

CONTACT AND RESIDUAL TOXICITY STUDIES OF
ZECTRAN[®] AGAINST EIGHTEEN SPECIES OF
FOREST INSECT PESTS

Project CC-006

by

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Information Report CC-X-29

Canadian Forestry Service
Department of Environment

December 1972

Laboratory studies with Zectran[®] against a number of species of forest insect pests are continuing since 1965. The results have been presented in a number of reports published either by the species, or given in annual summary reports, and some results are unpublished. The purpose of this report is to consolidate under one cover, results of contact and residual toxicity studies carried out to date. This report presents data on Zectran[®] arranged chronologically as required by the department, various firms and other agencies from time to time. The LD₅₀ values and the residual toxicity studies are summarized in Table 1 and 2 respectively. The details of methods and materials and comparative studies with other insecticides are presented in references cited.

TABLE 1 - CONTACT TOXICITY OF ZECTRAN TO FOREST INSECT PESTS
TESTED UNDER LABORATORY CONDITIONS FROM 1965-1972.

	Insect Stage	LD ₅₀ µg/cm ² (48 hr)	Fiducial Limits (95%)	Reference
<u>1965</u>				
Swaine jack-pine sawfly	V instar	0.53	0.046-0.059	Nigam 1970a
<u>1966</u>				
Black-headed jack-pine sawfly	IV instar	0.027	0.021-0.032	Nigam 1970a
Larch sawfly	IV instar	0.035	0.031-0.039	Nigam 1970a
<u>1967</u>				
Forest tent caterpillar*	III instar	100% mort.	@0.094 µg/cm ²	
<u>1968</u>				
European pine sawfly	IV instar	0.020	0.015-0.024	Nigam 1970b
Spruce budworm	V instar	0.041	0.034-0.049	Nigam 1970a
Spruce budworm	VI instar	0.048	0.042-0.054	
Jack-pine budworm	VI instar	0.064	0.057-0.072	Nigam 1970c
Ambrosia beetle	Adult	0.164	0.134-0.190	Nigam 1969b
<u>1969</u>				
Sitka spruce weevil	Adult	0.617	0.547-0.684	
Eastern hemlock looper	III instar	0.102	0.088-0.117	
Green-striped forest looper*	IV instar	100% mort.	@0.673 µg/cm ²	Nigam 1971a
Western hemlock looper	III instar	100% mort.	@0.224 µg/cm ²	Nigam 1971a
<u>1971</u>				
Red-headed pine sawfly	IV instar	0.012	0.010-0.015	
White-pine weevil	Adult	0.081	0.068-0.950	Nigam 1971b
Gypsy moth*	III instar	100% mort.	@0.280 µg/cm ²	
Native elm bark beetle*	Adult	100% mort.	@0.112 µg/cm ²	
White-marked tussock moth	III instar	0.073	0.033-0.100	
Western false hemlock looper*	III instar	100% mort.	@0.280 µg/cm ²	Nigam 1972

* No LD₅₀ available. Figures show maximum mortality for minimum dosage.

TABLE 2 - RESIDUAL TOXICITY OF ZECTRAN^R (OLD & NEW PROCESS) AGAINST
VARIOUS SPECIES OF INSECT PESTS DURING 1970, 1971 AND 1972.

Year	Insect Species	Tree Species (Host)	Conc. of Insec. %	Rate of Application GPA	Days After Treatment	Corrected Percentage Mortality (hours after insect addition)			Weather Data for Test Period	
						24	48	72	Aver. or Total	
1970	Spruce Budworm (SBW)	White Spruce	2	1	0	80.4		98.0	Temp.	62°
					1	51.6	90.4	91.8	Dew Pt.	50°
					3		63.7	90.9	Rain	0.22"
					5			68.2	Sun	67.9 hrs
					10			56.4		
1971	Jack Pine Sawfly (JPS)	Jack Pine	1	1	0	100.0	100.0	100.0	Temp.	59°
					1	100.0	100.0	100.0	Dew Pt.	41°
					3	3.4	10.4	17.6	Rain	0.35"
					5	28.3	48.3	50.1	Sun	96.4 hrs
					10	33.3	67.2	80.7		
	Spruce Budworm (SBW)	White Spruce	2	1	0	100.0	100.0	100.0	Temp.	61°
					1	58.3	86.2	93.1	Dew Pt.	45°
					3	54.6	69.1	81.2	Rain	1.27"
					5	5.0	36.9	41.9	Sun	87.6 hrs
					10	29.0	45.2	62.8		
	Spruce Budworm (SBW)	White Spruce	2	1	0	100.0	100.0	100.0	Temp.	61°
					1	32.8	57.2	87.5	Dew Pt.	45°
					3	69.1	72.7	90.2	Rain	1.27"
					5	21.7	64.9	72.8	Sun	87.6 hrs
					10	27.1	41.3	54.1		
	Larch Sawfly (LSF)	Eur. Larch	1	1	0	100.0	100.0	100.0	Temp.	67°
					1	75.0	89.5	94.5	Dew Pt.	54°
					3	67.8	88.1	98.1	Rain	4.81"
					5	70.0	80.7	89.5	Sun	343.7 hrs
					10	71.7	98.3	98.3		
					15	10.0	25.9	21.5		
					20	16.7	38.3	56.9		
					25	23.3	30.0	43.3		
					30	30.0	70.0	80.7		
					35	21.7	51.7	70.0		
					40	12.5	23.1	42.1		

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TABLE 2 - RESIDUAL TOXICITY OF ZECTRAN^R (OLD & NEW PROCESS) AGAINST
VARIOUS SPECIES OF INSECT PESTS DURING 1970, 1971 AND 1972. - CONT'D

Year	Insect Species	Tree Species (Host)	Conc. of Insec. %	Rate of Appli- cation GPA	Days After Treatment	Corrected Percentage Mortality (hours after insect addition)			Weather Data for Test Period	
						24	48	72	Aver. or Total	
1972	Jack Pine Sawfly (JPS)	Jack Pine	1	1	0	100.0	100.0	100.0	Temp.	61°
					1	83.3	93.3	96.7	Dew Pt.	47°
					3	100.0	100.0	100.0	Rain	0.97"
					5	62.1	75.9	82.8	Sun	69.7 hrs
					10	36.9	69.2	83.7		
	Spruce Budworm (SPW)	White Spruce	2	1	0	49.9	76.7	82.2	Temp.	59°
					1	20.7	51.7	72.4	Dew Pt.	44°
					3	10.2	25.0	33.3	Rain	0.89"
					5	42.6	70.4	77.8	Sun	71.5 hrs
					10	14.2	25.3	40.2		
	Spruce Budworm (SBW)	Balsam Fir	2	1	0	84.9	90.0	98.0	Temp.	59°
					1	37.0	71.4	87.0	Dew Pt.	44°
					3	46.6	64.1	78.9	Rain	0.89"
					5	21.8	30.4	52.6	Sun	71.5 hrs
					10	17.2	50.8	78.5		

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