

CONTACT TOXICITY OF VARIOUS
PYRETHROID INSECTICIDES AGAINST
DIFFERENT STAGES OF THE SPRUCE BUDWORM LARVAE

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by

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INTRODUCTION

The use of chemical insecticides to manage forest insect pests has become one of the most controversial and emotional issues from the sixties. An ideal or even acceptable insecticide chemical should possess very high effectiveness against the pests and must not be toxic to humans exposed on short- or long-term basis, as it is applied or to the residues resulting from its use. The compound should have a physiological specificity or use pattern that is not harmful to other beneficial organisms, including not only useful insects (predators, parasites and pollinators) but all exposed bioi (fish, birds and small mammals etc.), particularly those directly contacted by the insecticide in the form and manner applied. The residues of the compound must dissipate, by physical or chemical means at a rate so that hazardous levels do not accumulate in individual organisms or on passing through a food chain. The insecticide should be easy to formulate and compatible with other adjuvants, available in adequate supply and must be economical (Nigam 1971).

The natural pyrethrins come very close to fulfill these requirements. In the late sixties keeping this in mind work on stabilized natural pyrethrins and resmethrin (SBP 1382) was started in this laboratory (Nigam 1975). In the meantime, Dr. Elliot of Rothanshend Experimental Station and other organic chemists from U.S.A., Czechoslovakia and Japan have continued to synthesize a number of new compounds similar to pyrethrin in order to further improve upon them. The main aim of their synthesis was to retain good qualities of natural products but to overcome its drawbacks (particularly its lack of stability in sunlight) which restricts its field use in forestry and agriculture.

Natural Pyrethrins have the following excellent properties:

- i) A wide spectrum of insecticidal activity;
- ii) Rapid knockdown and kill;
- iii) Insect-repellency;
- iv) Low mammalian toxicity; and
- v) Non-persistence in the environment.

They had the following drawbacks, which made them of limited use to forestry:

- i) High cost
- ii) Instability in sunlight;
- iii) High toxicity to aquatic organisms.

A number of synthetic pyrethroids were tested against various species of forest insect pests starting from Allethrin to NRDC 168 along with natural pyrethrins in order to find a more acceptable chemical insecticide. This report presents work carried out with spruce budworm from 1971 to 1981 for evaluation of contact toxicity of pyrethroid compounds. The data is arranged according to various stages in chronological order for internal use and will be further processed for future publication as required.

METHOD AND MATERIAL

(i) Field collected spruce budworm larvae:

Third and fourth instar larvae of spruce budworm were collected in the field from the Ottawa area. The larvae were kept in cold room at 10°C and 70-80% R.H. until they were sorted for different instars. They were provided with young tender buds of white spruce and balsam fir as food. The sorted insects were kept in growth chambers maintained at 20-21°C, 70 ± 2% R.H. and a photoperiod of 16 hours. The larvae were reared to 5th and 6th instars or to pupae as required in the growth chambers. The larval development was delayed at times to coordinate the spray program by lowering the rearing temperatures to 5°C.

(ii) Laboratory reared spruce budworm:

Diapausing second instar spruce budworm larvae were received from insect rearing section. The larvae were kept first at room temperature (24°C) for 4-5 hours and were then placed inside an environmental chamber at 22°C, 70% R.H. and 16 hour photoperiod for breaking their diapause. The larvae were transferred onto a synthetic diet poured into creamer cups and were reared inside the environmental chamber operating at the same settings as mentioned above. The various stages of spruce budworm were sorted out from the creamer cups as required.

(iii) Insecticides and their formulation:

The details of insecticide formulations used in this study are given in Table 100. The concentration of each insecticide used is given in the plan of each experiment. The insecticides were diluted from the concentrates with dyed Velsical AR60 to the final concentration (Table 100). Mix A was used to dissolve the technical grade before diluting with AR60. Dupont oil red (0.5%) was used as a tracer dye. The same insecticides were obtained from different sources with slight differences in their formulations and production procedures were also tested (Table 100).

(iv) Insecticide treatment:

The spraying procedure was very similar to that described by Nigam (1968 and 1969). A modified Potters tower was calibrated to deliver volumes of dyed insecticide solutions resulting in deposits of 0.1 to 1.0 imperial gallons per acre (1.12 to 11.2 litres per hectare). The calibration of the tower was carried out in time Units (Nigam, 1967); using a micro-syringe for the standard deposit on the required surface area (9 cm No. 1 Whatman filter paper circles). The deposits of insecticides were determined by colorimeter method as described by Rayner (1956). Thirty to ninety larvae per dosage in replicate groups of 10 were sprayed to determine contact toxicity. The spray was applied directly onto CO₂ anesthetized larvae placed on Whatman filter paper circles. The pupae were not anesthetized. The deposit was calculated in µg/cm² and used for probit analysis. Two types of controls were used in preliminary studies, i.e., controls treated with dyed solvents and without solvent treatment. There was no apparent

effect of the solvent on the control mortality so controls without solvents were used in the final studies. The details of each experiment are described individually (Experiments 1-67).

(v) Observation and analysis of data:

The larvae were held at 21°C and 55-60% R.H. after treatment and provided with fresh foliage or synthetic diet. Mortality counts were made at 24, 48 and 72 hours after treatment and corrected for control mortality according to Abbott's formula (1925). Probit analysis of the data was carried out according to Finney (1964) using program No. S103 prepared by Statistical Research Science, Canada Department of Agriculture for a Univac 1108 computer and subsequently modified for Fortran. The computer service was provided by Biometric and Computer division of Canada Department of Fisheries and Forestry. The relative potencies of the insecticides were calculated according to Finney (1964) using aminocarb as the standard insecticide.

EXPERIMENTS AND RESULTS

The studies conducted during 1971 to 1981 can be divided into the following categories:

Evaluation of various pyrethroid compounds against laboratory reared L₅ and field collected L₅ and L₆ for selection of most effective material.

Evaluation of toxicity against laboratory reared L₅ of the same pyrethroid compound in different formulations received from the same source or different manufacturers to determine their effectiveness.

Comparative susceptibility of L₂, L₃ and L₅ to contact-toxicity of permethrin.

Comparison of toxicity of pyrethroids to laboratory reared and field collected L₅.

Differences in the susceptibility of L₅ and L₆ collected from field to various pyrethroids.

The plan of each experiment is presented individually (Experiments 1-67) and mortality observations for 24, 48 and 72 hours after treatment are tabulated for each experiment (Tables 1-67). The results of probit analysis for each period of observation are given at the end of each experiment. The comparative contact toxicity of 24, 48 and 72 hours after treatment against larvae is presented in Tables 68-99. The values are rounded to three decimal places, which may effect some fuducial limits and LD₅₀, LD₉₅ values.

(i) Evaluation of various pyrethroid compounds against laboratory reared L₅ and field collected L₅ and L₆ for selection of most effective material.

(a) Laboratory reared fifth instar (L₅)

The work reported here was carried out from 1975 to 1978 and the evaluation of these materials is done on the basis of 72 hour contact toxicity data summarized in Tables 73, 76, 79, and 80. The NRDC 143 (permethrin) supplied by Chipman Chemical Co. was used as a standard for comparison of various compounds as Chipman Chemical Company was most active for development of permethrin for forestry use in Canada. NRDC 143 experiment No. 11 carried out in 1976 was used for comparison if NRDC 143 was not tested that year along with other materials, except in 1978 when the 1977 experiment was used for comparison.

In 1975, permethrin from two sources and ABG 6010, asmethrin and bioethanomethrin were tested (Table 73). Asmethrin was most promising but its further development was not carried out due to lack of interest by the participating company. ABG 6010 was poorest and others were equal to permethrin at LD₉₅ level.

In 1976, permethrin formulations from FMC and Chipman, cypermethrin, fenpropanate, fenvalerate and bioethanomethrin (racemic form) were tested. Among the various permethrin formulations the Chipman formulation was the most effective. When comparison with other pyrethroids was done, cypermethrin was approximately 2.5 times more toxic than permethrin (Chipman) and the others were similar to permethrin (Table 76).

In 1977, seven pyrethroids in 17 formulations from different sources were tested. Decamethrin from FMC was the most effective at LD₉₅ level followed by Decamethrin and NRDC 168s from Procida, then cypermethrin and fenvalerate. Decamethrin is 17-34 times more toxic than permethrin (NRDC-143) at LD₉₅ level and cypermethrin 2 to 4 times more toxic than permethrin (NRDC-143) at LD₉₅ level depending upon the source. Fenvalerate was slightly better than permethrin (Chipman NRDC 143) at LD₉₅ level (Table 79).

In order to confirm the 1977 findings that cypermethrin is approximately 4 times more toxic than permethrin and fenvalerate is slightly better than permethrin. Experiments with these compounds were repeated in 1978 and a new compound AC 222-705 was introduced. The cypermethrin and fenvalerate became of special interest because Shell and Sumitomo were interested to develop these compounds for forestry use. In 1978, cypermethrin and fenvalerate at 72 hours after treatment at LD₉₅ level were 4.86 and 1.10 times respectively more toxic than permethrin (NRDC 143) and AC 222-705 was approximately 2.43 times more toxic than permethrin at the LD₉₅ level 72 hours after treatment (Table 80). Decamethrin and NRDC-168s were not further tested as there was no interest expressed by participating company until 1981. During 1980 and 1981 AC 222-705 (Payoff), NRDC-143 (Permethrin), S57-2 (Fenvalerate), WL 41706 (Fenvalerate) and WL 43467 (Cypermethrin) were tested. These results were very similar to previous years (Table 82 and 83).

On the basis of toxicity to 5th instar laboratory reared spruce budworm larvae, following relative toxicity of commercially available pyrethroid compounds can be expressed on the basis of LD₉₅ values for 72 hours and using value of permethrin as one:

<u>Insecticide</u>	<u>Relative Toxicity</u>
Permethrin	1
Fenvalerate	1.1 to 1.4
AC 222-705 (Payoff)	2.4 to 4.55
Cypermethrin	2.8 - 5.56
Decamethrin	17 - 34

There is a range in relative toxicities due to differences in sources and formulation of the compounds.

(b) Field collected fifth instar larvae

Testing against field collected fifth instar was done from 1974 to 1980. The materials tested were bioethanomethrin, fenvalerate, permethrin, fenpropanate, cypermethrin (WL 43467). Cypermethrin was most effective approximately 5-6 times more toxic at LD₉₅ level 72 hours after treatment followed by fenvalerate and bioethanomethrin (Tables 84, 85, 88, 89 and 90). There was variation in toxicity of fenvalerate from year to year probably due to variation in field collected insects.

(c) Field collected sixth instar larvae

The experiments were conducted from 1971 to 1980. The compounds were pyroicide, resmethrin, bioethanomethrin, SP2539, asmethrin, permethrin, cypermethrin and fenvalerate (Table 92, 93, 94, 95, 96, 97, 98 and 99) out of nine compounds cypermethrin is the most promising followed by asmethrin and permethrin.

(ii) Evaluation of toxicity against laboratory reared L₅ of the same pyrethroid compound in different formulations received from the same source or different manufacturer to determine their effectiveness.

Four pyrethroid compounds; permethrin, cypermethrin, fenvalerate and decamethrin were supplied by various manufacturers in different formulations, their effectiveness is described individually.

Permethrin: Permethrin was supplied by FMC, S.B. Penick and Chipman as their experimental compound No. FMC 33297, FMC 40963, SBP 1513 and NRDC 143 in the form of 40% EC, 5% EC, 90% tech and 25% EC, respectively (Table 100). The LD₅₀ values to L₅ from all sources was the same i.e., 0.15 µg/cm², however, there was a slight difference in LD₉₅ values but they were not significant (Table 73 & 79).

Cypermethrin: Cypermethrin was supplied by FMC, Chipman and Shell as their Experimental Code Nos. FMC 30980, PP 383 and WL 43467 in the form of 20% EC, 97% technical and 40% EC respectively (Table 100). At LD₅₀ levels there was no difference in the products received from the different sources, the LD₅₀ values were 0.003 µg/cm² for PP 383 and WL 43467 and 0.004 µg/cm² for FMC 30980, these values were not significantly different. At LD₉₅ level WL 43467 is the most effective and FMC 30980 is least effective among the formulations (Table 79).

Fenvalerate: Fenvalerate was supplied by Sumitomo and Shell as Experimental Compound No. S5602 and WL 43775 in the form of 20% EC and 30% EC respectively (Table 100). There was no difference in the toxicity of the fenvalerate formulations at LD₅₀ level to L₅. At the LD₉₅ level S5702 was slightly better than WL 43775 but differences were not significant (Table 79).

Decamethrin: Decamethrin was provided by FMC and Procida as their Experimental compound No. FMC 45498 and NRDC 161 respectively in the form of 2.6% EC. Decamethrin from both sources had no significantly different LD₅₀ values; while at LD₉₅ level FMC 45498 was two times more toxic than NRDC 161 (Table 79).

(iii) Comparative susceptibility of laboratory reared L₂, L₃ and L₅ to contact toxicity of permethrin.

In 1976, permethrin was tested against L₂, L₃ and L₅ Table No. 68, 69 and 76. From their LD₅₀ and LD₉₅ values second instars appear to be least susceptible as compared to L₃ and L₅. There was no difference in the susceptibility of L₃ and L₅ larvae.

(iv) Comparison of toxicity of pyrethroids to laboratory reared and field collected L₅.

Five compounds; permethrin, fenvalerate, bioethanomethrin (racemic form), fenpropanate and cypermethrin were tested against laboratory reared L₅ and field collected L₅ (Tables 76, 80, 84, 88 and 90). The comparison of susceptibility of two sources of L₅ is done on the basis of LD₅₀ and LD₉₅ values at 72 hours after treatment and insecticides are discussed individually.

Permethrin: NRDC 143 was tested in 1976 with both types of L₅ and field collected L₅ appear to be less susceptible as compared to laboratory insects at both LD₅₀ and LD₉₅ level (Table 76 & 88).

Fenvalerate: S 5602 was tested in 1976 with both types of L₅ here again field collected insects appear to be less susceptible at both LD₅₀ and LD₉₅ level (Table 76 & 88).

Fenpropanate: S-3206 was also tested in 1976 with both types of population in this case field collected insects were more susceptible as compared to laboratory reared L₅ (Table 76 & 88).

Cypermethrin: WL43467 was tested in 1978 on both laboratory and field collected L₅. Field collected were slightly more susceptible but there was no significant difference (Table 80 & 90).

Bioethanomethrin (racemic form): RU 11483 was tested with field collected L₅ during 1974 and with laboratory reared L₅ in 1976. In this case there was no difference in susceptibility at LD₅₀ level, while at LD₉₅ level, field collected larvae were less susceptible but the differences are not very significant (Table 76 & 84).

(v) Differences in susceptibility of L₅ and L₆ collected from field to various pyrethroids.

Four insecticides; permethrin, fenvalerate cypermethrin and bioethanomethrin were tested against field collected fifth and sixth instar larvae. The susceptibility differences are compared at 72 hours after treatment. Each insecticide is discussed individually.

Permethrin: NRDC-143 was tested in 1976 against L₅ and L₆ collected from field. Sixth instar were slightly more susceptible as compared to fifth instars. The differences are significant at LD₅₀ level while at LD₉₅ level, differences are not significant (Table 88 and 96).

Fenvalerate: S-5602 was tested in 1978 against L₅ and L₆ collected from field. Fifth instar were more susceptible to this material as compared to sixth instar and differences were significant at both LD₅₀ and LD₉₅ levels (Table 90 and 98).

