

Summary of Contact and Residual
Toxicity Studies of Insecticides
Against Forest Insect Pests
During 1972

Project CC-006

by

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SUMMARY OF CONTACT AND RESIDUAL TOXICITY STUDIES OF INSECTICIDES
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Insecticides were tested for contact and residual toxicity using a modified Potter's tower. The results are summarized under contract and residual toxicity studies. Unless otherwise specified mortality counts were made at 72 hours after treatment.

CONTACT TOXICITY

Insecticides were tested for contact toxicity against insects from British Columbia, Ontario, Quebec and the Maritimes. The results are summarized by area of origin and by species. Insect collections were provided by the staff of the Forest Insect and Disease Survey. Insecticides are arranged in descending order of toxicity.

BRITISH COLUMBIA

Ambrosia Beetle - *Trypodendron lineatum* (Olivier)

Five insecticides were tested against ambrosia beetle adults during 1972. The corrected percentage mortality ranged from 27% to 100%.

Dursban > B11163 > Dylox > Gardona > Phosvel

Western False Hemlock Looper - *Nepytia freemani* (Mun.)

Seven insecticides were tested against the larvae of this insect. The corrected percentage mortality ranged from 59% to 100%.

SBP1382 > phoxim > Zectran > Matacil > fenitrothion >
Gardona > Orthene

Black-headed Budworm - *Acleris variana* (Fernald)

Four insecticides were tested against larvae of black-headed budworm. The corrected percentage mortality ranged from 0% to 100%.

Matacil > fenitrothion > DDT > Dipel

Western Hemlock Looper - *Lambdina fiscellaria lugubrosa* (Hulst)

Three insecticides were tested against third instar larvae of western hemlock looper. The corrected percentage mortality ranged from 17% to 100%.

SBP1382 > phoxim > Orthene

ONTARIO

European Pine Sawfly - *Neodiprion sertifer* (Geoffroy)

Eleven insecticides were tested against fourth instar larvae of European pine sawfly. The corrected percentage mortality ranged from 59% to 100%.

Supracide > Dibrom > Dowco 214 > PP511 > SBP1382 > Meobal > trithion > Bassa > RL5396 > Galecron > allethrin

Black-headed Jack-pine Sawfly - *Neodiprion pratti banksianae* (Rohwer)

Eleven insecticides were tested against fourth instar larvae of black-headed jack-pine sawfly. The corrected percentage mortality ranged from 93% to 100%.

Supracide > methomyl > Dibrom > Dowco 214 > SBP1382 > PP511 > Fitios = Meobal > trithion > RL5396 > Galecron

Larch Sawfly - *Pristiphora erichsonii* (Hartig)

Nine insecticides were tested against fourth instar larvae of larch sawfly. The corrected percentage mortality ranged from 93% to 100%.

Supracide > SBP1382 > Cygon = PP511 > Surecide > Meobal > Dylox > trithion > allethrin

Spruce Budworm - *Choristoneura fumiferana* (Clemens)

Six insecticides were tested against sixth instar larvae of spruce budworm collected in the Ottawa area. The corrected percentage mortality ranged from 88% to 100%.

Matacil > Zectran > F6957 > fenitrothion = SBP1382 > DDT

Spruce Budworm Adults - *Choristoneura fumiferana* (Clemens)

Five insecticides were tested against spruce budworm adults. The corrected percentage mortality was 100% for all five insecticides for 24 hours after treatment.

Phoxim > fenitrothion > SBP1382 > Gardona > malathion

European Snout Weevil - *Phyllobius oblongus* (Linnaeus)

Four insecticides were tested against the adults of European snout weevil. The insects were treated with Methoxychlor and malathion in the field before being collected for laboratory studies. The corrected percentage mortality was 100% for 48 hours after treatment.

fenitrothion > phoxim > Dursban > Gardona

QUEBEC

Red-headed Pine Sawfly - *Neodiprion lecontei* (Fitch)

Eighteen insecticides were tested against fourth instar larvae of red-headed pine sawfly. The corrected percentage mortality ranged from 0% to 100%.

Gardona > Supracide > Dowco 214 > Phosvel > Bay 78182 > Meobal > PP511 > Dibrom > SBP1382 > Dupont 1642 > Imidan = trithion > Dimetilan > R15396 > Bassa > Neopynamin > Galecron > R23680

Swaine Jack-pine Sawfly - *Neodiprion swaini* (Middleton)

Seven insecticides were tested against fourth instar larvae of swaine jack-pine sawfly. The corrected percentage mortality ranged from 69% to 100%.

Supracide > phoxim > Cygon > SBP1382 > PP511 > Dylox > allethrin

Gypsy Moth - *Porthetria dispar* (Linnaeus)

Nine insecticides were tested against third instar larvae of gypsy moth reared on artificial diet from eggs collected in 1971. The corrected percentage mortality ranged from 0% to 100%

SBP1382 > Matacil > Supracide > Sevin ULV_B > Meobal > Orthene = Imidan > malathion > Galecron

MARITIMES

Spruce Coneworm - *Dioryctria reniculella* (Grote)

The corrected percentage mortality for sixth instar spruce coneworm was 52% with 2% fenitrothion at the rate of 1 gpa.

