FORESTRY INSECT REPORTS

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CONIFERS IN GENERA: Abies, Picea, Pseudotsuga, Pinus
Western Spruce Budworm: Choristoneura occidentalis Freeman

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COMPARATIVE TOXICITY OF THREE FORMULATIONS OF PHOSMET TO WESTERN SPRUCE BUDWORM, 1980: The Imidan 1E formulation of phosmet has been field tested against the western spruce budworm with mixed results. In an attempt to increase the amount of phosmet in the Imidan formulation so that less carrier need be applied, Stauffer Chemical Co. developed two experimental formulations of Imidan 2E and 3E. For laboratory tests, insects were placed on fresh Douglas-fir foliage 24 hours before spraying and were held in Randall cages. Insecticide sprays were applied to 6th-stage larvae on foliage in a spray chamber. Formulations were diluted in water (12 or 32 mg ai/ml) with a delivery volume of 0.25 ml (equivalent to 9.4 l/ha). Two doses were selected from a dose response curve established for Imidan 1E; one was estimated to cause 50 percent mortality, the other 90 percent. The two doses of each formulation were applied in increasing concentration; the order of application of each formulation was randomized. After spraying, insects and foliage were replaced in the Randall cage. Mortality was evaluated at 7 days post-spray. Differences in mortality between the three formulations for each dose were evaluated with a 3 x 2 contingency table at the $\alpha = 0.05$ level.

The percent mortality from the three formulations was the same for each dose. No controls were considered necessary in this experiment; control mortality was 3.3 percent during dose fixing. From this test it is evident that there is no adverse effect on efficacy with an increase of phosmet concentration in a formulation. For greatest economy further field tests of Imidan should be conducted using the Imidan 3E formulation.

Formulation and rate (g/ha)	Number of larvae treated*	Percent mortality**
Imidan 1E, 185	355	78.3
Imidan 2E, 185	347	73.8
Imidan 3E, 185	352	78.1
Imidan 1E, 493	368	91.6
Imidan 2E, 493	385	95.1
Imidan 3E, 493	372	94.4

*The mortality for each treatment is the result of 20 replications of approximately 20 insects each.
**Mortalities from different formulations of phosmet applied at the same rate were not significantly different (x^2 = 2.58 w/2 d.f. for 185 g/ha and x^2 = 4.30 w/2 d.f. for 493 g/ha).

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TOXICITIES OF INSECTICIDES INGESTED BY WESTERN SPRUCE BUDWORM, 1980: Bioassays to determine the toxicities of 4 insecticides ingested by last stage western spruce budworm were conducted. Insects were selected at random from the 84th to 90th generations of non-diapausing laboratory colony. Eight concentrations serially diluted from a freshly formulated concentrate were used in each of 3 replications for each experiment. All insecticides were formulated in distilled water on the basis of weight/volume concentrations of the active ingredient. Two hundred ul of each solution were added to 10 cc of molten artificial diet and the diet was stirred thoroughly. When solidified, each diet aliquot was fed to 10 larvae. Mortality was tallied after 10 days.

DPX-5444 was the most toxic insecticide tested, while U-57770 was least toxic. The relative toxicity of the 4 insecticides was (LC_{50} DPX-5444 ÷ LC_{50} insecticide X):DPX-5444, 1.0; MV-770, 0.050; U-56295, 0.036; U-57770, 0.020.

Insecticide	Number treated*	Slope ± S.E.	LC_{50} (95% CL)**	LC_{90} (95% CL)**
DPX-5444	300	3.29 ± 0.36	0.30 (0.26-0.36)	0.74 (0.56-1.18)
MV-770	259	6.71 ± 1.32	6.0 (5.4-6.8)	9.4 (7.8-14.4)
U-56295	460	3.59 ± 0.30	8.4 (7.5-9.4)	19.2 (16.3-24.3)
U-57770	480	5.23 ± 0.81	14.9 (13.2-16.6)	26.3 (22.0-39.0)

*In control groups of 30-50 insects treated concurrently, estimated natural response ranged from 0 ± 0 to 0.073 ± 0.021.
**Concentrations are expressed in parts per million. Probit analysis performed by POLO (Russell, R. M., J. L. Robertson, and N. E. Savin. 1977. POLO: a new computer program for probit analysis. Bull. Entomol. Soc. Amer. 23(3): 209-13).