Cypermethrin: WL 43467 was also tested during 1978 against L₅ and L₆ collected from field. There is no difference in susceptibility of L₅ and L₆ at LD₅₀ level. While at LD₉₅ level L₆ is significantly less susceptible (Table 90 and 98).

Bioethanomethrin: RU 11679 was tested against field collected L₆ in 1973 and L₅ in 1974. L₅ are more susceptible to this material as compared to L₆. The differences are significant at LD₅₀ level while at LD₉₅ fiducial limits are overlapping, although there is significant difference in LD₉₅ values (Tables 84 and 94).

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EXPERIMENT NO.1

Object: To determine the contact toxicity of contact NRDC 143 (Permethrin) against lab-reared 2nd instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.15%

Replications: Six

No. of Larvae per Treatment: Sixty

Total No. of Larvae Utilized: Four hundred and twenty

Computer Code: BDN 436. Dat, 1

Experimental Code: SBD 30, 36 - 1976

Table No.1

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0140	5/59	8	3	7/59	12	7	9/59	15	8
0.2	.0255	16/60	27	23	6/60	10	5	19/60	32	26
0.4	.0460	36/60	60	58	40/61	66	64	41/61	67	64
0.6	.0730	43/60	72	71	49/60	82	81	49/60	82	80
0.8	.1050	56/59	95	95	57/59	97	97	57/59	97	97
1.0	.1355	58/60	97	97	59/60	98	98	60/60	100	100
CONTROL		3/60	5		3/59	5		5/59	8	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	3.49	.043	.037-.048	.127	.107-.163
48 HOURS	4.61	.044	.039-.049	.100	.087-.122
72 HOURS	3.77	.038	.033-.043	.103	.088-.130

EXPERIMENT NO. 2

Object: To determine the contact toxicity of NRDC 143 (Permethrin) against lab.-reared 3rd instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.05%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBT-N43 (188-190)

Experimental Code: SBT 7-1976

Table No. 2

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0060	0/30	0	0	0/30	0	0	0/30	0	0
0.2	.0090	3/28	11	11	4/28	14	14	4/28	14	14
0.4	.0160	15/30	50	50	15/30	50	50	16/30	53	53
0.6	.0220	18/30	60	60	20/30	67	67	20/30	67	67
0.8	.0320	22/30	73	73	27/30	90	90	29/30	97	97
1.0	.0410	29/30	97	97	30/30	100	100	30/30	100	100
CONTROL		0/31	0		0/30	0		0/30	0	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	4.08	.019	.016-.021	.047	.038-.065
48 HOURS	4.85	.016	.015-.019	.036	.030-.046
72 HOURS	5.24	.016	.014-.018	.033	.028-.042

EXPERIMENT NO. 3

Object: To determine the contact toxicity of RU 11483 (Bioethanomethrin) racemic form against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.02%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBL-RU3 (85-87)

Experimental Code: SBL 62-1973

Table No. 3

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0030	2/30	7	7	2/30	7	7	2/30	7	7
0.2	.0040	0/30	0	0	2/29	7	7	2/29	7	7
0.4	.0090	0/30	0	0	0/29	0	0	0/29	0	0
0.6	.0130	8/30	27	27	10/30	33	33	10/29	34	34
0.8	.0170	10/30	33	33	12/30	40	40	13/30	43	43
1.0	.0220	21/30	70	70	22/30	73	73	22/30	73	73
CONTROL		0/26	0		0/26	0		0/26	0	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	2.99	.020	.017-.028	.073	.045-.208
48 HOURS	2.58	.019	.015-.026	.082	.049-.236
72 HOURS	2.63	.018	.015-.025	.077	.047-.210

EXPERIMENT NO. 4

Object: To determine the contact toxicity of ABG 6010 against lab.-reared 5th instar Spruce Budworm Larvae

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.3%

Replications: Nine

No. of Larvae per Treatment: Ninety

Total No. of Larvae Utilized: Six hundred and thirty

Computer Code: BL ABG5.DAT;1

Experimental Code: SBL 185, 180, 195-1975

Table No. 4

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0300	1/89	1	0	3/88	3	0	5/89	6	0
0.2	.0610	3/90	3	0	3/89	3	0	4/89	4	0
0.4	.1173	37/88	42	40	40/88	45	41	40/88	45	41
0.6	.1903	74/90	82	81	76/90	84	83	76/90	84	83
0.8	.2540	82/90	91	91	84/90	93	93	84/90	93	93
1.0	.3137	90/90	100	100	90/90	100	100	90/90	100	100
CONTROL		3/90	3		5/90	6		5/89	6	

Findings: The summary of probit analysis is as follows:

Period	b	LD ₅₀ ug/cm ²	FL	LD ₉₅ ug/cm ²	FL
24 HOURS	5.80	.134	.123-.145	.258	.235-.293
48 HOURS	6.08	.132	.120-.142	.246	.224-.279
72 HOURS	5.99	.131	.120-.142	.247	.225-.280

EXPERIMENT NO. 5

Object: To determine the contact toxicity of FMC 33297, (Permethrin) against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.0625%

Replications: Nine

No. of Larvae per Treatment: Ninety

Total No. of Larvae Utilized: Six hundred and thirty

Computer Code: BL F335.DAT

Experimental Code: SBL 181, 200, 231 - 1975

Table No. 5

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0070	2/90	2	1	6/90	7	5	6/90	7	1
0.2	.0127	10/90	11	10	13/90	14	12	17/87	20	15
0.4	.0277	51/90	57	57	53/90	59	58	54/90	60	57
0.6	.0410	74/90	82	82	77/90	86	86	78/90	87	86
0.8	.0550	85/90	94	94	86/90	96	96	87/90	97	97
1.0	.0690	89/90	99	99	90/90	100	100	90/90	100	100
CONTROL		1/90	1		2/90	2		5/89	6	

Findings: The summary of probit analysis is as follows:

Period	b	LD ₅₀ ug/cm ²	FL	LD ₉₅ ug/cm ²	FL
24 HOURS	4.53	.025	.023-.027	.058	.052-.066
48 HOURS	4.41	.023	.021-.025	.055	.049-.064
72 HOURS	4.62	.023	.021-.026	.053	.048-.061

EXPERIMENT NO. 6

Object: To determine the contact toxicity of NRDC 119 (Cismethrin) against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.02%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBL N19 (217-219)

Experimental Code: SBL 244 - 1975

Table No. 6

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0030	2/30	7	7	2/30	7	7	2/30	7	7
0.2	.0040	3/30	10	10	3/30	10	10	4/30	13	13
0.4	.0090	20/30	67	67	20/30	67	67	20/30	67	67
0.6	.0130	25/30	83	83	25/30	83	83	26/30	87	87
0.8	.0190	30/30	100	100	30/30	100	100	30/30	100	100
1.0	.0230	28/30	93	93	28/30	93	93	28/30	93	93
CONTROL		0/30	0		0/30	0		0/30	0	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	4.08	.007	.006-.009	.019	.015-.025
48 HOURS	4.08	.007	.006-.009	.019	.015-.025
72 HOURS	4.03	.007	.006-.008	.018	.015-.024

EXPERIMENT NO. 7

Object: To determine the contact toxicity of SBP 1513 (Permethrin) against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.0625%

Replications: Six

No. of Larvae per Treatment: Sixty

Total No. of Larvae Utilized: Four hundred and twenty

Computer Code: BL S3B5.DAT

Experimental Code: SBL 197, 217 - 1975

Table No. 7

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0085	5/60	8	5	7/60	12	9	10/60	17	14
0.2	.0140	26/60	43	41	27/60	45	43	29/60	48	46
0.4	.0265	53/60	88	88	53/60	88	88	53/60	88	88
0.6	.0405	59/60	98	98	59/60	98	98	59/60	98	98
0.8	.0545	60/60	100	100	60/60	100	100	60/60	100	100
1.0	.0700	59/59	100	100	59/59	100	100	59/59	100	100
CONTROL		2/60	3		2/60	3		2/60	3	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	5.45	.016	.014-.017	.032	.028-.038
48 HOURS	5.15	.015	.014-.017	.032	.028-.039
72 HOURS	4.75	.015	.013-.016	.032	.028-.040

EXPERIMENT NO. 8

Object: To determine the contact toxicity of RU 11679 (Bioethamomethrin) against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.02%

Replications: Nine

No. of Larvae per Treatment: Ninety

Total No. of Larvae Utilized: Six Hundred and Thirty

Computer Code: SBL RU

Experimental Code: SBL 134, 204, 208 - 1975

Table No. 8

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0027	0/90	0	0	0/88	0	0	1/86	1	1
0.2	.0047	1/90	1		3/90	3	3	5/90	6	6
0.4	.0083	13/85	15	15	14/85	16	16	15/85	18	18
0.6	.0133	45/90	50	50	48/90	53	53	48/90	53	53
0.8	.0183	56/90	62	62	60/90	67	67	61/90	68	68
1.0	.0233	81/90	90	90	93/90	92	92	84/90	93	93
CONTROL										

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	4.72	.014	.013-.015	.031	.027-.037
48 HOURS	4.55	.013	.012-.014	.030	.027-.035
72 HOURS	4.09	.013	.009-.018	.032	.021-.133

EXPERIMENT NO. 9

Object: To determine the contact toxicity of FMC 33297 (Permethrin) against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.06%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBL-F33 (31-33)

Experimental Code: SBL 283 - 1976

Table No. 9

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0050	1/29	3	3	2/29	7	4	3/29	10	7
0.2	.0090	7/30	23	23	7/30	23	21	9/30	30	28
0.4	.0190	17/29	57	57	17/29	59	58	18/29	62	61
0.6	.0300	25/30	83	83	26/30	87	87	27/30	90	90
0.8	.0420	29/30	97	97	29/30	97	97	29/30	97	97
1.0	.0520	29/30	97	97	29/30	97	97	29/30	97	97
CONTROL		0/30	0		1/30	3		1/30	3	

Findings: The summary of probit analysis is as follows:

Period	b	LD50	FL	LD95	FL
		ug/cm ²		ug/cm ²	
24 HOURS	3.57	.015	.013-.018	.045	.036-.061
48 HOURS	3.70	.016	.013-.018	.044	.035-.061
72 HOURS	3.39	.014	.011-.017	.043	.034-.061

EXPERIMENT NO. 10

Object: To determine the contact toxicity of FMC 40963 (Permethrin) against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.05%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBL-F40 (41-43)

Experimental Code: SBL 290 - 1976

Table No.10

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0030	1/30	3	3	5/30	17	14	8/30	27	25
0.2	.0080	4/30	13	13	7/30	23	21	11/30	37	35
0.4	.0160	10/30	33	33	12/30	40	38	15/30	50	48
0.6	.0270	18/30	60	60	19/30	63	62	20/30	67	66
0.8	.0370	26/30	87	87	29/30	97	97	29/30	97	97
1.0	.0480	29/30	97	97	29/30	97	97	29/30	97	97
CONTROL		0/30	0		1/30	3		1/30	3	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	3.10	.019	.015-.022	.063	.048-.097
48 HOURS	2.7269	.015	-	.062	-
72 HOURS	1.9527	.011	-	.076	-

EXPERIMENT NO. 11

Object: To determine the contact toxicity of NRDC 143 (Permethrin) against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.015%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBL-N43 (62-64)

Experimental Code: SBL 295 - 1976

Table No. 11

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0070	10/30	33	31	10/30	33	31	13/30	43	39
0.2	.0120	18/30	60	59	18/30	60	59	18/30	60	57
0.4	.0240	25/30	83	82	25/30	83	82	26/30	87	86
0.6	.0350	26/30	87	87	28/30	93	93	28/30	93	92
0.8	.0490	30/30	100	100	30/30	100	100	30/30	100	100
1.0	.0650	30/30	100	100	30/30	100	100	30/30	100	100
CONTROL		1/30	3		1/30	3		2/30	7	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	2.81	.011	.008-.014	.041	.031-.064
48 HOURS	3.08	.010	.008-.013	.036	.028-.054
72 HOURS	2.90	.010	.007-.012	.035	.027-.056

EXPERIMENT NO. 12

Object: To determine the contact toxicity of PP383 (Cypermethrin) against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.015%

Replications: Six

No. of Larvae per Treatment: Sixty

Total No. of Larvae Utilized: Four hundred and twenty

Computer Code: BLPP36.DAT

Experimental Code: SBL 277, 295 - 1976

Table No. 12

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0015	1/60	2	0	2/59	3	0	7/59	12	0
0.2	.0030	10/60	17	15	14/60	23	14	18/60	30	20
0.4	.0055	33/60	55	54	34/60	57	52	36/60	60	55
0.6	.0090	49/60	82	82	54/60	90	89	54/60	90	89
0.8	.0120	48/60	80	80	55/60	92	91	55/60	92	91
1.0	.0155	59/60	98	98	59/60	98	98	59/60	98	98
CONTROL		1/60	2		6/60	10		7/60	12	

Findings: The summary of probit analysis is as follows:

Period	b	LD50	FL	LD95	FL
		ug/cm ²		ug/cm ²	
24 HOURS	3.70	.006	.005-.006	.016	.013-.019
48 HOURS	4.42	.005	.005-.006	.013	.011-.015
72 HOURS	3.96	.005	.004-.006	.013	.011-.016

EXPERIMENT NO. 13

Object: To determine the contact toxicity of S-3206 (Fenpropanate) against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.05%

Replications: Six

No. of Larvae per Treatment: Sixty

Total No. of Larvae Utilized: Four hundred and twenty

Computer Code: BL S366.DAT

Experimental Code: SBL 264, 297 - 1976

Table No. 13

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0055	3/60	5	2	4/60	7	4	4/60	7	2
0.2	.0090	13/60	22	20	13/60	22	20	14/60	23	19
0.4	.0175	32/60	53	52	33/60	55	54	33/60	55	53
0.6	.0275	51/60	85	85	51/60	85	85	54/60	90	89
0.8	.0380	46/60	77	76	48/60	80	79	49/60	82	81
1.0	.0495	49/60	82	81	52/60	87	87	53/60	88	87
CONTROL		2/59	3		2/58	3		3/58	5	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	2.78	.018	.012-.026	.072	.044-.272
48 HOURS	2.94	.017	.015-.020	.063	.051-.085
72 HOURS	3.12	.017	.009-.026	.057	.035-.325

EXPERIMENT NO. 14

Object: To determine the contact toxicity of S-5602 (Fenvalerate) against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.05%

Replications: Nine

No. of Larvae per Treatment: Ninety

Total No. of Larvae Utilized: Six hundred and thirty

Computer Code: BLS566.DAT

Experimental Code: SBL 254, 265, 281 - 1976

Table No. 14

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0033	4/90	4	2	5/90	6	4	10/90	11	4
0.2	.0067	32/90	36	35	35/90	39	38	40/90	44	40
0.4	.0153	56/90	62	61	60/90	67	66	63/89	71	69
0.6	.0250	76/90	84	84	81/90	90	90	81/90	90	89
0.8	.0350	88/90	98	98	89/90	99	99	90/90	100	100
1.0	.0470	88/90	98	98	90/90	100	100	90/90	100	100
CONTROL		2/90	2		2/90	2		6/90	7	

Findings: The summary of probit analysis is as follows:

Period	b	LD50	FL	LD95	FL
		ug/cm ²		ug/cm ²	
24 HOURS	3.11	.011	.007-.014	.037	.026-.072
48 HOURS	3.36	.010	.005-.015	.030	.019-.119
72 HOURS	3.28	.009	.008-.010	.029	.025-.036