RESIDUAL TOXICITY

The insecticides were tested for residual toxicity by spraying potted host plants in the spraying chamber. The sprayed plants were exposed to weathering conditions for 10 days. The insects used for bioassay of residues were collected from field and maintained in the laboratory until their release on the insecticide treated foliage. The residue of the insecticides bioassayed on the same day of spraying (i.e. 4±2 hours after spraying) are referred to as 0 day and these host trees were not exposed to weathering. The insecticides are arranged in descending order of residual toxicity at 0 and 10 days of residual life. The corrected percentage mortality is given in brackets and is that observed 72 hours after releasing of insects.

Spruce Budworm - *Choristoneura fumiferana* (Clemens)

Residual toxicity of eight insecticides was tested against fifth instar larvae of spruce budworm. Two percent Matacil, Zectran, fenitrothion, and 5% DDT at the rate of 1 gpa were repeated from previous year using white spruce and balsam fir as hosts (Series I). Two percent Orthene, Sevin 4 Oil, Imidan and SBP1382 at the rate of 1 gpa were tested this year using white spruce (Series II).

Series I

White Spruce 0 day - Matacil(92) > Zectran(82) > fenitrothion(68) > DDT(42)
10 days - Matacil(50) > Zectran(40) > fenitrothion(27) = DDT(27)

Balsam Fir 0 day - Matacil(100) > Zectran(98) > fenitrothion(95) > DDT(74)
10 days - Matacil(90) > Zectran(79) > DDT(46) > fenitrothion(24)

Series II

White Spruce 0 day - Orthene(90) > Sevin 4 Oil(40) > Imidan(27) > SBP1382(7)
10 days - Orthene(16) > Imidan(12) > Sevin 4 Oil(2) > SBP1382(1)

Jack Pine Sawfly - *Neodiprion pratti banksianae* (Rohwer)

One percent concentration of five insecticides at the rate of 1 gpa were tested against fourth instar larvae of jack pine sawfly using jack pine plants.

0 day - Zectran = SD 8447 = Baygon = Matacil = Bayer 77488 all 100%
10 days - Zectran(84) > SD 8447(76) > Baygon(27) > Matacil(23) > Bayer 77488(0)

Larch Sawfly - *Pristiphora erichsonii* (Hartig)

Three insecticides were tested against fourth instar larvae of larch sawfly. Larch trees were sprayed with 1% concentration at the rate of 1 gpa.

0 day - Dimethoate == SD 8447(100) > Baygon(82)
10 days - Dimethoate(51) > SD 8447(50) > Baygon(15)

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List of Insecticides

No.	Insecticide	Type	Formula	Source
1	Allethrin	Botanical derivative contact	2-allyl-4-hydroxy-3-methyl-2-cyclopenten-1-one ester of 2,2-dimethyl-3-(2-methylpropenyl)-cyclopropanecarboxylic acid	McLaughlin Gormley King Company
2	Bassa [®]	Carbamate	O-sec-butylphenyl methyl carbamate	Kumiai
3	B11163	Organophosphate contact	O,O-dimethyl-O-(2 methoxy-4-cyanophenyl) phosphorothioate	Stauffer
4	Bay 78182	Organophosphate contact	(O-chlorophenyl) gloxylo nitrile oxime, O-O-diethyl phosphorothioate	Bayer
5	Cygon [®]	Organophosphate systemic	O,O-dimethyl (S-1N-methyl carbamoylmethyl)phosphorodithioate	American Cyanamide
6	DDT	Chlorinated hydrocarbon contact	1,1,1-trichloro-2,2-bis(p-chlorophenyl) ethane	Math. Col. & Bell
7	Dibrom	Organophosphate contact	1,2-dibromo-2,2-dichloroethyl dimethyl phosphate	Chevron
8	Dimetilan [®]	Carbamate contact	1-(dimethylcarbomoyl)-5 methyl-3-pyrazolyl dimethyl carbamate	Geigy
9	Dipel	Bacterial derivative	Bacillus thuringiensis	Abbott Laboratories
10	Dursban [®]	Organophosphate contact	O,O-diethyl O-(3,5,6-trichloro-2-pyridyl) phosphorothioate	Dow
11	Dowco [®] 214	Organophosphate contact	O,O dimethyl O-3,5,6-trichloro-2-pyridyl phosphorothioate	Dow

