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## FIELD TESTS OF LINDANE FOR FLATHEADED BORER CONTROL

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Flatheaded borers (*Melanophila californica* Van Dyke) were controlled with a 1.5% Lindane by weight in diesel oil. In one of these tests, the chemical was effective in destroying all emerging insects even though the treated tree had received about 25 inches of precipitation. These tests would suggest the feasibility of using Lindane for controlling flatheaded borers.



Figure 1. 70" d.b.h. pine. 15 gal. of Lindane mix required for treatment compared to 75 gal. of EDB mix.

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California flatheaded borers (Melanophila californica Van Dyke) are primary killers of pines in Southern California. Prolonged drought conditions have made conditions favorable to an insect population of epidemic proportions.

Direct control has been practiced on California flatheaded borers and pine bark beetles for a number of years. Lindane, a residual insecticide, has been used with excellent results on pine bark beetles, but has not been used to control flatheads. A fumigant, ethylene dibromide (EDB), has been used on the California flatheaded borer. Control of flatheaded borers with EDB has been quite good, but there are some disadvantages as compared to using Lindane as shown in the following table:

Table 1. Lindane mix vs. EDB mix

Item	Lindane	EDB	Comment
Units of mix needed to treat trees	1	5	Must saturate the bark with EDB
Worker hazard	Minor	Noticeable	Workers have some reaction to EDB
Ips control	Excellent	Poor	Material may be reinfested when EDB has evaporated

Because of these disadvantages in using EDB, two related tests using Lindane were made.

The first test was made in the winter of 1963-64. An infested tree was treated with 1.5% Lindane by weight in diesel oil in the fall of 1963. The tree then lay on the ground through the wet season receiving in excess of 25 inches of precipitation. A check in the early spring of 1964 revealed the presence of live pupae. A section of bark of about 2 square feet in size was then removed and placed in a wire cage. With the advent of warm weather, the pupae matured and began to emerge.

All of the beetles which actually emerged died within one day. The dead insects were counted and removed from the cage each day. When several days had passed with no additional emergence, the bark was dissected. Some dead adults were found which had been killed in the Lindane zone of the bark.

The second test was started in November, 1964. Five round sections were taken from a flathead infested tree. Four sections were treated and one section was reserved to act as a control. The sections were then placed in screened cages and stored in an open warehouse. The results in June, 1965 are listed in Table 2.

Table 2. Results of various treatments

Sample No.	Surface Area (sq. ft.)	Treatment	Results
1	2.4	Lindane <sup>a/</sup> 1:15	No beetles emerged. Found dead pupae in bark.
2	1.5	Lindane 1:10	No beetles emerged. Found dead larva.
3	2.2	Lindane 1:20	No beetles emerged. Found dead larva.
4	2.0	EDB <sup>b/</sup> 1:40	No beetles emerged. Found dead larva.
5	1.7	Control No treatment	25 live beetles in cage.

<sup>a/</sup> Standard mix for bark beetles in District VI. One part Lindane concentrate (20%) to fifteen parts diesel yields a 1.5% weight mix; this mixture is applied to the bark until it "glistens."

<sup>b/</sup> Standard mix. One part EDB concentrate (85%) to 40 parts diesel. The mix is "flowed" on until the bark is soaked to the point of runoff.

#### CONCLUSIONS

From these tests, it would appear that we may expect to achieve good control on flatheaded borers using the standard 1:15 bark beetle mix of Lindane-diesel.

The advantages of using a single treatment method are as follows:

First, reduced volume of mix will simplify equipment needs and reduce the expenditure for carrier oil. This advantage is particularly strong when material must be backpacked to the infested trees.

Second, safety for workers will be increased since Lindane is much less volatile than EDB.

Third, application errors will be reduced since crews will be trained for only one treatment method.

Fourth, secondary attacks by Ips beetles will be eliminated.