EXPERIMENT NO. 15

Object: To determine the contact toxicity of RU 11483 (Bioethanomethrin) racemic form against lab.-reared 5th instar Spruce Budowrm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.05%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBL RU3 (96-98)

Experimental Code: SBL 294 - 1976

Table No. 15

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0050	2/30	7	4	2/30	7	4	3/30	10	3
0.2	.0100	3/30	10	7	3/30	10	7	3/30	10	3
0.4	.0180	4/30	13	10	5/30	17	14	6/30	20	14
0.6	.0290	26/30	87	87	26/30	87	87	26/30	87	86
0.8	.0400	26/30	87	87	26/30	87	87	27/30	90	89
1.0	.0530	30/30	100	100	30/30	100	100	30/30	100	100
CONTROL		1/30	3		1/30	3		2/30	7	

Findings: The summary of probit analysis is as follows:

Period	b	LD50	FL	LD95	FL
		ug/cm ²		ug/cm ²	
24 HOURS	7.07	.024	.013-.032	.041	.031-.163
48 HOURS	6.50	.023	.015-.031	.042	.032-.107
72 HOURS	7.23	.024	.020-.026	.040	.035-.050

EXPERIMENT NO. 16

Object: To determine the contact toxicity of ABG 6070 against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.4%

Replications: Nine

No. of Larvae per Treatment: Ninety

Total No. of Larvae Utilized: Six hundred and thirty

Computer Code: SBL-A67 (652 - 654)

Experimental Code: SBL 349, 378, 435 - 1977

Table No. 16

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0377	1/90	1	1	6/90	7	6	9/90	10	8
0.2	.0708	9/87	10	10	11/87	13	12	12/87	14	12
0.4	.1417	29/90	32	32	45/90	50	49	47/90	52	51
0.6	.2088	38/90	42	42	57/90	63	63	61/90	68	67
0.8	.3090	55/90	61	61	75/90	83	83	76/90	84	84
1.0	.3988	80/90	89	89	85/90	94	94	87/90	97	97
CONTROL		0/89	0		1/89	1		2/89	2	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	2.98	.211	.155-.300	.755	.459-2.76
48 HOURS	3.18	.150	.135-.165	.494	.419-.613
72 HOURS	3.21	.142	.128-.157	.462	.392-.571

EXPERIMENT NO. 17

Object: To determine the contact toxicity of FMC 30980 (Cypermethrin) against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: .008%

Replications: Six

No. of Larvae per Treatment: Sixty

Total No. of Larvae Utilized: Four hundred and twenty

Computer Code: BL F307.DAT;1

Experimental Code: SBL 407, 417 - 1977

Table No. 17

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0008	2/61	3	3	2/61	3	3	2/61	3	3
0.2	.0014	1/60	2	2	2/60	3	3	2/60	3	3
0.4	.0032	8/60	13	13	9/60	15	15	16/60	27	27
0.6	.0047	21/60	35	35	24/60	40	40	32/60	53	53
0.8	.0064	33/60	55	55	38/60	63	63	44/60	73	73
1.0	.0086	50/60	83	83	51/60	85	85	56/60	93	93
CONTROL		0/59	0		0/59	0		0/59	0	

Findings: The summary of probit analysis is as follows:

Period	b	LD50	FL	LD95	FL
		ug/cm ²		ug/cm ²	
24 HOURS	3.28	.006	.005-.006	.018	.014-.026
48 HOURS	3.27	.005	.005-.006	.016	.013-.023
72 HOURS	3.56	.004	.004-.005	.012	.010-.016

EXPERIMENT NO. 18

Object: To determine the contact toxicity of FMC 33297 (Permethrin) against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.03%

Replications: Six

No. of Larvae per Treatment: Sixty

Total No. of Larvae Utilized: Four hundred and twenty

Computer Code: SBL-F33 (670-672)

Experimental Code: SBL 411, 433 - 1977

Table No. 18

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0029	1/60	2	2	1/60	2	0	1/60	2	0
0.2	.0057	1/60	2	2	3/60	5	3	3/60	5	3
0.4	.0127	23/60	38	38	23/60	38	37	23/60	38	37
0.6	.0198	32/60	53	53	37/60	62	61	40/60	67	66
0.8	.0271	42/60	70	70	53/60	88	88	53/60	88	88
1.0	.0347	46/60	77	77	56/60	93	93	56/60	93	93
CONTROL		0/60	0	0	1/60	2		1/60	2	

Findings: The summary of probit analysis is as follows:

Period	b	LD ₅₀ ug/cm ²	FL	LD ₉₅ ug/cm ²	FL
24 HOURS	3.00	.018	.016-.021	.065	.051-.092
48 HOURS	4.28	.016	.014-.017	.038	.032-.047
72 HOURS	4.30	.015	.014-.017	.037	.032-.046

EXPERIMENT NO. 19

Object: To determine the contact toxicity of FMC 40963 (Permethrin) against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: .05%

Replications: Six

No. of Larvae per Treatment: Sixty

Total No. of Larvae Utilized: Four hundred and twenty

Computer Code: SBL F40

Experimental Code: SBL 381, 443 - 1977

Table No. 19

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
.1	.0051	3/60	5	3	3/60	5	3	3/58	5	3
.2	.0092	11/59	19	17	13/59	22	20	13/59	22	20
.4	.0192	38/60	63	62	39/60	65	64	39/60	65	64
.6	.0295	47/60	78	78	49/60	82	82	49/60	82	82
.8	.0406	57/60	95	95	57/60	95	95	57/60	95	95
1.0	.0525	60/60	100	100	60/60	100	100	60/60	100	100
CONTROL		2/60	3		2/60	3		2/60	3	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	3.91	.016	.014-.018	.042	.036-.052
48 HOURS	3.84	.015	.014-.017	.041	.036-.051
72 HOURS	3.84	.015	.014-.017	.041	.036-.051

EXPERIMENT NO. 20

Object: To determine the contact toxicity of FMC 45497 (NRDC-160) against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.006%

Replications: Six

No. of Larvae per Treatment: Sixty

Total No. of Larvae Utilized: Four hundred and twenty

Computer Code: BLF477.DAT

Experimental Code: 369, 410 - 1977

Table No. 20

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0005	3/60	5	2	5/60	8	5	5/60	8	5
0.2	.0011	1/60	2	0	4/59	7	4	4/59	7	4
0.4	.0022	4/60	7	4	4/60	7	4	5/60	8	5
0.6	.0035	10/60	17	14	15/60	25	23	20/60	33	31
0.8	.0048	31/60	52	51	41/60	68	67	45/60	75	74
1.0	.0061	52/60	87	87	58/60	97	97	59/60	98	98
CONTROL		2/59	3		2/59	3		2/59	3	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	8.87	.005	.004-.005	.007	.007-.008
48 HOURS	9.91	.004	-	.006	-
72 HOURS	8.94	.004	-	.006	-

EXPERIMENT NO. 21

Object: To determine the contact toxicity of FMC 45498 (Decamethrin) against lab.-reared 5th instar spruce budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.001%

Replications: Six

No. of Larvae per Treatment: Sixty

Total No. of Larvae Utilized: Four hundred and twenty.

Computer Code: BLFMC 7.DAT;1

Experimental Code: SBL 385, 408 - 1977

Table No. 21

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.00009	0/60	0	0	0/60	0	0	0/60	0	0
0.2	.00018	2/60	3	1	2/60	3	1	3/60	5	1
0.4	.00040	4/60	7	5	4/60	7	3	6/60	10	6
0.6	.00060	14/60	23	21	30/60	50	48	31/60	52	50
0.8	.00083	36/60	60	59	49/60	82	81	50/60	83	82
1.0	.00105	55/60	92	92	60/60	100	100	60/60	100	100
CONTROL		1/60	2		2/56	4		2/56	4	

Findings: The summary of probit analysis is as follows:

Period	b	LD50	FL	LD95	FL
		ug/cm ²		ug/cm ²	
24 HOURS	8.32	.0007	.0007-.0008	.0011	.0011-.0012
48 HOURS	9.68	.0006	.0006-.0007	.0009	.0009-.0010
72 HOURS	9.04	.0006	.0006-.0006	.0009	.0009-.0010

EXPERIMENT NO. 22

Object: To determine the contact toxicity of FMC 45812 against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.02%

Replications: Six

No. of Larvae per Treatment: Sixty

Total No. of Larvae Utilized: Four hundred and twenty

Computer Code: BLF427.DAT

Experimental Code: SBL 370, 396 - 1977.

Table No. 22

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0020	5/60	8	3	9/60	15	9	9/60	15	8
0.2	.0036	1/60	2	0	4/60	7	0	5/60	8	0
0.4	.0074	7/60	12	7	8/60	13	6	9/59	15	8
0.6	.0124	30/60	50	47	40/60	67	65	40/60	67	64
0.8	.0165	51/60	85	84	51/60	85	84	51/60	85	84
1.0	.0226	56/60	93	93	58/60	97	97	58/60	97	97
CONTROL		3/59	5		4/59	7		5/59	8	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	6.45	.012	.011-.013	.022	.020-.027
48 HOURS	6.63	.011	.010-.012	.020	.018-.024
72 HOURS	6.53	.011	.010-.012	.021	.018-.024

EXPERIMENT NO. 23

Object: To determine the contact toxicity of NRDC 143 (Permethrin) against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.05%

Replications: Six

No. of Larvae per Treatment: Sixty

Total No. of Larvae Utilized: Four hundred and twenty

Computer Code: SBL-N43 (691-693)

Experimental Code: SBL 358, 442 - 1977.

Table No. 23

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0049	3/60	5	0	3/59	5	0	3/59	5	0
0.2	.0094	12/60	20	15	14/60	23	14	15/60	25	17
0.4	.0179	31/60	52	48	39/60	65	61	39/60	65	61
0.6	.0271	49/60	82	81	55/60	92	91	55/60	92	91
0.8	.0381	52/60	87	86	58/60	97	97	58/60	97	97
1.0	.0484	52/60	87	86	59/60	98	98	59/60	98	98
CONTROL		4/60	7		6/60	10		6/60	10	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	3.37	.019	.016-.021	.057	.047-.076
48 HOURS	4.82	.016	.014-.017	.034	.030-.042
72 HOURS	4.72	.015	.013-.017	.034	.030-.042

EXPERIMENT NO. 24

Object: To determine the contact toxicity of NRDC 161 (Decamethrin) against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: .001%

Replications: Nine

No. of Larvae per Treatment: Ninety

Total No. of Larvae Utilized: Six hundred and thirty

Computer Code: BLN617.DAT

Experimental Code: SBL 350, 359, 409 - 1977

Table No. 24

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0001	3/90	3	2	5/90	6	4	7/90	8	6
0.2	.0002	5/89	6	5	12/89	13	11	12/89	13	11
0.4	.0003	14/90	16	15	22/90	24	22	28/90	31	30
0.6	.0006	12/90	13	12	35/90	39	38	36/90	40	39
0.8	.0008	40/90	44	43	67/90	74	73	68/90	76	76
1.0	.0011	46/90	51	51	84/90	93	93	85/90	94	94
CONTROL		1/89	1		2/89	2		2/89	2	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	2.11	.001	.001-.083	.007	.002- 3017 x 10 ⁵
48 HOURS	3.22	.0005	.0003-.001	.002	.001-.034
72 HOURS	2.97	.0005	.0002-.001	.002	.001-.091

EXPERIMENT NO. 25

Object: To determine the contact toxicity of NRDC 168-S against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.002%

Replications: Nine

No. of Larvae per Treatment: Ninety

Total No. of Larvae Utilized: Six hundred and thirty

Computer Code: SBL-N68 (697-699)

Experimental Code: SBL 360, 352, 450 - 1977

Table No. 25

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0002	12/83	14	13	27/83	33	32	33/83	40	38
0.2	.0004	12/90	13	12	40/90	44	43	42/90	47	45
0.4	.0007	23/90	26	25	55/90	61	61	64/90	71	70
0.6	.0011	41/90	46	45	81/90	90	90	81/90	90	90
0.8	.0016	61/90	68	68	90/90	100	100	90/90	100	100
1.0	.0021	68/90	76	76	89/90	99	99	90/90	100	100
CONTROL		1/90	1		1/90	1		4/90	4	

Findings: The summary of probit analysis is as follows:

Period	b	LD ₅₀ ug/cm ²	FL	LD ₉₅ ug/cm ²	FL
24 HOURS	1.99	.001	.0008-.002	.075	.003-.079
48 HOURS	2.55	.0004	.0001-.0006	.002	.0009-.018
72 HOURS	2.55	.0003	.0001-.0006	.001	.0008-.014

EXPERIMENT NO. 26

Object: To determine the contact toxicity of PP383 (Cypermethrin) against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: .01%

Replications: Six

No. of Larvae per Treatment: Sixty

Total No. of Larvae Utilized: Four hundred and twenty

Computer Code: BLS367.DAT

Experimental Code: SBL 406, 416 - 1977

Table No. 26

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0010	3/60	5	5	5/60	8	6	5/60	8	6
0.2	.0019	8/60	13	13	8/60	13	11	8/60	13	11
0.4	.0041	17/60	28	28	22/60	37	36	29/60	48	47
0.6	.0063	37/60	62	62	48/60	80	80	53/60	88	88
0.8	.0085	45/60	75	75	51/60	85	85	57/60	95	95
1.0	.0113	56/60	93	93	59/60	98	98	59/60	98	98
CONTROL		0/60	0		1/60	2		1/60	2	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	2.93	.005	.003-.007	.018	.011-.064
48 HOURS	3.18	.004	.001-.007	.013	.007-.331
72 HOURS	3.58	.003	.002-.005	.010	.006-.058

EXPERIMENT NO. 27

Object: To determine the contact toxicity of S-3206 (Fenpropanate) against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.05%

Replications: Six

No. of Larvae per Treatment: Sixty

Total No. of Larvae Utilized: Four hundred and twenty

Computer Code: BLS36.DAT

Experimental Code: SBL 425, 428 - 1977

Table No. 27

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0044	4/60	7	4	6/60	10	5	7/60	12	7
0.2	.0088	19/60	32	30	25/60	42	39	26/60	43	40
0.4	.0185	44/60	73	72	45/60	75	74	46/60	77	76
0.6	.0292	57/60	95	95	58/60	97	97	59/60	98	98
0.8	.0428	57/60	95	95	59/60	98	98	60/60	100	100
1.0	.0553	57/60	95	95	59/60	98	98	60/60	100	100
CONTROL		2/60	3		3/60	5		3/60	5	

Findings: The summary of probit analysis is as follows:

Period	b	LD ₅₀ ug/cm ²	FL	LD ₉₅ ug/cm ²	FL
24 HOURS	3.32	.013	.011-.015	.040	.033-.051
48 HOURS	3.57	.011	.010-.013	.033	.027-.041
72 HOURS	3.99	.011	.010-.012	.027	.023-.034

EXPERIMENT NO. 28

Object: To determine the contact toxicity of S-5602 (Fenvalerate) against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.05%

Replications: Six

No. of Larvae per Treatment: Sixty

Total No. of Larvae Utilized: Four hundred and twenty

Computer Code: SBL S56

Experimental Code: SBL 388, 400

Table No. 28

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0044	3/60	5	5	3/60	5	5	3/60	5	5
0.2	.0094	20/60	33	33	22/60	37	37	22/60	37	37
0.4	.0192	56/60	93	93	56/60	93	93	56/60	93	93
0.6	.0300	58/60	97	97	58/60	97	97	58/60	97	97
0.8	.0419	60/60	100	100	60/60	100	100	60/60	100	100
1.0	.0526	60/60	100	100	60/60	100	100	60/60	100	100
CONTROL		0/60	0		0/60	0		0/59	0	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	4.75	.011	.010-.012	.024	.020-.029
48 HOURS	4.70	.010	.009-.012	.023	.020-.029
72 HOURS	4.70	.010	.009-.012	.023	.020-.029

EXPERIMENT NO. 29

Object: To determine the contact toxicity of SBP 1382 (Resmethrin) against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.1%

Replications: Nine

No. of Larvae per Treatment: Ninety

Total No. of Larvae Utilized: Six hundred and thirty

Computer Code: SBL-S12 (715-717)

Experimental Code: SBL 382, 365, 441 - 1977

Table No. 29

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0105	7/89	8	6	14/89	16	10	16/89	18	11
0.2	.0176	18/90	20	18	24/90	27	22	24/90	27	21
0.4	.0341	54/90	60	59	61/90	68	66	62/90	69	66
0.6	.0538	83/90	92	92	85/90	94	94	85/90	94	93
0.8	.0784	84/90	93	93	88/90	98	98	88/90	98	98
1.0	.1023	88/90	98	98	90/90	100	100	90/90	100	100
CONTROL		2/90	2		6/90	7		7/90	8	

Findings: The summary of probit analysis is as follows:

Period	b	LD ₅₀ ug/cm ²	FL	LD ₉₅ ug/cm ²	FL
24 HOURS	3.87	.029	.026-.031	.076	.067-.090
48 HOURS	4.28	.026	.023-.028	.063	.055-.074
72 HOURS	4.27	.026	.023-.028	.063	.055-.074

EXPERIMENT NO. 30

Object: To determine the contact toxicity of WL 41706 (Fenproprate) against lab.-reared 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: .04%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten.