No.	Insecticide	Type	Formula	Source
12	Dupont 1642	Carbamate contact	S-methyl N(Carbamoyloxy)thioacetimidate	DuPont
13	Dylox [®]	Organo-phosphate contact	dimethyl (2,2,2-trichloro-1-hydroxyethyl)phosphonate	Chemagro
14	F6957	Botanical derivative contact	Stabilized pyrethrins	McLaughlin Gormley King Company
15	Fenitrothion [®]	Organo-phosphate contact	O,O-dimethyl O-(4-nitro-m-tolyl) phosphorothioate	Sumitomo
16	Fitios [®]	Organo-phosphate contact	S-[(ethylcarbamoyl)methyl] O,O-dimethyl phosphorodithioate	Bombrini
17	Galecron [®]	Amide contact	N'-(4-chloro-o-tolyl)-N,N-dimethylformamide	Ciba
18	Gardona [®]	Organo-phosphate contact	2-chloro-1-(2,4,5-trichlorophenyl)vinyl dimethyl phosphate	Shell
19	Imidan [®]	Organo-phosphate contact	O,O-dimethyl S-phthalimido-methyl phosphorodithioate	Stauffer
20	Malathion	Organo-phosphate contact	diethyl mercaptosuccinate, S-ester with O,O-dimethyl phosphorodithioate	American Cyanamide
21	Methomyl	Carbamate contact	methyl N-[(methylcarbamoyl)oxy]thioacetinate	DuPont
22	Matacil [®]	Carbamate contact	4-dimethylamino-m-tolyl methylcarbamate	Chemagro
23	Meobal [®]	Carbamate contact	3,4-xylyl methylcarbamate	Sumitomo
24	Neopynamin [®]	Botanical derivative contact	2,2-dimethyl-3-(2-methylpropenyl) cyclopropanecarboxylic acid esters with N-(hydroxymethyl)-1-cyclohexene-1,2-diacarboximide	Sumitomo
25	Orthene	Organo-phosphate contact	O-S-dimethyl acetyl phosphoroamidithioate	Chevron

No.	Insecticide	Type	Formula	Source
26	PP511	Organo-phosphate	2-diethylamino-6-methylpyrimidin-4-yl dimethyl phosphorothionate	Chipman
27	Phosvel	Organo-phosphate contact	O-(4-bromo-2,5-chlorophenyl) O-methyl phenyl phosphonothioate	Velsicol
28	Phoxim	Organo-phosphate contact	Phenylglyoxylonitrile oxime O,O-diethyl phosphorothioate	Chemagro
29	R15396	Organo-phosphate contact	4-[O,O-diethylphosphorothioyl] benzaloximino-N'-m-hexylcarbamate	Stauffer
30	R23680	Non organo-phosphate non-carbamate contact		Stauffer
31	SBP1382	Botanical derivative contact	(5-benzyl-3-furyl)methyl 2,2-dimethyl-3-(2-methylpropenyl)cyclopropanecarboxylate	Penick
32	Sevin ulv B	Carbamate contact	1 naphthyl methylcarbamate	Union Carbide
33	Surecide ^R	Organo-phosphate contact	O-p-cyanophenyl O-ethyl phenylphosphonothioate	Sumitomo
34	Supracide ^R	Organo-phosphate contact	S-((2-methoxy-5-oxo- Δ^2 -1,3,4-thiadiazolin-4-yl)methyl) O,O-dimethyl phosphorodithioate	Geigy
35	Trithion	Organo-phosphate contact	S[(p-chlorophenylthio)methyl] O,O-diethyl phosphorodithioate	Stauffer
36	Zectran ^R	Carbamate systemic	4-dimethylamino-3,5-xylol methyl carbamate	Dow

LIST OF INSECTS USED - CONTACT TOXICITY

Insect	Insect Code	Area of Origin	Instar Stage	No. of Insects Used
Ambrosia beetle	AMB	British Columbia	Adult	1400
Black-headed budworm	BHB	Nanaimo River, B.C.	Vth	720
False hemlock looper	NFL	Kamloops area, B.C.	IVth	600
Western hemlock looper	WHL	British Columbia	IIIrd	200
Spruce budworm	SBP	New Brunswick	Pupae	100
Spruce budworm	SBA	Ottawa area	Adult	1200
Spruce budworm	SBT	Thunder Bay area	Vth	800
Spruce budworm	SBWS	Ottawa area	VIth	2800
Spruce budworm	SBL	Laboratory reared	Vth	7400
Spruce budworm	SBLS	Laboratory reared	VIth	1200
Jack-pine budworm	JPB	Parry Sound District	Vth	400
Black-headed jack-pine sawfly	JPS	Ottawa area	IVth	6400
European pine sawfly	EPS	Belleville	IVth	3400
Larch sawfly	LS	Ottawa area	IVth	3600
European snout weevil	ESW	Sudbury District	Adult	400
Red-headed pine sawfly	RPS	Pontiac County	IVth	5800
Swaine jack-pine sawfly	SJS	Chicoutimi area	IVth	3200
Gypsy moth	GM	Southwestern Quebec	IIIrd	3600
Spruce cone worm	SCW	New Brunswick	Vth	90
White-marked tussock moth	WTM	Laboratory reared	IIIrd	1200

RESIDUAL TOXICITY

Spruce bud worm	SBW	Ottawa area	Vth	7500
Spruce budworm	SBW	Ottawa area	Adult	680
Black-headed jack-pine sawfly	JPS	Ottawa area	IVth	1800
Larch sawfly	LS	Ottawa area	IVth	3120