SUMMARY OF LABORATORY EVALUATIONS OF INSECTICIDES AGAINST VARIOUS SPECIES OF FOREST INSECT PESTS DURING 1975

by

P. C. NIGAM

Report CC-X-124

Chemical Control Research Institute
Canadian Forestry Service
Department of the Environment
Ottawa, Ontario

October, 1975

FMC33297 > NRDC 143 > FMC 40963 > Phosphamidon > Nuvanol®

Laboratory Reared Larvae

Eighteen insecticides and their formulations were tested against fifth instar larvae of laboratory-reared spruce budworm. The corrected percentage mortality ranged from 23% to 100%.

NRDC 119 > RU 11679 > RU 11483 = Matacil® + .005% GA 4 421 = Matacil + .005% GA 4 282 = Matacil + .001% GA 4 282 = SBP 1513 = Matacil + .001% GA 4 279 = Matacil + .001% GA 4 421 > Matacil Tech. > FMC 33297 > RH 218 > Dowco® 214 = Methomyl = Fenitrothion + .005% GA 4 421 > Fenitrothion + .005% GA 4 282 = Fenitrothion + .005% GA 4 279 > Fenitrothion = Dylox® Tech. = Dylox Std. Tech. = Dylox Molten Tech. > Phosvel® Tech. > Dimethoate Irving = Dimethoate Cyanamid 6b = Dimethoate Cyanamid Tech. = Dimethoate Cyanamid 3b > ABG 6010 > Diazinon > Malathion.

Laboratory Reared Pupae

Eleven insecticides were tested against pupae of laboratory reared spruce budworm. The corrected percentage mortality ranged from 0% to 100%.

Supracide® > Phosphamidon > Imidan® > Methomyl > Dimethoate Cyanamid Tech. > Zectran® > Matacil > Fenitrothion > Orthene > DDT > Dimetilan®

Larch Sawfly - *Pristiphora erichsonii* (Hartig)

Nine insecticides were tested against fourth instar larvae of larch sawfly. The corrected percentage mortality ranged from 62% to 100%.

RU 11679 > S 5602 TG = Fyfanon® > Fenitrothion = FMC 33297 > Chipman NRDC 143 > ABG 6010 > Dowco 214 > Dylox.

Fifteen insecticides were tested against fifth instar larvae of larch sawfly. The corrected percentage mortality ranged from 45% to 100%.

S 5602 TG > FMC 40963 > SBP 1513 > Fyfanon > RH 218 = NRDC 119 > Chipman NRDC 143 = FMC 33297 > Dylox = Dowco 214 > RHC 367 > ABG 6010 > Bay NTN 9306 > Bay NTN 8629 > Orthene.

Jack Pine Sawfly - *Neodiprion pratti banksianae* Rohwer

Thirteen insecticides were tested against fourth instar larvae of Jack pine sawfly. The corrected percentage mortality ranged from 24% to 100%.

NRDC 119 = Supracide > SBP 1513 = Dowco 214 > Fyfanon > S 5602 TG = Chipman NRDC 143 > FMC 33297 = ABG 6010 > RH 218 > RHC 367 > Phosvel > Orthene.

Five insecticides were tested against fifth instar larvae of Jack pine sawfly. The corrected percentage mortality ranged from 89% to 100%.

SBP 1513 > Dowco 214 > Chipman NRDC 143 > FMC 33297 > RH 218.

QUEBEC

Swaine Jack Pine Sawfly - *Neodiprion swainei* Middleton

Twelve insecticides were tested against fourth instar larvae of Swaine Jack pine sawfly. The corrected percentage mortality ranged from 22% to 100%.

RU 11679 > Supracide > FMC 40963 > SBP 1513 > Chipman NRDC 143 > FMC 33297 > ABG 6010 > Bay NTN 9306 > RH 218 > S 5602 TG > Bay NTN 8629.

Four insecticides were tested against fourth instar larvae of Swaine Jack pine sawfly. The corrected percentage mortality ranged from 38% to 100%.

FMC 33297 > Dowco 214 > Bay NTN 8629 > RH 218.

Red-Headed Pine Sawfly - *Neodiprion Lecontei* (Fitch)

Four insecticides were tested against fourth instar larvae of Red-headed pine sawfly. The corrected percentage mortality ranged from 77% to 100%.