Computer Code: SBL-W46 (504-506)

Experimental Code: SBL 434 - 1977

Table No. 30

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0043	4/30	13	13	4/30	13	10	4/30	13	9
0.2	.0070	2/30	7	7	5/30	17	14	5/30	17	14
0.4	.0138	19/30	63	63	20/30	67	66	20/30	67	67
0.6	.0224	25/30	83	83	27/30	90	90	27/30	90	90
0.8	.0304	27/30	90	90	27/30	90	90	28/30	93	93
1.0	.0366	30/30	100	100	30/30	100	100	30/30	100	100
CONTROL		0/29	0		1/29	3		1/28	4	

Findings: The summary of probit analysis is as follows:

Period	b	LD ₅₀ ug/cm ²	FL	LD ₉₅ ug/cm ²	FL
24 HOURS	3.61	.012	.010-.014	.034	.027-.046
48 HOURS	3.81	.011	.009-.013	.031	.025-.042
72 HOURS	4.02	.011	.009-.013	.029	.024-.039

EXPERIMENT NO. 31

Object: To determine the contact toxicity of WL 43467 (Cypermethrin) against lab.-reared 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.01%

Replications: Nine

No. of Larvae per Treatment: Ninety

Total No. of Larvae Utilized: Six hundred and thirty

Computer Code: SBL-W47 (721-723)

Experimental Code: SBL 363, 373, 436 - 1977

Table No. 31

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0010	7/90	8	5	10/90	11	3	13/90	14	4
0.2	.0018	26/90	29	27	32/90	36	33	35/90	39	32
0.4	.0035	49/89	54	53	59/89	66	63	63/89	70	67
0.6	.0057	72/90	80	79	77/90	86	85	79/90	88	87
0.8	.0078	84/90	93	93	90/90	100	100	90/90	100	100
1.0	.0101	90/90	100	100	90/90	100	100	90/90	100	100
CONTROL		3/88	3		7/87	8		9/87	10	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	3.50	.0030	.0027-.0033	.009	.008-.011
48 HOURS	3.94	.0027	.0024-.0030	.007	.006-.008
72 HOURS	3.92	.0026	.0023-.0028	.007	.006-.008

EXPERIMENT NO. 32

Object: To determine the contact toxicity of WL 43775 (Fenvalerate) against lab.-reared 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.5%

Replications: Six

No. of Larvae per Treatment: Sixty

Total No. of Larvae Utilized: Four hundred and twenty

Computer Code: BLW457.DAT

Experimental Code: SBL 389, 461 - 1977

Table No. 32

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0051	5/60	8	8	5/60	8	6	7/60	12	10
0.2	.0111	27/60	45	45	28/60	47	46	28/60	47	46
0.4	.0204	45/60	75	75	50/60	83	83	50/60	83	83
0.6	.0305	56/60	93	93	57/60	95	95	57/60	95	95
0.8	.0441	53/60	88	88	60/60	100	100	60/60	100	100
1.0	.0549	56/60	93	93	60/60	100	100	60/60	100	100
CONTROL		0/61	0		1/61	2		1/61	2	

Findings: The summary of probit analysis is as follows:

Period	b	LD50	FL	LD95	FL
		ug/cm ²		ug/cm ²	
24 HOURS	2.83	.013	.007-.019	.049	.031-.147
48 HOURS	4.22	.012	.010-.013	.029	.025-.035
72 HOURS	3.98	.011	.010-.013	.026	.025-.036

EXPERIMENT NO. 33

Object: To determine the contact toxicity of AC 222-705 (Payoff) against lab.-reared 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.02%

Replications: Twelve

No. of Larvae per Treatment: One hundred and twenty

Total No. of Larvae Utilized: Eight hundred and forty

Computer Code: SBL-A25 (163-165)

Experimental Code: SBL 481, 481, 484, 487 - 1978

Table No.33

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0023	10/120	8	5	14/120	12	9	18/120	15	11
0.2	.0041	26/120	22	20	37/120	31	29	45/120	38	35
0.4	.0083	54/120	45	43	79/120	66	65	89/120	74	73
0.6	.0130	96/120	80	79	105/120	88	88	112/120	93	93
0.8	.0171	104/120	87	87	118/120	98	98	118/120	98	98
1.0	.0212	120/120	100	100	120/120	100	100	120/120	100	100
CONTROL		3/120		3	4/120	3		6/120	5	

Findings: The summary of probit analysis is as follows:

Period	b	LD50	FL	LD95	FL
		ug/cm ²		ug/cm ²	
24 HOURS	3.55	.008	.006-.010	.022	.017-.040
48 HOURS	3.76	.006	.005-.007	.016	.012-.026
72 HOURS	3.81	.005	.005-.006	.014	.013-.016

EXPERIMENT NO. 34

Object: To determine the contact toxicity of S-5602 (Fenvalerate) against lab.-reared 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.04%

Replications: Nine

No. of Larvae per Treatment: Ninety

Total No. of Larvae Utilized: Six hundred and thirty

Computer Code: SBL-S56 (169-171)

Experimental Code: SBL 454, 455, 462 - 1978

Table No. 34

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0036	4/90	4	2	5/90	6	3	7/90	8	3
0.2	.0075	5/90	6	3	10/90	11	8	13/90	14	9
0.4	.0149	50/91	56	55	55/90	61	60	55/90	61	59
0.6	.0235	79/90	88	88	82/90	91	91	83/90	92	92
0.8	.0345	77/90	86	86	85/90	94	94	86/90	96	96
1.0	.0439	84/90	93	93	88/90	98	98	88/90	98	98
CONTROL		2/96	2		3/96	3		5/96	5	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	3.83	.015	.001-.033	.041	.023-.657 × 10 ⁷
48 HOURS	4.47	.014	.012-.015	.032	.028-.037
72 HOURS	4.49	.013	.012-.015	.031	.028-.036

EXPERIMENT NO. 35

Object: To determine the contact toxicity of WL 43467 (Cypermethrin) against lab.-reared 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.008%

Replications: Nine

No. of Larvae per Treatment: Ninety

Total No. of Larvae Utilized: Six hundred and thirty

Computer Code: SBL-W47 (178-180)

Experimental Code: SBL 458, 459, 461 - 1978

Table No. 35

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0007	5/90	6	3	7/90	8	4	11/90	12	0
0.2	.0013	14/90	16	13	15/90	17	14	16/90	18	7
0.4	.0031	41/90	46	44	44/90	49	47	47/90	52	45
0.6	.0047	63/90	70	69	73/90	81	80	75/90	83	81
0.8	.0064	81/90	90	90	87/90	97	97	87/90	97	97
1.0	.0087	86/90	96	96	88/90	98	98	89/90	99	99
CONTROL		3/90	3		4/90	4		11/90	12	

Findings: The summary of probit analysis is as follows:

Period	b	LD50	FL	LD95	FL
		ug/cm ²		ug/cm ²	
24 HOURS	3.47	.003	.003-.003	.009	.008-.011
48 HOURS	4.01	.003	.001-.004	.007	.005-.047
72 HOURS	5.28	.003	.003-.003	.007	.006-.008

EXPERIMENT NO. 36

Object: To determine the contact toxicity of S-5602 (Fenvalerate) against lab.-reared 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.02%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: S-5602.DAT

Experimental Code: SBL 492 - 1979

Table No. 36

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0008	0/30	0	0	0/30	0	0	0/30	0	0
0.2	.0032	1/30	3	3	1/30	3	3	1/30	3	3
0.4	.0080	2/29	7	7	3/29	10	10	5/29	17	17
0.6	.0129	9/30	30	30	22/30	73	73	22/29	76	76
0.8	.0179	9/29	31	31	24/29	83	83	25/29	86	86
1.0	.0255	11/30	37	37	30/30	100	100	30/30	100	100
CONTROL		0/30	0		0/30	0		0/30	0	

Findings: The summary of probit analysis is as follows:

Period	b	LD50	FL	LD95	FL
		ug/cm ²		ug/cm ²	
24 HOURS	1.86	.034	.023-.088	.262	.097-4.481
48 HOURS	5.19	.011	.004-.016	.023	.015-.415
72 HOURS	5.06	.010	.009-.012	.022	.018-.029

EXPERIMENT NO. 37

Object: To determine the contact toxicity of AC222-705 (Payoff) against lab.-reared 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.01%

Replications: Nine

No. of Larvae per Treatment: Ninety

Total No. of Larvae Utilized: Five hundred and forty

Computer Code: AC 222.DAT

Experimental Code: SBL 624, 631, and 635 - 1980

Table No. 37

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.00146	5/90	6	6	13/89	15	15	15/86	17	17
0.2	.00241	21/90	23	23	34/90	38	38	36/89	40	40
0.4	.00448	34/89	38	38	51/88	58	58	56/88	64	64
0.6	.00705	49/90	54	54	68/90	76	76	79/90	88	88
0.8	.00954	43/90	48	48	72/90	80	80	83/90	92	92
1.0	.01206	58/90	64	64	84/90	93	93	88/90	98	98
CONTROL		0/89	0		0/88	0		0/88	0	

Findings: The summary of probit analysis is as follows:

Period	b	LD ₅₀ ug/cm ²	FL	LD ₉₅ ug/cm ²	FL
24 HOURS	1.77	.008	.006-.009	.064	.041-.128
48 HOURS	2.45	.0037	.0032-.0041	.017	.014-.023
72 HOURS	3.01	.0031	.0027-.0034	.011	.009-.013

EXPERIMENT NO. 38

Object: To determine the contact toxicity of NRDC 143 (Permethrin) against lab.-reared 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.03%

Replications: Twelve

No. of Larvae per Treatment: One hundred and twenty

Total No. of Larvae Utilized: Seven hundred and twenty

Computer Code: Per.DAT;1

Experimental Code: SBL 591, 599, 621 and 626 - 1980

Table No. 38

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.00397	1/119	1	1	1/119	1	0	3/119	3	2
0.2	.00765	6/121	5	5	8/120	7	6	11/118	9	8
0.4	.01310	21/120	18	18	27/120	23	23	30/120	25	24
0.6	.02157	57/120	48	48	66/119	55	55	70/119	59	59
0.8	.02779	92/119	77	77	99/119	83	83	100/119	84	84
1.0	.03546	83/120	69	69	90/120	75	75	99/120	83	83
CONTROL		0/120	0		1/119	1		1/119	1	

Findings: The summary of probit analysis is as follows:

Period	b	LD ₅₀ ug/cm ²	FL	LD ₉₅ ug/cm ²	FL
24 HOURS	3.57	.022	.017-.031	.064	.041-.222
48 HOURS	3.82	.020	.015-.027	.054	.036-.171
72 HOURS	3.79	.018	.015-.022	.050	.037-.093

EXPERIMENT NO. 39

Object: To determine the contact toxicity of S-5602 (Fenvalerate) against lab.-reared 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.04%

Replications: Twelve

No. of Larvae per Treatment: One hundred and twenty

Total No. of Larvae Utilized: Seven hundred and twenty

Computer Code: S-56 A₁, A₂, A₃

Experimental Code: SBL 594, 598, 604 and 605 - 1980

Table No. 39

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0041	1/120	1	1	2/120	2	2	4/118	3	3
0.2	.0071	3/119	3	3	5/119	4	4	6/119	5	5
0.4	.0154	28/119	24	24	48/119	40	40	57/119	48	48
0.6	.0221	52/119	44	44	76/119	64	64	81/116	70	70
0.8	.0290	61/119	52	52	79/119	66	66	88/119	74	74
1.0	.0391	62/120	52	52	103/119	87	87	106/118	90	90
CONTROL		0/119	0		0/119	0		0/119	0	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	2.59	.031	.023-.053	.132	.068-.952
48 HOURS	3.43	.019	.018-.021	.058	.050-.070
72 HOURS	3.42	.017	.016-.018	.051	.045-.061

EXPERIMENT NO. 40

Object: To determine the contact toxicity of WL41706 (Fenpropanate) against lab.-reared 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.03%

Replications: Twelve

No. of Larvae per Treatment: One hundred and twenty

Total No. of Larvae Utilized: Seven hundred and twenty

Computer Code: W41, A₁, A₂, A₃

Experimental Code: SBL 579, 588, 597 and 603 - 1980

Table No. 40

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0029	2/120	2	1	2/120	2	0	4/120	3	1
0.2	.0055	20/118	17	16	22/118	19	17	25/118	21	19
0.4	.0106	56/120	47	46	62/120	52	51	64/120	53	52
0.6	.0164	77/120	64	64	86/120	72	71	93/120	78	78
0.8	.0211	90/120	75	75	100/120	83	83	105/120	88	88
1.0	.0299	93/120	78	78	107/120	89	89	110/120	92	92
CONTROL		1/119	1		2/119	2		2/119	2	

Findings: The summary of probit analysis is as follows:

Period	b	LD50	FL	LD95	FL
		ug/cm ²		ug/cm ²	
24 HOURS	2.71	.013	.012-.014	.052	.043-.067
48 HOURS	3.25	.011	.010-.012	.036	.031-.043
72 HOURS	3.34	.010	.009-.011	.032	.028-.037

EXPERIMENT NO. 41

Object: To determine the contact toxicity of WL 43467 (Cypermethrin) against lab.-reared 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.008%

Replications: Six

No. of Larvae per Treatment: Sixty

Total No. of Larvae Utilized: Three hundred and sixty

Computer Code: WL43.DAT

Experimental Code: SBL 572 and 622 - 1980

Table No. 41

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0012	0/60	0	0	2/60	3	1	3/60	5	3
0.2	.0018	3/60	5	3	9/60	15	13	11/60	18	16
0.4	.0040	10/60	17	15	32/60	53	52	38/60	63	62
0.6	.0056	11/60	18	16	40/60	67	66	44/60	73	72
0.8	.0078	10/60	17	15	40/60	67	66	55/60	92	92
1.0	.0109	24/60	40	39	60/60	100	100	60/60	100	100
CONTROL		1/59	2		1/59	2		1/59	2	

