PROTECTING LOGS FROM LONG-HORNED WOOD BORERS WITH LINDANE EMULSION

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ABSTRACT

At Larkin, British Columbia, a 1% emulsion of lindane applied on 21 June 1965 protected sections of fresh-felled Pinus ponderosa *Laws. trees from oviposition by* Monochamus. *The same concentration of lindane applied 23 July to logs infested with* Monochamus *larvae under the bark, killed the larvae or prevented them from penetrating the wood.*

SOMMAIRE

A Larkin, Colombie Britannique, l'auteur à fait une application de Lindane en émulsion d'un pour cent sur des billes de Pinus ponderosa *Laws. fraîchement abattus. C'était le 21 juin 1965 et par après les longicornes* (genre Monochamus) *n'y déposèrent plus leurs oeufs. La même émulsion, vaporisée cette fois le 23 juillet sur des billes infestées sous l'écorce, tua les larves ou freina jusqu'à la mi-août leur pénétration dans le bois.*

INTRODUCTION

In the interior of British Columbia, wood borers of the genus *Monochamus*, cause a great deal of damage to trees injured by fire, and to freshly cut logs. Damage can be prevented by removing the trees or logs from the forest before the beetles oviposit, or by utilizing infested timber before the larvae have bored into the wood. When this is not feasible, preventive or control spraying may be necessary.

Becker *et al* (1956) demonstrated that one treatment of lindane emulsion sprayed on pine logs gave 87 to 100% protection against damage by wood borers and bark beetles throughout the entire summer.

In 1964 good control was obtained with lindane emulsion against *Dendroctonus ponderosae* Hopk. brood (Ross 1965) so that the same concentration was used against *Monochamus* spp. at Larkin, B.C. in 1965. The spray was tested (A) to prevent oviposition, and (B) to prevent half-grown larvae established under the bark from penetrating the wood.

METHODS

Three 10-inch d.b.h. ponderosa pine, *Pinus ponderosa* Lawson and Son, trees at Larkin were felled on 21 June 1965 and cut into 30 four-foot-long logs. Ten logs were placed in a group 200 feet apart from the remaining group of logs. This was to ensure that spray during treatment A would not inadvertently drift onto the check logs. The individuals within each group were spaced 10 feet apart in an east-west direction on two-inch blocks.

Treatment A. On 21 June to prevent *Monochamus* oviposition, lindane

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emulsible concentrate in water at 1% concentration[3] was applied by hand sprayer to the entire bark surface of each log in the discrete group of 10. One Imperial gallon treated 100 square feet of bark.

Treatment B. On 23 July, to prevent larval penetration of the wood, every other log in the group of 20 infested logs was removed some 175 feet and sprayed with 1% lindane. Most of the larvae in the logs were under the bark at the time of treatment but only a few had penetrated the wood to a depth of three-fourths of an inch. The spray was applied at 13:30 hours while the air temperature was about 90°F. No significant rainfall occurred until the latter half of August.

The treated and check logs were peeled on 12 and 13 August 1965 and the numbers of *Monochamus* egg niches, living and dead larvae, and galleries in the wood were counted on the central three-foot section of each log. Living larvae taken from the sprayed and check logs were kept without food in jars for 8 days to obtain comparative longevity data.

Results

Systematic observations were not made on the activity of insects on the site, but a number of *Monochamus maculosus* (Haldeman) adults were seen in copula on the unsprayed logs on 30 June. No insects were observed on the sprayed logs of treatment A, although two dead *M. maculosus* were found alongside. Boring dust from *Ips* sp. was present on all of the unsprayed logs by mid-July.

No *Monochamus* egg niches were seen in the bark of the logs of treatment A at the time they were peeled.

The mortality of *Monochamus* larvae by 13 August was 45% in the sprayed logs of treatment B and 7% in the check logs. Most of the living larvae in the sprayed logs were darkened and contracted in an abnormal manner.

Five of the sprayed logs of treatment B bore a total of 10 *Monochamus* galleries in the wood, none of which contained living or dead larvae at the time of peeling. All of the check logs were infested; a total of 115 galleries in the wood were found, and all contained larvae.

Table 1 shows the average number and range of *Monochamus* egg niches and larval galleries per square foot in sections of treated and check ponderosa pine logs in mid-August.

TABLE 1

Influence of Treatment on Wood Borers in Ponderosa Pine Logs

Treatment and Date 1965		Number of Monochamus	
		Egg niches in bark	larval galleries in wood
A.	Lindane 1% - 21 June	0	0
B.	Lindane 1% - 23 July	3.86 (0.27 to 11.84)	0.14 (0 to 0.60)
	Check	7.08 (0.13 to 18.54)	1.63 (0.13 to 3.31)

Of *Monochamus* larvae taken from the logs on 13 August and kept without food in vials, 70% of those from check logs, and only 18% of those from sprayed logs, were still alive by 20 August.

[3] 2½ oz. lindane (99% technical) in one pint Xylol 3 oz. emulsifier, and brought up to 1½ Imperial gallons of fluid.

Discussion

Conditions for the experiment appear to have been satisfactory. Numerous *M. maculosus* adults were present in the treatment area shortly after the trees were felled, and each of the 10 check logs and each of the 10 logs sprayed on 23 July bore many egg niches of *Monochamus*. The absence of egg niches in the logs sprayed 21 June and the presence of two dead adults alongside, indicate that treatment A was effective in preventing oviposition.

The logs sprayed (treatment B) on 23 July when peeled on 13 August, had an average of 3.86 niches per square foot, about half the number on check logs. Probably oviposition ceased on 23 July on the sprayed logs but continued on the check logs. Reduced longevity of the larvae that survived in the sprayed logs indicate that they had been weakened by the poison: it is assumed that they were incapable of burrowing into the wood.

About 1.5% of the *Monochamus* larvae had penetrated the wood of two logs peeled on 22 July, the day before the group of 10 attacked logs was sprayed. The fact that on 13 August the galleries in the wood of the check logs all contained larvae and the galleries in the sprayed logs were without larvae indicate that the latter had been excavated by the time of spraying, and that the lindane emulsion caused the larvae to withdraw to the bark. There were 12 times as many penetrations into the wood in the check logs (1.63 per square foot) as in the sprayed logs (0.14 per square foot) indicating that the spray had given good protection (See table). The presence of numerous *Ips* boring-holes in the bark of every log at the time of spray application permitted better penetration of the poison. At the time of peeling *Monochamus* larval mortality caused by the poison was about 40%, however the abnormal condition of the majority of larvae that survived and their shortened longevity indicate that the poison was much more effective than survival indicated.

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References

BECKER, W. B., H. G. ABBOTT, and J. H. RICH. 1956. Effect of lindane emulsion sprays on the insect invasion of white pine sawlogs and the grade yield of the resulting lumber. *Journ. Econ. Ent.* 49: 664-6.

ROSS, D. A. 1965. Control of mountain pine beetle, *Dendroctonus ponderosae* Hopk. brood in logs with lindane emulsion. *Proc. Ent. Soc. B.C.* 62: 8-10.