FMC 40963 > Chipman NRDC 143 = FMC 33297 > RH 218.

STOMACH TOXICITY

Six insecticides, two bacterial formulations and PH 60-40 were tested against the fifth instar larvae of laboratory reared Spruce budworm, except for PH 60-40, which was tested with both fourth and fifth instar larvae. The toxicity of the treatments was evaluated after 72 hours, except for PH 60-40, where observations were taken up to 19 days. The corrected percentage mortality ranged from 3% to 90% for insecticides; and from 95% to 100% for the bacterial formulations.

Dowco 214 > RH 218 > RU 11679 wp > Phosvel > FMC 33297 > SBP 1513.

Dipel® + .0005% chitinase = Dipel > Dipel + .002% chitinase > Thuricide® + .002% chitinase > Thuricide + .0005% chitinase > Thuricide.

In PH 60-40, 100% mortality of fifth instar larvae was observed at 2.1995 $\mu g/cm^2$ dose after 19 days; 1.2616 $\mu g/cm^2$ dose gave 100% mortality of fourth instar after 12 days.

STOMACH AND CONTACT TOXICITY

Five insecticides were tested against fifth instar larvae of laboratory reared spruce budworm. The corrected percentage mortality was taken 72 hours after treatment, and ranged from 41% to 100%.

SBP 1513 = FMC 33297 > Dowco 214 > RH 218 > Phosvel.

RESIDUAL TOXICITY

The insecticides were tested for residual toxicity by spraying potted trees in the spraying chamber. The sprayed host plants were then exposed to weathering conditions for up to 10 days for jack pine, balsam fir, white spruce; and for up to 40 days for larch. The insects used for bioassay of residues were collected in the 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 hrs. 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, except in the case of Ph 60-40 where it is ten days after insect addition.

Spruce Budworm - *Choristoneura fumiferana* Clemens

Residual toxicity of sixteen insecticides was tested against the spruce budworm. Of these, thirteen were tested against fifth instar, one against fourth instar larvae, and two against the spruce budworm adult. Two percent aminocarb and phoxim, and five percent Orthene, at the rate of 9.4 ℓ/ha (1 GPA) were tested in Series I against fifth instar larvae using balsam fir as hosts. Phoxim was tested for the first time on balsam fir, aminocarb and Orthene were repeats from previous years. Methomyl, phoxim, Volaton-A, Volaton®-B, and Volaton-D (various formulations of phoxim) were all applied against fifth instar larvae to white spruce as a solution of 2% active ingredient at a rate of 9.4 ℓ/ha (1 GPA). The Volaton formulations and phoxim (run for comparison) were repeated from last year.

In white spruce Series II, FMC 33297, leptophos, RH 218, trichlorfon, Dowco 214, and Chipman NRDC 143 were tested at 2% A.I. and at a rate of 9.4 ℓ/ha (1 GPA) against fifth instar spruce budworm. All except trichlorfon, which was run 5 years ago, were tested for the firest time. PH 60-40 at 2 and 1% A.I. and at a rate of 9.4 ℓ/ha(1 GPA) was tested against fourth instar spruce budworm. It was a repeat from the previous year although, at that time, a 5% solution against fifth instar, and an application of insecticide by hand were used.

First attempt to study residual toxicity against spruce budworm adults was made. Phosphamidon and iodofenphos at 1.25, 0.625, 0.312% and 2, 1, 0.5%, respectively, were applied at the rate of 9.4 ℓ/ha (1 GPA) to potted white spruce trees. After insecticide application, the trees were exposed to the weathering elements for a period ranging from 0 to 10 days. Foliage was clipped at 0 (4 ±2 hrs.), 3,5, and 10 days after treatment. The clipped foliage was placed into plastic dishes equipped with perforated snap-on lids and 10 spruce budworm adults (5 female and 5 male moths) were released into each dish. There were 4 dishes for each insecticide concentration and weathering period, and the same number of dishes for control. Mortality counts were taken at 24, and 72 hours.