Findings: The summary of probit analysis is as follows:

Period	b	LD50	FL	LD95	FL
		ug/cm ²		ug/cm ²	
24 HOURS	1.99	.017	.012-.038	.116	.048-1.025
48 HOURS	3.30	.004	.002-.007	.013	.008-.131
72 HOURS	3.84	.003	.003-.004	.009	.008-.011

EXPERIMENT NO. 42

Object: To determine the contact toxicity of AC222-705 (Payoff) against lab.-reared 5th instar Spruce Budworm Larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.007%

Replications: Nine

No. of Larvae per Treatment: Ninety

Total No. of Larvae Utilized: Six hundred and thirty

Computer Code: AC705.DAT;2

Experimental Code: SBL 680, 687, and 691 - 1981

Table No. 42

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0008	0/90	0	0	2/90	2	1	3/90	3	2
0.2	.0015	5/89	6	5	14/89	16	15	19/89	21	20
0.4	.0036	24/90	27	26	43/90	48	47	51/90	57	57
0.6	.0053	26/88	30	29	60/88	68	68	65/88	74	74
0.8	.0071	43/91	47	46	73/91	80	80	82/91	90	90
1.0	.0088	36/91	40	39	82/91	90	90	83/91	92	92
CONTROL		1/89	1		1/89	1		1/89	1	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	2.05	.009	.008-.012	.060	.035-.146
48 HOURS	3.05	.004	.003-.004	.013	.011-.016
72 HOURS	3.05	.003	.003-.003	.010	.009-.013

EXPERIMENT NO. 43

Object: To determine the contact toxicity of NRDC 143 (Permethrin) against lab.-reared 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.03%

Replications: Twelve

No. of Larvae per Treatment: One hundred and twenty

Total No. of Larvae Utilized: Seven hundred and twenty

Computer Code: SBLPER.DAT;1

Experimental Code: SBL 671, 675, 678 and 684 - 1981

Table No. 43

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0034	1/120	1	1	4/120	3	3	5/120	4	2
0.2	.0069	17/120	14	14	21/119	18	18	24/119	20	18
0.4	.0137	34/120	28	28	45/120	38	38	49/120	41	40
0.6	.0204	65/119	55	55	78/119	66	66	82/119	69	68
0.8	.0256	83/119	70	70	100/119	84	84	106/119	89	89
1.0	.0325	88/120	73	73	109/119	92	92	113/119	95	95
CONTROL		0/120	0		0/120	0		2/120	2	

Findings: The summary of probit analysis is as follows:

Period	b	LD ₅₀ ug/cm ²	FL	LD ₉₅ ug/cm ²	FL
24 HOURS	2.88	.019	.017-.021	.070	.056-.091
48 HOURS	3.29	.014	.011-.018	.045	.032-.091
72 HOURS	3.66	.014	.009-.018	.039	.027-.089

EXPERIMENT NO. 44

Object: To determine the contact toxicity of S-5602 (Fenvalerate) against lab.-reared 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.04%

Replications: Six

No. of Larvae per Treatment: Sixty

Total No. of Larvae Utilized: Three hundred and sixty

Computer Code: SBL 686.DAT;1

Experimental Code: SBL 686 and 692 - 1981

Table No. 44

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0032	0/60	0	0	3/60	5	3	4/60	7	5
0.2	.0063	3/60	5	5	6/60	10	8	9/60	15	13
0.4	.0121	17/60	28	28	31/60	52	51	39/60	65	64
0.6	.0190	26/60	43	43	38/60	63	62	41/60	68	67
0.8	.0273	35/60	58	58	47/60	78	78	54/60	90	90
1.0	.0333	28/60	47	47	55/60	92	92	57/60	95	95
CONTROL		0/60	0		1/60	2		1/60	2	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	2.33	.026	.017-.074	.132	.055-9.068
48 HOURS	3.19	.014	.012-.016	.046	.037-.061
72 HOURS	3.29	.011	.005-.019	.036	.021-.373

EXPERIMENT NO. 45

Object: To determine the contact toxicity of WL43467 (Cypermethrin) against lab.-reared 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.008%

Replications: Twelve

No. of Larvae per Treatment: One hundred and twenty

Total No. of Larvae Utilized: Seven hundred and twenty

Computer Code: WL43467.DAT

Experimental Code: SBL 670, 672, 674, and 677 - 1981

Table No. 45

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0008	3/120	3	2	7/120	6	3	14/120	12	9
0.2	.0017	9/119	8	7	30/119	25	23	38/119	32	30
0.4	.0034	20/120	17	16	61/120	51	49	75/120	63	62
0.6	.0046	16/120	13	12	66/120	55	54	84/120	70	69
0.8	.0062	36/120	30	29	87/120	73	72	107/120	89	89
1.0	.0080	40/120	33	32	101/120	84	84	115/120	96	96
CONTROL		1/120	1		4/120	3		4/120	3	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	1.64	.015	.011-.027	.156	.068-.721
48 HOURS	2.59	.004	.003-.004	.016	.013-.021
72 HOURS	2.93	.003	.002-.003	.010	.008-.012

EXPERIMENT NO. 46

Object: To determine the contact toxicity of RU 11483 (Bioethanomethrin) racemic form against field-collected 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN--(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.1%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBW-RU3 (7-9)

Experimental Code: SBW 116 - 1974

Table No. 46

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0080	8/30	27	22	8/30	27	22	8/30	27	15
0.2	.0180	10/31	32	27	11/31	35	30	12/31	39	29
0.4	.0300	19/30	63	60	20/30	67	65	21/30	70	65
0.6	.0510	28/31	90	89	28/31	90	89	28/31	90	88
0.8	.0660	30/30	100	100	30/30	100	100	30/30	100	100
1.0	.0830	30/30	100	100	30/30	100	100	30/30	100	100
CONTROL		2/29	7		2/29	7		4/29	14	

Findings: The summary of probit analysis is as follows:

Period	b	LD ₅₀ ug/cm ²	FL	LD ₉₅ ug/cm ²	FL
24 HOURS	3.55	.022	.017-.026	.064	.051-.092
48 HOURS	3.41	.021	.016-.025	.063	.050-.091
72 HOURS	4.20	.023	.018-.028	.058	.047-.082

EXPERIMENT NO. 47

Object: To determine the contact toxicity of RU11679 (Bioethanomethrin) against field-collected 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.02%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBW-RU9 (4-6)

Experimental Code: SBW 119 - 1974

Table No. 47

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0020	6/30	20	20	7/30	23	21	8/30	27	19
0.2	.0030	4/30	13	13	5/30	17	14	7/30	23	14
0.4	.0060	10/31	32	32	10/31	32	30	10/31	32	24
0.6	.0100	16/31	52	52	18/31	58	57	18/31	58	53
0.8	.0130	23/31	74	74	25/31	81	80	25/31	81	79
1.0	.0160	24/30	80	80	24/30	80	79	24/30	80	78
CONTROL		0/29	0		1/29	3		3/29	10	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	2.08	.008	.006-.010	.048	.029-.118
48 HOURS	2.24	.007	.006-.009	.040	.026-.093
72 HOURS	2.40	.008	.006-.010	.039	.025-.102

EXPERIMENT NO. 48

Object: To determine the contact toxicity of S-5602-TG (Fenvalerate) against field-collected 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.1%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBW-ST6 (305-307)

Experimental Code: SBW128 - 1975

Table No. 48

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0060	13/29	45	41	15/29	52	48	15/29	52	45
0.2	.0130	25/30	83	82	26/30	87	86	26/30	87	85
0.4	.0280	28/30	93	92	29/30	97	97	29/30	97	97
0.6	.0510	30/30	100	100	30/30	100	100	30/30	100	100
0.8	.0560	30/30	100	100	30/30	100	100	30/30	100	100
1.0	.0860	30/30	100	100	30/30	100	100	30/30	100	100
CONTROL		2/30	7		2/30	7		4/30	13	

Findings: The summary of probit analysis is as follows:

Period	b	LD ₅₀ ug/cm ²	FL	LD ₉₅ ug/cm ²	FL
24 HOURS	2.94	.007	.005-.009	.025	.019-.044
48 HOURS	3.06	.006	.004-.008	.021	.016-.039
72 HOURS	3.16	.007	.004-.009	.022	.016-.041

EXPERIMENT NO. 49

Object: To determine the contact toxicity of NRDC 143 (Permethrin) against field-collected 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.1%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBW-N43 (215-217)

Experimental Code: SBW-129 - 1976

Table No. 49

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0140	1/31	3	0	4/31	13	7	6/31	19	10
0.2	.0210	6/30	20	18	8/30	27	22	10/30	33	26
0.4	.0340	23/30	77	76	24/30	80	79	24/30	80	78
0.6	.0510	25/30	83	82	27/30	90	89	27/30	90	89
0.8	.0680	30/30	100	100	30/30	100	100	30/30	100	100
1.0	.0910	30/30	100	100	30/30	100	100	30/30	100	100
CONTROL		1/31	3		2/31	6		3/31	10	

Findings: The summary of probit analysis is as follows:

Period	b	LD ₅₀ ug/cm ²	FL	LD ₉₅ ug/cm ²	FL
24 HOURS	5.91	.029	.026-.033	.056	.048-.071
48 HOURS	5.71	.027	.023-.031	.053	.045-.068
72 HOURS	5.24	.026	.022-.030	.054	.045-.072

EXPERIMENT NO. 50

Object: To determine the contact toxicity of S-3206 (Fenproponate) against field-collected 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN--(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.05%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBW-S36 (218-220)

Experimental Code: SBW 140 - 1976

Table No. 50

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0040	4/30	13	13	5/29	17	17	7/29	24	22
0.2	.0080	6/30	20	20	6/30	20	20	9/30	30	28
0.4	.0150	19/30	63	63	20/30	67	67	20/30	67	66
0.6	.0250	16/30	53	53	17/30	57	57	20/30	67	66
0.8	.0330	30/30	100	100	30/30	100	100	30/30	100	100
1.0	.0450	30/30	100	100	30/30	100	100	30/30	100	100
CONTROL		0/30	0		0/30	0		1/30	3	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	2.87	.013		.048	
48 HOURS	2.76	.012		.048	
72 HOURS	2.69	.011	.008-.013	.044	.033-.071

EXPERIMENT NO. 51

Object: To determine the contact toxicity of S-5602 (Fenvalerate) against field-collected 5th instar Spruce Budwrom larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.05%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBW-S56 (221-223)

Experimental Code: SBW141 - 1976

Table No. 51

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0030	3/30	10	10	4/30	13	13	5/30	17	14
0.2	.0070	4/32	13	13	5/32	16	16	7/32	22	20
0.4	.0160	13/30	43	43	24/30	80	80	24/30	80	79
0.6	.0250	19/30	63	63	26/30	87	87	26/30	87	87
0.8	.0330	18/30	60	60	27/30	90	90	27/30	90	90
1.0	.0440	19/30	63	63	28/30	93	93	30/30	100	100
CONTROL		0/30	0		0/30	0		1/30	3	

Findings: The summary of probit analysis is as follows:

Period	b	LD ₅₀ ug/cm ²	FL	LD ₉₅ ug/cm ²	FL
24 HOURS	1.66	.022	.017-.031	.219	.112-.819
48 HOURS	2.67	.010	.008-.013	.043	.033-.066
72 HOURS	2.93	.010	.008-.012	.037	.028-.055

EXPERIMENT NO. 52

Object: To determine the contact toxicity of S-5602 (Fenvalerate) against field-collected 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.05%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBW-S56 (63-65)

Experimental Code: SBW 146 - 1977

Table No. 52

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0044	2/30	7	7	3/30	10	3	3/30	10	0
0.2	.0100	5/30	17	17	6/30	20	14	6/30	20	11
0.4	.0173	14/30	47	47	17/30	57	54	18/30	60	56
0.6	.0280	20/30	67	67	25/30	83	82	26/30	87	86
0.8	.0394	24/30	80	80	29/30	97	97	30/30	100	100
1.0	.0543	27/30	90	90	29/30	97	97	29/30	97	97
CONTROL		0/30	0		2/30	7		3/30	10	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	2.70	.019	.016-.023	.078	.057-.130
48 HOURS	4.18	.017	.014-.020	.042	.034-.059
72 HOURS	4.72	.017	.014-.019	.037	.031-.052

EXPERIMENT NO. 53

Object: To determine the contact toxicity of S-5602 (Fenvalerate) against field-collected 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.04%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBW-S56 (139-141)

Experimental Code: SBW 160 - 1978

Table No. 53

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0043	4/30	13	13	5/30	17	14	6/30	20	18
0.2	.0070	8/30	27	27	13/30	43	41	13/30	43	41
0.4	.0158	27/30	90	90	29/30	97	97	29/30	97	97
0.6	.0245	30/30	100	100	30/30	100	100	30/30	100	100
0.8	.0315	30/30	100	100	30/30	100	100	30/30	100	100
1.0	.0407	30/30	100	100	30/30	100	100	30/30	100	100
CONTROL		0/30	0		1/30	3		1/30	3	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	4.79	.008	.007-.010	.019	.015-.025
48 HOURS	5.30	.007	.006-.009	.015	.012-.022
72 HOURS	5.04	.007	.006-.008	.015	.012-.022

EXPERIMENT NO. 54

Object: To determine the contact toxicity of WL 43467 (Cypermethrin) against field-collected 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.006%

Replications: Nine

No. of Larvae per Treatment: Ninety

Total No. of Larvae Utilized: Six hundred and thirty

Computer Code: SBW-W47 (190-192)

Experimental Code: SBW 159, 164, 165 - 1978

Table No. 54

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0007	7/90	8	7	10/90	11	7	11/90	12	4
0.2	.0012	21/89	24	23	23/89	26	23	24/89	27	21
0.4	.0025	41/90	46	45	49/90	53	51	53/90	59	55
0.6	.0042	57/89	64	64	73/89	82	81	74/89	83	82
0.8	.0052	70/90	78	78	89/90	99	99	89/90	99	99
1.0	.0068	75/90	83	83	87/90	97	97	88/90	98	98
CONTROL		1/95	1		4/95	4		8/95	8	

Findings: The summary of probit analysis is as follows:

Period	b	LD50	FL	LD95	FL
		ug/cm ²		ug/cm ²	
24 HOURS	2.38	.004	.002-.003	.013	.011-.018
48 HOURS	3.51	.002	.001-.003	.006	.004-.012
72 HOURS	3.84	.0021	.0019-.0024	.006	.005-.007

EXPERIMENT NO. 55

Object: To determine the contact toxicity of WL43467 (Cypermethrin) against field-collected 5th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN--(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.008%

Replications: Nine

No. of Larvae per Treatment: Sixty

Total No. of Larvae Utilized: Four hundred and twenty

Computer Code: SBW W47, 24, 48 and 72

Experimental Code: SBW 181 and 187 - 1980

Table No. 55

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0009	1/60	2	2	2/60	3	3	5/60	8	6
0.2	.0019	8/60	13	13	13/60	22	22	15/60	25	23
0.4	.0035	15/60	25	25	25/60	42	42	33/60	55	54
0.6	.0055	41/59	69	69	48/59	81	81	52/59	88	88
0.8	.0068	41/60	68	68	50/60	83	83	56/60	93	93
1.0	.0088	48/60	80	80	57/59	97	97	56/59	97	97
CONTROL		0/60	0		0/60	0		1/60	2	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	3.14	.005	.004-.005	.015	.012-.021
48 HOURS	3.53	.0034	.0030-.0037	.010	.008-.012
72 HOURS	3.66	.0029	.0025-.0032	.008	.007-.010

