and prepare the site for direct seeding either the winter of the good crop year or the second year after. The area should be prebaited with an indandione anticoagulant 10-15 days before seeding with endrin-treated seed (2). Areas dependent upon natural seedfall should be baited in the spring and late summer of the year after good seed production. Because of the large number of seedeaters, a baited buffer strip is advisable.

LITERATURE CITED

1. GASHWILER, J. "Tree Seed Abundance vs Deermouse Population in Douglas-fir Clearcuts." IN: Proc., Soc. Amer. Foresters. P. 219-222. 1965.
2. HOOVEN, E. F. Baiting to Reduce Losses of Conifer Seeds to Small Forest Mammals. For. Res. Lab., Res. Note 55. 3 p. 1975.