Balsam Fir

0 day - Orthene = phoxim (100) > aminocarb (64)
10 day - Orthene (53) > aminocarb (30)

White Spruce - Series I

0 day - methomyl = Volaton-A = Volaton-B (100) > Volaton-D (98) > phoxim (96)

10 day - methomyl (0)

White Spruce - Series II

0 day - Chipman NRDC 143 = FMC 33297 = Dowco 214 = RH 218 = leptophos (100) > trichlorfon (94)

10 day - Chipman NRDC 143 (100) > FMC 33297 (71) > Dowco 214 (50) > leptophos (25) > trichlorfon (8) > RH 218 (4)

0 and 10 day values for 1% and 2% PH 60-40, ten days after insect addition were 56 and 35% for 1% and 44 and 27% for the 2% solution, respectively.

Spruce Budworm Adult

White Spruce - 0 day - 2% iodofenphos (89) > 1% iodofenphos (82) > 0.5% iodofenphos (75) > 1.25% phosphamidon (73) > 0.625% phosphamidon (17) > 0.312% phosphamidon (15)

10 day - 2% iodofenphos = 1% iodofenphos = 0.5% iodofenphos (5) > 1.25% phosphamidon = 0.625% phosphamidon = 0.312% phosphamidon (0)

Jack Pine Sawfly - *Neodiprion pratti banksianae* Rohwer

One percent concentrations of five insecticides: Dowco 214, FMC 33297, Leptophos, Chipman NRDC 143, and RH 218, applied to jack pine at the rate of 9.4 ℓ/ha (1GPA); were tested for the first time against fourth instar jack pine sawfly.

0 day - Chipman NRDC 143 = FMC 33297 = leptophos = Dowco 214 = RH 218 = all 100%

10 day - Chipman NRDC 143 (100) > FMC 33297 (74) > Dowco 214 (43) > leptophos (23) > RH 218 (17)

Larch Sawfly - *Pristiphora erichsonii* (Hartig)

Three insecticides, aminocarb, fenitrothion, and Imidan were tested at 1% concentration of active ingredient and a rate of 9.4 ℓ/ha (1 GPA) against fourth instar larch sawfly, using European larch as host trees. This is a repeat from single test runs in 1970 and 1971.

0 day - aminocarb = Imidan = fenitrothion - all 100%

10 day - aminocarb (100) > Imidan (81) > fenitrothion (48)

INSECTICIDES TESTED IN 1975

NO.	INSECTICIDE	FORMULATION % A.I.	TYPE	SOURCE
1	ABG 6010	48		Abbot Laboratory
2	Bay NTN 8629	45		Chemagro
3	Bay NTN 9306	65		Chemagro
4	Chipman NRDC 143	25 E.C.		Chipman
5	DDT	100	Chlorinated hydrocarbon	Math. Col. & Bell
6	Diazinon®	97.3	Organophosphate	CIBA-Geigy
7 (a)	Dimethoate (Irving)	30.9	Organophosphate	Irving Co.
(b)	Dimethoate (Cyanamid 3b)	30.9	Organophosphate	Cyanamid Co.
(c)	Dimethoate (Cyanamid 6b)	30.9	Organophosphate	Cyanamid Co.
(d)	Dimethoate technical	94.4	Organophosphate	Cyanamid Co.
8	Dimetilan®	25 E.C.	Carbamate	Geigy
9	Dowco® 214 technical	95.6	Organophosphate	Dow
10 (a)	Dylox® technical	98	Organophosphate	Chemagro
(b)	Dylox® Molten technical	39	Organophosphate	Chemagro
(c)	Dylox® Standard technical	39	Organophosphate	Chemagro
11 (a)	Fenitrothion	98.7	Organophosphate	Sumitomo
(b)	Fenitrothion + synergist GA 4-279, GA 4-282, GA 4-421	98.7 100	Organophosphate	Sumitomo Geigy
12	FMC 33297 (NRDC 143)	10 E.C.	Pyrethroid	FMC Corp.
13	FMC 40963 (NRDC 143)	5 E.C.	Pyrethroid	FMC Corp.
14	Fyfanon®	95	Organophosphate	Cheminova
15 (a)	Gardona®	94	Organophosphate	Shell
(b)	Gardona® + pinolene			
16	Imidan®	12.5	Organophosphate	(Stauffer) Chipman
17	Malathion (CYTHION®)	50	Organophosphate	Cyanamid Co.