EXPERIMENT NO. 56

Object: To determine the contact toxicity of Pyrocide against field-collected 6th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6; 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.1%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBS-PYR (107-109)

Experimental Code: SBWS-23 - 1971

Table No. 56

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0100	0/30	0	0	1/30	3	0	3/30	10	0
0.2	.0170	2/30	7	7	3/30	10	0	4/30	13	0
0.4	.0340	5/29	17	17	5/29	17	8	6/29	21	5
0.6	.0580	13/30	43	43	13/30	43	37	13/30	43	31
0.8	.0690	20/29	69	69	20/29	69	66	20/29	69	63
1.0	.0990	24/30	80	80	24/30	80	78	24/30	80	76
CONTROL		0/30	0		3/30	10		5/30	17	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	3.45	.057	.049-.068	.172	.128-.286
48 HOURS	5.09	.067	.061-.073	.140	.124-.161
72 HOURS	4.99	.070	.064-.077	.150	.132-.173

EXPERIMENT NO. 57

Object: To determine the contact toxicity of S.B.P. 1382 (Resmethrin) against field-collected 6th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 1.0%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBS-S12 (73-75)

Experimental Code: SBWS 32 - 1972

Table No. 57

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0840	5/31	16	13	5/31	16	13	6/31	19	16
0.2	.1760	18/30	60	59	18/30	60	59	18/30	60	59
0.4	.3650	21/30	70	69	23/30	77	76	23/30	77	76
0.6	.5830	29/30	97	97	30/30	100	100	30/30	100	100
0.8	.7620	29/30	97	97	30/30	100	100	30/30	100	100
1.0	.9210	29/30	97	97	30/30	100	100	30/30	100	100
CONTROL		1/30	3		1/30	3		1/30	3	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	2.81	.184	.141-.227	.709	.540-1.070
48 HOURS	3.52	.172	.137-.207	.504	.397-.721
72 HOURS	3.37	.166	.1310-.2015	.511	.400-.739

EXPERIMENT NO. 58

Object: To determine the contact toxicity of RU 11679 (Bioethanomethrin) against field-collected 6th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.02%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBS-RU9 (97-99)

Experimental Code: SBWS 44 - 1973

Table No. 58

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0020	0/30	0	0	0/29	0	0	0/27	0	0
0.2	.0030	2/30	7	7	2/30	7	0	2/30	7	0
0.4	.0070	7/30	23	23	8/30	27	22	10/30	33	28
0.6	.0100	6/30	20	20	13/30	43	39	14/30	47	43
0.8	.0140	10/30	33	33	12/30	40	35	12/30	40	35
1.0	.0180	20/30	67	67	20/29	69	67	20/29	69	67
CONTROL		0/30	0		2/30	7		2/30	7	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	2.45	.016	.013-.024	.077	.043-.256
48 HOURS	2.99	.014	.012-.020	.051	.030-.253
72 HOURS	2.74	.014	.011-.020	.055	.032-.278

EXPERIMENT NO. 59

Object: To determine the contact toxicity of SP-2539 against field-collected 6th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.5%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBS-SP9 (103-105)

Experimental Code: SBWS 46 - 1973

Table No. 59

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0420	4/30	13	10	5/31	16	10	7/31	23	11
0.2	.0910	10/30	33	31	13/30	43	39	14/30	47	39
0.4	.1970	19/30	63	62	19/30	63	60	23/30	77	74
0.6	.3190	29/30	97	97	29/30	97	97	29/30	97	97
0.8	0.4250	30/30	100	100	30/30	100	100	30/30	100	100
1.0	.5090	30/30	100	100	30/30	100	100	30/30	100	100
CONTROL		1/30	3		2/30	7		4/30	13	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	3.62	.124	.099-.149	.354	.283-.494
48 HOURS	3.44	.119	.092-.144	.356	.281-.510
72 HOURS	3.65	.112	.084-.138	.317	.249-.464

EXPERIMENT NO. 60

Object: To determine the contact toxicity of NRDC 119 (Cismethrin) against field-collected 6th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.1%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBS-N19 (31-33)

Experimental Code: SBWS 59 - 1974

Table No. 60

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0080	15/30	50	48	17/80	57	56	17/30	57	56
0.2	.0200	28/30	93	93	28/30	93	93	28/30	93	93
0.4	.0320	29/30	97	97	29/30	97	97	29/30	97	97
0.6	.0510	30/30	100	100	30/30	100	100	30/30	100	100
0.8	.0650	30/30	100	100	30/30	100	100	30/30	100	100
1.0	.0790	32/33	97	97	32/33	97	97	33/33	100	100
CONTROL		1/30	3		1/30	3		1/30	3	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	2.69	.007	.005-.014	.030	.017-2.098
48 HOURS	2.45	.006	.003-.009	.030	.022-.052
72 HOURS	3.20	.007	.004-.010	.024	.018-.040

EXPERIMENT NO. 61

Object: To determine the contact toxicity of S.B.P. 1382 (Resmethrin) against field-collected 6th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.1%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBS-S12 (34-36)

Experimental Code: SBWS 62 - 1974

Table No. 61

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0060	0/30	0	0	2/30	7	0	3/30	10	0
0.2	.0170	9/30	30	30	13/30	43	39	14/30	47	41
0.4	.0310	12/30	40	40	15/30	50	46	16/30	53	48
0.6	.0530	25/30	83	83	26/30	87	86	27/30	90	89
0.8	.0690	22/30	73	73	26/30	87	86	27/30	90	89
1.0	.0930	27/30	90	90	28/30	93	92	28/30	93	92
CONTROL		0/30	0		2/30	7		3/30	10	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	2.74	.032	.026-.039	.129	.095-.209
48 HOURS	2.73	.026	.020-.033	.106	.078-.179
72 HOURS	2.78	.025	.018-.031	.098	.072-.166

EXPERIMENT NO. 62

Object: To determine the contact toxicity of NRDC 143 (Permethrin) against field-collected 6th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.1%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBS-N43 (224-226)

Experimental Code: SBS71 - 1976

Table No. 62

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0100	2/30	7	7	3/30	10	10	6/30	20	20
0.2	.0160	15/30	50	50	18/30	60	60	18/30	60	60
0.4	.0310	25/30	83	83	26/30	87	87	26/30	87	87
0.6	.0470	30/30	100	100	30/30	100	100	30/30	100	100
0.8	.0640	29/30	97	97	29/30	97	97	29/30	97	97
1.0	.0830	29/30	97	97	29/30	97	97	29/30	97	97
CONTROL		0/28	0		0/28	0		0/28	0	

Findings: The summary of probit analysis is as follows:

Period	b	LD50	FL	LD95	FL
		ug/cm ²		ug/cm ²	
24 HOURS	3.99	.018	.011-.026	.047	.031-.156
48 HOURS	3.76	.017		.045	
72 HOURS	3.39	.015	.012-.018	.046	.037-.067

EXPERIMENT NO. 63

Object: To determine the contact toxicity of FMC 30980 (Cypermethrin) against field-collected 6th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.01%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBS-F30 (534-536)

Experimental Code: SBWS 80 - 1977

Table No. 63

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0009	1/30	3	3	1/30	3	0	3/30	10	8
0.2	.0016	8/30	27	27	8/30	27	22	9/30	30	20
0.4	.0039	17/30	57	57	17/30	57	54	20/30	67	62
0.6	.0058	20/30	67	67	22/30	73	71	22/30	73	69
0.8	.0082	26/30	87	87	27/30	90	89	27/30	90	89
1.0	.0105	28/30	93	93	28/30	93	92	28/30	93	92
CONTROL		0/30	0		2/30	7		4/30	13	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	2.68	.003	.003-.004	.014	.010-.022
48 HOURS	3.11	.004	.003-.004	.012	.009-.019
72 HOURS	3.01	.003	.003-.004	.012	.009-.020

EXPERIMENT NO. 64

Object: To determine the contact toxicity of PP 383 (Cypermethrin) against field-collected 6th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: .015%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBS-PP3 (542-544)

Experimental Code: SBWS 79 - 1977

Table No. 64

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0016	8/30	27	27	9/30	30	30	11/30	37	37
0.2	.0026	12/30	40	40	13/30	43	43	16/30	53	53
0.4	.0059	22/30	73	73	24/30	80	80	25/30	83	83
0.6	.0092	23/30	77	77	24/30	80	80	25/30	83	83
0.8	.0133	29/30	97	97	30/30	100	100	30/30	100	100
1.0	.0168	30/30	100	100	30/30	100	100	30/30	100	100
CONTROL		0/30	0		0/30	0		0/30	0	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	2.44	.003	.002-.004	.015	.011-.025
48 HOURS	2.55	.003	.002-.004	.013	.009-.020
72 HOURS	2.39	.002	.002-.003	.012	.008-.019

EXPERIMENT NO. 65

Object: To determine the contact toxicity of S-5602 (Fenvalerate) against field-collected 6th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.04%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBS-S56 (103-105)

Experimental Code: SBS 85 - 1978

Table No. 65

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0035	5/30	17	17	5/30	17	14	5/30	17	11
0.2	.0062	7/30	23	23	7/30	23	21	8/30	27	22
0.4	.0138	13/30	43	43	13/30	43	41	16/30	53	49
0.6	.0212	23/30	77	77	24/30	80	79	24/30	80	78
0.8	.0280	20/30	67	67	20/30	67	66	25/30	83	82
1.0	.0380	23/30	77	77	25/30	83	82	27/30	90	89
CONTROL		0/30	0		1/30	3		2/30	7	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	1.79	.014	.010-.018	.115	.066-.321
48 HOURS	2.06	.014	.011-.018	.087	.055-.204
72 HOURS	2.57	.012	.009-.015	.053	.038-.095

EXPERIMENT NO. 66

Object: To determine the contact toxicity of WL43467 (Cypermethrin) against field-collected 6th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: .0.006%

Replications: Three

No. of Larvae per Treatment: Thirty

Total No. of Larvae Utilized: Two hundred and ten

Computer Code: SBS-W47-(106-108)

Experimental Code: SBS-86 - 1978

Table No. 66

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0008	3/30	10	10	8/30	27	25	8/30	27	25
0.2	.0012	6/30	20	20	9/30	30	28	10/30	33	31
0.4	.0028	9/30	30	30	13/30	43	41	16/30	53	52
0.6	.0041	15/30	50	50	19/30	63	62	22/30	73	72
0.8	.0051	18/30	60	60	27/30	90	90	27/30	90	90
1.0	.0065	20/30	67	67	25/30	83	82	25/30	83	82
CONTROL		0/30	0		1/30	3		1/30	3	

Findings: The summary of probit analysis is as follows:

Period	b	LD50 ug/cm ²	FL	LD95 ug/cm ²	FL
24 HOURS	1.83	.004	.003-.006	.032	.017-.125
48 HOURS	2.01	.002	.002-.003	.015	.010-.037
72 HOURS	2.06	.002	.002-.003	.013	.008-.028

EXPERIMENT NO. 67

Object: To determine the contact toxicity of WL43467 (Cypermethrin) against field-collected 6th instar Spruce Budworm larvae.

Plan of Experiment:

Treatments: SEVEN-(six rates of application - 0.1, 0.2, 0.4, 0.6, 0.8, 1.0 GPA and Control)

Concentration of Insecticide: 0.008%

Replications: Six

No. of Larvae per Treatment: Sixty

Total No. of Larvae Utilized: Four hundred and twenty

Computer Code:

Experimental Code: SBS 98 and 101 - 1980

Table No. 67

INSECTICIDE		MORTALITY AFTER								
		24 HOURS			48 HOURS			72 HOURS		
GPA	DOSAGE ug/cm ²	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.	D/T	% MORT.	CORR % MORT.
0.1	.0009	10/59	17	15	16/59	27	26	17/59	29	25
0.2	.0011	20/56	36	35	22/56	39	38	22/56	39	36
0.4	.0031	37/60	62	61	50/60	83	83	51/60	85	84
0.6	.0045	30/59	51	50	36/59	61	60	37/59	63	61
0.8	.0058	40/59	68	67	47/59	80	80	50/59	85	84
1.0	.0083	55/60	92	92	56/60	93	93	56/60	93	93
CONTROL		1/59	2		1/59	2		3/59	5	

Findings: The summary of probit analysis is as follows:

Period	b	LD ₅₀ ug/cm ²	FL	LD ₉₅ ug/cm ²	FL
24 HOURS	1.74	.003	.001-.005	.023	.009-1.556
48 HOURS	1.78	.002	.0004-.003	.015	.006-.820
72 HOURS	1.91	.002	.0005-.003	.013	.006-.422

Remarks:

Table 68. Toxicity of Insecticides to Lab. Reared Second Instar Spruce Budworm Larvae (1976)

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ μg/cm ²	Fiducial Limits	Relative Toxicity	LD ₉₅ μg/cm ²	Fiducial Limits	Relative Toxicity
			24 Hours After Treatment						
NRDC 143	(Permethrin)	420	3.49	.043	.037 - .048	-	.127	.107 - .163	-
			48 Hours After Treatment						
NRDC 143	(Permethrin)	420	4.61	.044	.039 - .049	-	.100	.087 - .122	-
			72 Hours After Treatment						
NRDC 143	(Permethrin)	420	3.77	.038	.033 - .043	-	.103	.088 - .130	-

Table 69. Toxicity of Insecticides to Lab. Reared Third Instar Spruce Budworm Larvae (1976)

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ μg/cm ²	Fiducial Limits	Relative Toxicity	LD ₉₅ μg/cm ²	Fiducial Limits	Relative Toxicity
24 Hours After Treatment									
NRDC 143	(Permethrin)	210	4.08	.019	.016 - .021	-	.047	.038 - .065	-
48 Hours After Treatment									
NRDC 143	(Permethrin)	210	4.85	.016	.015 - .019	-	.036	.030 - .046	
72 Hours After Treatment									
NRDC 143	(Permethrin)	210	5.24	.016	.014 - .018	-	.033	.028 - .042	

Table 70. Toxicity of Insecticides to Lab. Reared Fifth Instar Spruce Budworm Larvae (1973)

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ µg/cm ²	Fiducial Limits	Relative Toxicity	LD ₉₅ µg/cm ²	Fiducial Limits	Relative Toxicity
24 Hours After Treatment									
*NRDC 143	(Permethrin)	210	2.81	.011	.008 - .013	1.00	.041	.031 - .064	1.00
RU 11483	(Bioethan- methrin) (racemic form)	210	2.99	.020	.017 - .028	.55	.073	.045 - .208	.56
48 Hours After Treatment									
*NRDC 143	(Permethrin)	210	3.08	.010	.008 - .013	1.00	.036	.028 - .054	1.00
RU 11483	(Bioethan- methrin) (racemic form)	210	2.58	.019	.017 - .026	.53	.082	.045 - .236	.44
72 Hours After Treatment									
*NRDC 142	(Permethrin)	210	2.90	.010	.007 - .012	1.00	.035	.027 - .056	1.00
RU 11483	(Bioethan- methrin) (racemic form)	210	2.63	.018	.015 - .025	.56	.077	.047 - .210	.45

*1976 Permethrin (Expt. #11, Table #11) used to calculate relative toxicities.

