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**LOSS OF ENDRIN FROM REPELLENT-COATED PINE SEED**

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*Weathering causes rapid loss of endrin from the repellent coating. Direct seeding should therefore be scheduled so as to minimize the time between sowing and germination.*

Direct-seeding operations are sometimes scheduled long before temperatures and soil moisture are suitable for prompt germination. A major reason for early sowing of loblolly (*Pinus taeda* L.) and slash (*P. elliottii* Engelm. var. *elliottii*) pines is to condition the seed by prolonged exposure on the ground instead of by cold stratification. A recent study in central Louisiana shows that this practice is risky because excessive endrin is lost from the protective coating by weathering when seeds are exposed up to 45 days.

**THE STUDY**

Single lots of loblolly and slash pine seeds, each at a moisture content of about 10 percent, were divided into two parts. One subplot of each species was soaked in water for 24 hours to approximate the moisture content obtained by cold stratification; the other was untreated.

All four sublots were coated with the standard repellent formulation of Arasan 42-S<sup>1</sup>, Endrin 50-W, aluminum powder, and a latex sticker. Adhesion was checked by subjecting seed samples to running water from a faucet for 2 minutes. All coatings were satisfactory except that of the slash seed soaked in water before treatment. Too much repellent had been applied to this subplot, and it tended to flake off in the stream of water.

Seeds were surface-sown on March 24, 1970, in a sandflat kept outdoors. The flat was 8 inches deep, and had no bottom. The coarse sand dried rapidly after a rain, thus inhibiting germination. Seeds were not watered artificially.

Two 200-seed samples were drawn at random from each subplot after 0, 15, 30, and 45 days of exposure. Extractions were then made for endrin content determinations by an infrared gas analyzer.<sup>2</sup>

<sup>1</sup> Mention of trade names is solely for information. No endorsement by the U.S. Department of Agriculture is implied.

<sup>2</sup> Analyses were by Dr. E. A. Epps, State Chemist, Louisiana State University, Baton Rouge, Louisiana.

## RESULTS

Before exposure, the amount of endrin per 200-seed sample was about 10.5 milligrams for loblolly and 17 to 24 milligrams for slash pine (table 1).

After the first 15 days, more than 80 percent remained on three sublots, but the soaked slash pine seed that had been coated too heavily had only 58 percent. Small initial losses were probably due to low rainfall, which totaled 0.16 inch.

After 30 days, the three lots treated correctly still had 60 to 70 percent of their endrin. Overall, they lost slightly more in the second 15 days than in the first. Rainfall in this period was near normal, totaling 2.33 inches. The slash pine seed soaked in water lost less than in the first period, but was now down to 41 percent of the original amount.

Between 30 and 45 days of exposure, above-average rainfall of 3.36 inches caused heavy losses among all four lots. Only 22 to 39 percent of the endrin was left at the end of this term, regardless of how much was originally applied. Actual weights of endrin ranged from

3 to 6 milligrams for each 200-seed sample—probably too little to protect the seeds from mammals.

## DISCUSSION

Patterns of endrin loss from repellent-coated seed will probably vary with rainfall. In this study early losses were low because precipitation was light, but it is logical to believe they would have been higher in a wetter period. The pertinent point, however, is that the heavy loss after 30 days indicates the inadvisability of sowing too far in advance of the time germination normally occurs.

Improvements in the sticker might reduce weathering of the repellent coating, but would require detailed research. Repellents must not be bound to the seed too firmly, because the effectiveness of endrin against certain predators is dependent on a small quantity coming loose when a seed is touched or picked up. If an improved sticker can be developed, it would probably allow a reduction in the amount of endrin currently recommended.

Table 1.—Endrin remaining on 200 repellent-coated seeds after different periods of exposure

Days of exposure	Loblolly				Slash			
	Dry		Soaked		Dry		Soaked	
	Mg.	Pct.	Mg.	Pct.	Mg.	Pct.	Mg.	Pct.
0	10.5	100	10.3	100	17.1	100	23.6	100
15	8.8	83.8	9.3	90.3	13.8	80.7	13.7	58.1
30	7.0	67.7	7.2	69.9	10.2	59.7	9.6	40.7
45	3.0	28.6	4.0	38.8	3.8	22.2	6.1	25.8