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NO.	INSECTICIDE	FORMULATION % A.I.	TYPE	SOURCE
18 (a)	MATACIL® Technical	99	Carbamate	Chemagro
(b)	MATACIL®	34	Carbamate	Chemagro
(c)	MATACIL® technical + Synergist GA 4 279, 4 282, 4 421	99 100	Carbamate Synergist	Chemagro Geigy
19	Methomyl (Lannate®)	100	Carbamate	DuPont
20	NRDC 119	100	Pyrethroid	Procida
21	Nuvanol® 20U (iodofenphos)	20 E.C.		Geigy
22 (a)	Orthene®	94	Organophosphate	Chevron
(b)	Orthene® + pinolene	94 100	Organophosphate Emulsifier	Chevron Geigy
23	Phosphamidon	90	Organophosphate	CIBA
24	Phosvel® technical	92	Organophosphate	Velsicol
25	Phoxim (Bayer 77488)	89	Organophosphate	Chemagro
26	RH 218	88	Organophosphate	Rohm & Haas
27	RHC 367	100	Organophosphate	Rohm & Haas
28	RU 11483	100	Pyrethroid	McLaughlin, Gormley & King Co.
29	RU 11679	100	Pyrethroid	McLaughlin, Gormley & King Co.
30	S 5602 TG	100		Sumitomo
31	SBP 1382 (resmethrin)	84.5	Pyrethroid	S.B. Penick
32	SBP 1513	90	Pyrethroid	S.B. Penick
33	Supracide®	40	Organophosphate	Geigy
34 (a)	Volaton® (A) volaton oil)	12.9	Organophosphate	Chemagro
(b)	Volaton® (B) corn oil	12.4	Organophosphate	Chemagro
(c)	Volaton® (D) 5% uv	12.9	Organophosphate	Chemagro
35	Zectran®	93	Carbamate	Dow

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NO.	INSECTICIDE	FORMULATION % A.I.	TYPE	SOURCE
36 (a)	Dipel®	10	Bacteria	Abbott
(b)	Dipel® + Chitinase			
37 (a)	Thuricide®	0.69	Bacteria	Sandoz-Wander Inc.
(b)	Thuricide® + Chitinase			
38	PH 60/40	25wp	Urea	Thompson-Hayward

INSECTS USED IN 1975

INSECT	AREA OF ORIGIN	INSTAR	NO. USED
	CONTACT TOXICITY		
JACK PINE SAWFLY	LANARK, ONT.	IV	5,040
JACK PINE SAWFLY	LANARK, ONT.	V	1,050
LARCH SAWFLY	OTTAWA VALLEY, ONT.	IV	2,010
LARCH SAWFLY	OTTAWA VALLEY, ONT.	V	7,560
SPRUCE BUDWORM	LAB. REARED (SAULT)	V	23,610
SPRUCE BUDWORM	LAB. REARED (SAULT)	PUPAE	2,730
SPRUCE BUDWORM	OTTAWA VALLEY, ONT.	V	210
SPRUCE BUDWORM	OTTAWA VALLEY, ONT.	ADULT	1,260
REDHEADED PINE SAWFLY	QUEBEC	IV	1,680
SITKA SPRUCE WEEVIL	BRITISH COLUMBIA	ADULT	1,050
SWAINE JACK PINE SAWFLY	QUEBEC	IV	2,730
SWAINE JACK PINE SAWFLY	QUEBEC	V	840
WHITE PINE WEEVIL	NORTHERN ONTARIO	ADULT	1,050
	STOMACH TOXICITY		
SPRUCE BUDWORM	LAB. REARED (SAULT)	IV	210
SPRUCE BUDWORM	LAB. REARED (SAULT)	V	4,250
	STOMACH & CONTACT TOXICITY		
SPRUCE BUDWORM	LAB. REARED (SAULT)	V	1,260
	RESIDUAL TOXICITY		
JACK PINE SAWFLY	LANARK, ONT.	IV	2,400
LARCH SAWFLY	OTTAWA VALLEY, ONT.	IV	2,640
SPRUCE BUDWORM	OTTAWA VALLEY, ONT.	IV	900
SPRUCE BUDWORM	OTTAWA VALLEY, ONT.	V	5,220
SPRUCE BUDWORM	OTTAWA VALLEY, ONT.	ADULT	560