Table 71. Toxicity of Insecticides to Lab. Reared Fifth Instar Spruce Budworm Larvae (1975)

24 Hours After Treatment

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ μg/cm ²	Fiducial Limits	Relative Toxicity	LD ₉₅ μg/cm ²	Fiducial Limits	Relative Toxicity
ABG 6010		630	5.80	.134	.123 - .145	.08	.258	.235 - .293	.16
FMC 33297	(Permethrin)	630	4.53	.025	.023 - .027	.44	.058	.052 - .066	.70
NRDC 119	(Cismethrin)	210	4.08	.007	.006 - .009	1.57	.019	.015 - .025	2.16
*NRDC 143	(Permethrin)	210	2.81	.011	.008 - .013	1.00	.041	.031 - .064	1.00
SBP 1513	(Permethrin)	420	5.45	.016	.014 - .017	.69	.032	.028 - .038	1.28
RU 11679	(Bioethano- methrin)	630	4.72	.014	.013 - .015	.79	.031	.027 - .037	1.32

*1976 Permethrin (Expt. #11, Table #11), used to calculate relative toxicities.

Table 72. Toxicity of Insecticides to Lab. Reared Fifth Instar Spruce Budworm Larvae (1975)

48 Hours After Treatment

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ μg/cm ²	Fiducial Limits	Relative Toxicity	LD ₉₅ μg/cm ²	Fiducial Limits	Relative Toxicity
ABG 6010		630	6.08	.132	.120 - .142	.08	.246	.224 - .279	.15
FMC 33297	(Permethrin)	630	4.41	.023	.021 - .025	.43	.055	.049 - .064	.65
NRDC 119	(Cismethrin)	210	4.08	.007	.006 - .009	1.43	.019	.015 - .025	1.89
*NRDC 143	(Permethrin)	210	3.08	.010	.008 - .013	1.00	.036	.028 - .054	1.00
SBP 1513	(Permethrin)	420	5.15	.015	.014 - .017	.67	.032	.028 - .039	1.13
RU 11679	(Bioethano- methrin)	630	4.55	.013	.012 - .014	.77	.030	.027 - .035	1.20

*1976 Permethrin (Expt. #11, Table 11), used to calculate relative toxicities.

Table 73. Toxicity of Insecticides to Lab. Reared Fifth Instar Spruce Budworm Larvae (1975)

72 Hours After Treatment

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ μg/cm ²	Fiducial Limits	Relative Toxicity	LD ₉₅ μg/cm ²	Fiducial Limits	Relative Toxicity
ABG 6010		630	5.99	.131	.120 - .142	.08	.247	.225 - .280	.14
FMC 33297	(Permethrin)	630	4.62	.023	.021 - .026	.43	.053	.048 - .061	.66
NRDC 119	(Cismethrin)	210	4.03	.007	.006 - .008	1.43	.018	.015 - .024	1.94
*NRDC 143	(Permethrin)	210	2.90	.010	.007 - .012	1.00	.035	.027 - .056	1.00
SBP 1513	(Permethrin)	420	4.75	.015	.013 - .016	.67	.032	.028 - .040	1.09
RU 11679	(Bioethano- methrin)	630	4.09	.013	.009 - .018	.77	.032	.021 - .133	1.09

*1976 Permethrin (Expt. #11, Table #11), used to calculate relative toxicities.

Table 74. Toxicity of Insecticides to Lab. Reared Fifth Instar Spruce Budworm Larvae (1976)

24 Hours After Treatment

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative Toxicity	LD ₉₅ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative Toxicity
FMC 33297	(Permethrin)	210	3.57	.015	.013 - .018	.75	.045	.036 - .061	.91
FMC 40963	(Permethrin)	210	3.10	.019	.015 - .022	.58	.063	.048 - .097	.65
NRDC 143	(Permethrin)	210	2.81	.011	.008 - .013	1.00	.041	.031 - .064	1.00
PP 383	(Cypermethrin)	420	3.70	.006	.005 - .006	1.83	.016	.013 - .019	2.56
S-3206	(Fenpropanate)	420	2.78	.018	.012 - .026	.61	.072	.044 - .272	.57
S-5602	(Fenvalerate)	630	3.11	.011	.007 - .014	1.00	.037	.026 - .072	1.11
RU 11483	(Bioethano- methrin) (racemic form)	210	7.07	.024	.013 - .032	.46	.041	.031 - .163	1.00

Table 75. Toxicity of Insecticides to Lab. Reared Fifth Instar Spruce Budworm Larvae (1976)

48 Hours After Treatment

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ μg/cm ²	Fiducial Limits	Relative Toxicity	LD ₉₅ μg/cm ²	Fiducial Limits	Relative Toxicity
FMC 33297	(Permethrin)	210	3.70	.016	.013 - .018	.63	.044	.035 - .061	.82
FMC 40963	(Permethrin)	210	2.73	.015	-----	.67	.062	-----	.58
NRDC 143	(Permethrin)	210	3.08	.010	.008 - .013	1.00	.036	.028 - .054	1.00
PP 383	(Cypermethrin)	420	4.42	.005	.005 - .006	2.00	.013	.011 - .015	2.77
S-3206	(Fenpropanate)	420	2.94	.017	.015 - .020	.59	.063	.051 - .085	.57
S-5602	(Fenvalerate)	630	3.36	.010	.005 - .015	1.00	.030	.019 - .119	1.16
RU 11483	(Bioethano- methrin) (racemic form)	210	6.50	.023	.015 - .031	.43	.042	.032 - .107	.85

Table 76. Toxicity of Insecticides to Lab. Reared Fifth Instar Spruce Budworm Larvae (1976)

72 Hours After Treatment

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ μg/cm ²	Fiducial Limits	Relative Toxicity	LD ₉₅ μg/cm ²	Fiducial Limits	Relative Toxicity
FMC 33297	(Permethrin)	210	3.39	.014	.011 - .017	.71	.043	.034 - .061	.81
FMC 40963	(Permethrin)	210	1.95	.011	-----	.91	.076	-----	.46
NRDC 143	(Permethrin)	210	2.90	.010	.007 - .012	1.00	.035	.027 - .056	1.00
PP 383	(Cypermethrin)	420	3.96	.005	.004 - .006	2.00	.013	.011 - .016	2.69
S-3206	(Fenpropanate)	420	3.12	.017	.009 - .026	.59	.057	.035 - .325	.61
S-5602	(Fenvalerate)	630	3.28	.009	.008 - .010	1.11	.029	.025 - .036	1.21
RU 11483	(Bioethan- methrin) (racemic form)	210	7.23	.024	.020 - .026	.42	.040	.035 - .050	.88

Table 77. Toxicity of Insecticides to Lab. Reared Fifth Instar Spruce Budworm Larvae (1977)

24 Hours After Treatment

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative Toxicity	LD ₉₅ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative Toxicity
ABG 6070		630	2.98	.211	.155 - .300	.09	.755	.459 - 2.763	.08
FMC 30980	(Cypermethrin)	420	3.28	.006	.005 - .006	3.17	.018	.014 - .026	3.17
FMC 33297	(Permethrin)	420	3.00	.018	.016 - .021	1.06	.065	.051 - .092	.88
FMC 40963	(Permethrin)	420	3.91	.016	.014 - .018	1.19	.042	.037 - .052	1.33
FMC 45497	(NRDC-160)	420	8.87	.005	.004 - .005	3.80	.007	.007 - .008	8.14
FMC 45498	(Decamethrin)	420	8.32	.0007	.0007 - .0008	19.00	.0011	.0011 - .0012	57.000
FMC 45812	(NRDC-148)	420	6.45	.012	.011 - .013	1.58	.022	.020 - .027	2.59
NRDC 143	(Permethrin)	420	3.37	.019	.016 - .021	1.00	.057	.047 - .076	1.00
NRDC 161	(Decamethrin)	630	2.11	.001	.001 - .083	19.00	.007	.002 - 3.01x10 ⁵	8.14
NRDC 168-s		630	1.99	.001	.001 - .002	17.27	.075	.003 - .079	.76
PP 383	(Cypermethrin)	420	2.93	.005	.003 - .007	3.80	.018	.011 - .064	3.17
S-3206	(Fenpropanate)	420	3.32	.013	.011 - .015	1.46	.040	.033 - .051	1.43
S-5602	(Fenvalerate)	420	4.75	.011	.010 - .012	1.73	.024	.020 - .029	2.38
SBP 1382	(Resmethrin)	630	3.87	.029	.026 - .031	.66	.076	.067 - .090	.75
WL 41706	(Fenpropanate)	210	3.61	.012	.010 - .014	1.58	.034	.027 - .046	1.68
WL 43467	(Cypermethrin)	630	3.50	.003	.003 - .003	6.33	.009	.008 - .011	6.33
WL 43775	(Fenvalerate)	420	2.83	.013	.007 - .019	1.46	.049	.031 - .147	1.16

Table 78. Toxicity of Insecticides to Lab. Reared Fifth Instar Spruce Budworm Larvae (1977)

48 Hours After Treatment

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative Toxicity	LD ₉₅ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative Toxicity
ABG 6070		630	3.18	.150	.135 - .165	.11	.494	.419 - .613	.07
FMC 30980	(Cypermethrin)	420	3.27	.005	.005 - .006	3.20	.016	.013 - .023	2.13
FMC 33297	(Permethrin)	420	4.38	.016	.014 - .017	1.00	.038	.032 - .047	.89
FMC 40963	(Permethrin)	420	3.84	.015	.014 - .017	1.07	.041	.036 - .051	.83
FMC 45497	(NRDC-160)	420	9.91	.004	-----	4.00	.006	-----	5.67
FMC 45498	(Decamethrin)	420	9.68	.0006	.0006- .0007	16.00	.0009	.0009- .0010	34.00
FMC 45812	(NRDC-148)	420	6.63	.011	.010 - .012	1.45	.020	.018 - .024	1.70
NRDC 143	(Permethrin)	420	4.42	.016	.014 - .017	1.00	.034	.030 - .042	1.00
NRDC 161	(Decamethrin)	630	3.22	.0005	.0003- .001	16.00	.002	.001 - .034	17.00
NRDC 168-s		630	2.55	.0004	.0001- .001	40.00	.002	.001 - .018	17.00
PP 383	(Cypermethrin)	420	3.18	.004	.001 - .007	4.00	.013	.007 - .331	2.62
S-3206	(Fenpropanate)	420	3.57	.011	.010 - .013	1.45	.033	.027 - .041	1.03
S-5602	(Fenvalerate)	420	4.70	.010	.009 - .013	1.60	.023	.020 - .029	1.48
SBP 1382	(Resmethrin)	630	4.28	.026	.023 - .028	.62	.063	.055 - .074	.54
WL 41706	(Fenpropanate)	210	3.81	.011	.009 - .013	1.45	.031	.025 - .042	1.10
WL 43467	(Cypermethrin)	630	3.94	.003	.002 - .003	5.33	.007	.006 - .008	4.86
WL 43775	(Fenvalerate)	420	4.22	.012	.010 - .013	1.33	.029	.025 - .035	1.17

Table 79. Toxicity of Insecticides to Lab. Reared Fifth Instar Spruce Budworm Larvae (1977)

72 Hours After Treatment

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative Toxicity	LD ₉₅ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative Toxicity
ABG 6070		630	3.21	.142	.128 - .157	.11	.462	.392 - .571	.07
FMC 30980	(Cypermethrin)	420	3.56	.004	.004 - .005	3.75	.012	.010 - .016	2.83
FMC 33297	(Permethrin)	420	4.30	.015	.014 - .017	1.00	.037	.032 - .046	.92
FMC 40963	(Permethrin)	420	3.83	.015	.014 - .017	1.00	.042	.036 - .051	.81
FMC 45497	(NRDC-160)	420	8.94	.004	-----	3.75	.006	-----	5.67
FMC 45498	(Decamethrin)	420	9.04	.0006	.0006- .0006	15.00	.0009	.0009- .0010	34.00
FMC 45812	(NRDC-148)	420	6.53	.011	.010 - .012	1.36	.021	.018 - .024	1.62
NRDC 143	(Permethrin)	420	4.72	.015	.013 - .017	1.00	.034	.030 - .042	1.00
NRDC 161	(Decamethrin)	630	2.97	.0005	.0002- .001	15.00	.002	.001 - .091	17.00
NRDC 168-s		630	2.55	.0003	.0001- .001	50.00	.002	.001 - .014	17.00
PP 383	(Cypermethrin)	420	3.58	.003	.002 - .005	5.00	.010	.006 - .058	3.40
S-3206	(Fenpropanate)	420	3.99	.011	.010 - .012	1.36	.027	.023 - .034	1.26
S-5602	(Fenvalerate)	420	4.70	.010	.009 - .012	1.50	.023	.020 - .029	1.48
SBP 1382	(Resmethrin)	630	4.27	.026	.023 - .028	.58	.063	.055 - .074	.54
WL 41706	(Fenpropanate)	210	4.02	.011	.009 - .013	1.36	.029	.024 - .039	1.17
WL 43467	(Cypermethrin)	630	3.92	.003	.002 - .003	5.00	.007	.006 - .008	4.86
WL 43775	(Fenvalerate)	420	3.98	.011	.010 - .013	1.36	.026	.025 - .036	1.31

Table 80. Toxicity of Insecticides to Lab. Reared Fifth Instar Spruce Budworm Larvae (1978)

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative Toxicity	LD ₉₅ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative Toxicity
24 Hours After Treatment									
AC 222 - 705	(Payoff)	840	3.55	.008	.006 - .010	2.38	.022	.017 - .040	2.59
*NRDC 143	(Permethrin)	420	3.37	.019	.016 - .021	1.00	.057	.047 - .076	1.00
S-5602	(Fenvalerate)	630	3.83	.015	.001 - .033	1.27	.041	.023 - 6.566x10 ⁶	1.39
WL 43467	(Cypermethrin)	630	3.47	.003	.003 - .003	6.33	.009	.008 - .011	6.33
48 Hours After Treatment									
AC 222 - 705	(Payoff)	840	3.76	.006	.005 - .007	2.67	.016	.012 - .026	2.13
*NRDC 143	(Permethrin)	420	4.82	.016	.014 - .017	1.00	.034	.030 - .042	1.00
S-5602	(Fenvalerate)	630	4.47	.014	.012 - .015	1.14	.032	.028 - .037	1.06
WL 43467	(Cypermethrin)	630	4.01	.003	.001 - .004	5.33	.007	.005 - .047	4.86
72 Hours After Treatment									
AC 222 - 705	(Payoff)	840	3.81	.005	.005 - .006	3.00	.014	.013 - .016	2.43
*NRDC 143	(Permethrin)	420	4.72	.015	.013 - .017	1.00	.034	.030 - .042	1.00
S-5602	(Fenvalerate)	630	4.50	.013	.012 - .015	1.15	.031	.028 - .036	1.10
WL 43467	(Cypermethrin)	630	5.28	.003	.003 - .003	5.00	.007	.006 - .008	4.86

*1977 Permethrin (Expt. #23, Table #23), used to calculate relative toxicities.

Table 81. Toxicity of Insecticides to Lab. Reared Fifth Instar Spruce Budworm Larvae (1979)

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ µg/cm ²	Fiducial ¹ Limits	Relative Toxicity	LD ₉₅ µg/cm ²	Fiducial Limits	Relative ¹ Toxicity
24 Hours After Treatment									
S-5602	(Fenvalerate)	210	1.86	.034	.023 - .088	.65	.262	.097 - 4.481	.24
48 Hours After Treatment									
S-5602	(Fenvalerate)	210	5.19	.011	.004 - .016	1.82	.023	.015 - .415	2.35
72 Hours After Treatment									
S-5602	(Fenvalerate)	210	5.06	.010	.009 - .012	1.80	.022	.018 - .029	2.27

¹1980 Permethrin (Expt. #38, Table #38), used to calculate relative toxicities.

Table 82. Toxicity of Insecticides to Lab. Reared Fifth Instar Spruce Budworm Larvae (1980)

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative Toxicity	LD ₉₅ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative Toxicity
24 Hours After Treatment									
AC 222 - 705	(Payoff)	630	1.77	.008	.006 - .009	2.75	.064	.041 - .128	1.00
NRDC 143	(Permethrin)	840	3.57	.022	.017 - .031	1.00	.064	.041 - .222	1.00
S-5602	(Fenvalerate)	840	2.59	.031	.023 - .053	.71	.132	.068 - .952	.48
WL 41706	(Fenpropanate)	840	2.71	.013	.012 - .014	1.69	.052	.043 - .067	1.23
WL 43467	(Cypermethrin)	420	1.99	.017	.012 - .038	1.29	.116	.048 - 1.025	.55
48 Hours After Treatment									
AC 222 - 705	(Payoff)	630	2.45	.004	.0032-.0041	5.41	.017	.014 - .023	3.18
NRDC 143	(Permethrin)	840	3.82	.020	.015 - .027	1.00	.054	.036 - .171	1.00
S-5602	(Fenvalerate)	840	3.43	.019	.018 - .021	1.05	.058	.050 - .070	.93
WL 41706	(Fenpropanate)	840	3.25	.011	.010 - .012	1.82	.036	.031 - .043	1.50
WL 43467	(Cypermethrin)	420	3.30	.004	.002 - .007	5.00	.013	.008 - .131	4.15
72 Hours After Treatment									
AC 222 - 705	(Payoff)	630	3.01	.003	.0027-.0034	5.81	.011	.009 - .013	4.55
NRDC 143	(Permethrin)	840	3.79	.018	.015 - .022	1.00	.050	.037 - .093	1.00
S-5602	(Fenvalerate)	840	3.42	.017	.016 - .018	1.06	.051	.045 - .061	.98
WL 41706	(Fenpropanate)	840	3.34	.010	.009 - .011	1.80	.032	.028 - .037	1.56
WL 43467	(Cypermethrin)	420	3.84	.003	.003 - .004	6.00	.009	.008 - .011	5.56

Table 83. Toxicity of Insecticides to Lab. Reared Fifth Instar Spruce Budworm Larvae (1981)

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative Toxicity	LD ₉₅ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative Toxicity
24 Hours After Treatment									
AC 222 - 705	(Payoff)	630	2.05	.009	.008 - .012	2.11	.060	.035 - .146	1.17
NRDC 143	(Permethrin)	840	2.88	.019	.017 - .021	1.00	.070	.056 - .091	1.00
S-5602	(Fenvalerate)	420	2.33	.026	.017 - .074	.73	.132	.055 - 9.068	.53
WL 43467	(Cypermethrin)	840	1.64	.015	.011 - .027	1.27	.156	.068 - .721	.45
48 Hours After Treatment									
AC 222 - 705	(Payoff)	630	3.05	.004	.003 - .004	3.50	.013	.011 - .016	3.46
NRDC 143	(Permethrin)	840	3.29	.014	.011 - .018	1.00	.045	.032 - .091	1.00
S-5602	(Fenvalerate)	420	3.19	.014	.012 - .016	1.00	.046	.037 - .061	.98
WL 43467	(Cypermethrin)	840	2.59	.004	.003 - .004	3.50	.016	.013 - .021	2.81
72 Hours After Treatment									
AC 222 - 705	(Payoff)	630	3.05	.003	.0028-.0034	4.67	.010	.009 - .013	3.90
NRDC 143	(Permethrin)	840	3.66	.014	.009 - .018	1.00	.039	.027 - .089	1.00
S-5602	(Fenvalerate)	420	3.29	.011	.005 - .019	1.27	.036	.021 - .373	1.08
WL 43467	(Cypermethrin)	840	2.93	.003	.002 - .003	4.67	.010	.008 - .012	3.90

Table 84. Toxicity of Insecticides to Field Collected Fifth Instar Spruce Budworm Larvae (1974)

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ μg/cm ²	Fiducial ¹ Limits	Relative Toxicity	LD ₉₅ μg/cm ²	Fiducial Limits	Relative ¹ Toxicity
24 Hours After Treatment									
RU 11483	(Bioethano- methrin) (racemic form)	210	3.54	.022	.017 - .026	1.32	.064	.051 - .092	.88
RU 11679	(Bioethano- methrin)	210	2.08	.008	.006 - .010	4.14	.048	.029 - .118	1.17
48 Hours After Treatment									
RU 11483	(Bioethano- methrin) (racemic form)	210	3.41	.021	.016 - .025	1.29	.063	.050 - .091	.84
RU 11679	(Bioethano- methrin)	210	2.24	.007	.006 - .009	3.86	.040	.026 - .093	1.33
72 Hours After Treatment									
RU 11483	(Bioethano- methrin) (racemic form)	210	4.20	.023	.018 - .028	1.13	.058	.047 - .082	.93
RU 11679	(Bioethano- methrin)	210	2.40	.008	.006 - .010	3.25	.039	.025 - .102	1.38

¹1976 Permethrin (Expt. #49, Table #49), used to calculate relative toxicities.

Table 85. Toxicity of Insecticides to Field Collected Fifth Instar Spruce Budworm Larvae (1975).

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ $\mu\text{g}/\text{cm}^2$	Fiducial ¹ Limits	Relative Toxicity	LD ₉₅ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative Toxicity
24 Hours After Treatment									
S-5602-TG	(Fenvalerate-technical grade)	210	2.94	.007	.005 - .009	4.14	.025	.019 - .044	2.24
48 Hours After Treatment									
S-5602-TG	(Fenvalerate-technical grade)	210	3.06	.006	.004 - .008	4.50	.021	.016 - .039	2.52
72 Hours After Treatment									
S-5602-TG	(Fenvalerate-technical grade)	210	3.16	.007	.004 - .009	3.71	.022	.016 - .041	2.45

¹1976 Permethrin (Expt. #49, Table #49), used to calculate relative toxicities.

Table 86. Toxicity of Insecticides to Field Collected Fifth Instar Spruce Budworm Larvae (1976)

24 Hours After Treatment

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ μg/cm ²	Fiducial Limits	Relative Toxicity	LD ₉₅ μg/cm ²	Fiducial Limits	Relative Toxicity
NRDC 143	(Permethrin)	210	5.91	.029	.026 - .033	1.00	.056	.048 - .071	1.00
S-3206	(Fenpropanate)	210	2.87	.013	-----	2.23	.048	-----	1.17
S-5602	(Fenvalerate)	210	1.66	.022	.017 - .031	1.32	.219	.112 - .819	.26

Table 87. Toxicity of Insecticides to Field Collected Fifth Instar Spruce Budworm Larvae (1976)

48 Hours After Treatment

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative Toxicity	LD ₉₅ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative Toxicity
NRDC 143	(Permethrin)	210	5.71	.027	.023 - .031	1.00	.053	.045 - .068	1.00
S-3206	(Fenpropanate)	210	2.76	.012	-----	2.25	.048	-----	1.10
S-5602	(Fenvalerate)	210	2.67	.010	.008 - .013	2.70	.043	.033 - .066	1.23

Table 88. Toxicity of Insecticides to Field Collected Fifth Instar Spruce Budworm Larvae (1976)

72 Hours After Treatment

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ μg/cm ²	Fiducial Limits	Relative Toxicity	LD ₉₅ μg/cm ²	Fiducial Limits	Relative Toxicity
NRDC 143	(Permethrin)	210	5.24	.026	.022 - .030	1.0	.054	.045 - .072	1.00
S-3206	(Fenpropanate)	210	2.69	.011	.008 - .013	2.36	.044	.033 - .071	1.23
S-5602	(Fenvalerate)	210	2.93	.010	.008 - .012	2.60	.037	.028 - .055	1.46

Table 89. Toxicity of Insecticides to Field Collected Fifth Instar Spruce Bduworm Larvae (1977)

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ µg/cm ²	Fiducial ¹ Limits	Relative Toxicity	LD ₉₅ µg/cm ²	Fiducial Limits	Relative Toxicity
24 Hours After Treatment									
S-5602	(Fenvalerate)	210	2.70	.019	.016 - .023	1.53	.078	.057 - .130	.72
48 Hours After Treatment									
S-5602	(Fenvalerate)	210	4.18	.017	.014 - .020	1.59	.042	.034 - .059	1.26
72 Hours After Treatment									
S-5602	(Fenvalerate)	210	4.72	.017	.014 - .019	1.53	.037	.031 - .052	1.46

¹1976 Permethrin (Expt. #49, Table #49), used to calculate relative toxicities.

Table 90. Toxicity of Insecticides to Field Collected Fifth Instar Spruce Budworm Larvae (1978)

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ $\mu\text{g}/\text{cm}^2$	Fiducial ¹ Limits	Relative Toxicity	LD ₉₅ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative ¹ Toxicity
24 Hours After Treatment									
S-5602	(Fenvalerate)	210	4.79	.008	.007 - .010	1.29	.019	.015 - .025	.41
WL 43467	(Cypermethrin)	630	2.38	.003	.002 - .003	4.50	.013	.011 - .018	1.47
48 Hours After Treatment									
S-5602	(Fenvalerate)	210	5.30	.007	.006 - .009	1.21	.015	.012 - .022	.52
WL 43467	(Cypermethrin)	630	3.51	.002	.001 - .003	8.50	.006	.004 - .012	3.00
72 Hours After Treatment									
S-5602	(Fenvalerate)	210	5.04	.007	.006 - .008	1.25	.015	.012 - .022	.87
WL 43467	(Cypermethrin)	630	3.84	.0021	.0019-.0024	7.50	.006	.005 - .007	5.75

¹1976 Permethrin (Expt. #49, Table 49), used to calculate relative toxicities.

Table 91. Toxicity of Insecticides to Field Collected Fifth Instar Spruce Budworm Larvae (1980)

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative ¹ Toxicity	LD ₉₅ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative ¹ Toxicity
24 Hours After Treatment									
WL 43467	(Cypermethrin)	420	3.14	.005	.004 - .005	5.80	.015	.012 - .021	3.73
48 Hours After Treatment									
WL 43467	(Cypermethrin)	420	3.53	.0034	.0030-.0037	7.94	.010	.008 - .012	5.30
72 Hours After Treatment									
WL 43467	(Cypermethrin)	420	3.66	.0029	.0025-.0032	8.97	.008	.007 - .010	6.75

¹1976 Permethrin (Expt. #49, Table #49), used to calculate relative toxicities.

Table 92. Toxicity of Insecticides to Field Collected Sixth Instar Spruce Budworm Larvae (1971)

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative ¹ Toxicity	LD ₉₅ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative ¹ Toxicity
24 Hours After Treatment									
Pyrocide		210	3.45	.057	.049 - .068	.32	.172	.128 - .286	.27
48 Hours After Treatment									
Pyrocide		210	5.09	.067	.061 - .073	.25	.140	.124 - .161	.32
72 Hours After Treatment									
Pyrocide		210	4.99	.070	.064 - .077	.21	.150	.132 - .173	.31

¹1976 Permethrin (Expt. #62, Table #62), used to calculate relative toxicities.

Table 93. Toxicity of Insecticides to Field Collected Sixth Instar Spruce Budworm Larvae (1972)

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ µg/cm ²	Fiducial Limits	Relative Toxicity	LD ₉₅ µg/cm ²	Fiducial Limits	Relative Toxicity
24 Hours After Treatment									
S.B.P. 1382	(Resmethrin)	210	2.81	.184	.141 - .227	.10	.709	.540 - 1.070	.07
48 Hours After Treatment									
S.B.P. 1382	(Resmethrin)	210	3.52	.172	.137 - .207	.10	.504	.397 - .721	.09
72 Hours After Treatment									
S.B.P. 1382	(Resmethrin)	210	3.37	.166	.131 - .202	.09	.511	.400 - .739	.09

¹1976 Permethrin (Expt. #62, Table #62), used to calculate relative toxicities.

Table 94. Toxicity of Insecticides to Field Collected Sixth Instar Spruce Budworm Larvae (1973)

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative ¹ Toxicity	LD ₉₅ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative ¹ Toxicity
24 Hours After Treatment									
RU 11679	(Bioethano- methrin)	210	2.45	.016	.013 - .024	1.13	.077	.043 - .256	.61
SP 2539		210	3.62	.124	.099 - .149	.15	.354	.283 - .494	.13
48 Hours After Treatment									
RU 11679	(Bioethano- methrin)	210	2.99	.014	.012 - .020	1.21	.051	.030 - .253	.88
SP 2539		210	3.44	.119	.092 - .144	.14	.356	.281 - .510	.13
72 Hours After Treatment									
RU 11679	(Bioethano- methrin)	210	2.74	.014	.011 - .019	1.07	.055	.032 - 2.78	.84
SP 2539		210	3.65	.112	.084 - .138	.13	.317	.249 - .464	.15

¹1976 Permethrin (Expt. #62, Table #62), used to calculate relative toxicities.

Table 95. Toxicity of Insecticides to Field Collected Sixth Instar Spruce Budworm Larvae (1974)

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative ¹ Toxicity	LD ₉₅ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative ¹ Toxicity
24 Hours After Treatment									
NRDC 119	(Cismethrin)	210	2.69	.007	.486x10 ⁷⁴ -.014	2.57	.030	.017 - 2.098	1.57
S.B.P. 1382	(Resmethrin)	210	2.74	.032	.026 - .039	.56	.129	.095 - .209	.36
48 Hours After Treatment									
NRDC 119	(Cismethrin)	210	2.45	.006	.003 - .009	2.83	.030	.022 - .052	1.50
S.B.P. 1382	(Resmethrin)	210	2.73	.026	.020 - .033	.65	.106	.078 - .179	.42
72 Hours After Treatment									
NRDC 119	(Cismethrin)	210	3.20	.007	.004 - .010	2.14	.024	.018 - .040	1.92
S.B.P. 1382	(Resmethrin)	210	2.78	.025	.018 - .031	.60	.098	.073 - .167	.47

¹1976 Permethrin (Expt. #62, Table #62), used to calculate relative toxicities.

Table 96. Toxicity of Insecticide to Field Collected Sixth Instar Spruce Budworm Larvae (1976)

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative Toxicity	LD ₉₅ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative Toxicity
24 Hours After Treatment									
NRDC 143	(Permethrin)	210	3.99	.018	.011 - .026	1.0	.047	.031 - .156	1.0
48 Hours After Treatment									
NRDC 143	(Permethrin)	210	3.76	.017	-----	1.0	.045	-----	1.0
72 Hours After Treatment									
NRDC 143	(Permethrin)	210	3.39	.015	.012 - .018	1.0	.046	.037 - .067	1.0

Table 97. Toxicity of Insecticides to Field Collected Sixth Instar Spruce Budworm Larvae (1977)

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ μg/cm ²	Fiducial Limits	Relative Toxicity	LD ₉₅ μg/cm ²	Fiducial Limits	Relative ¹ Toxicity
24 Hours After Treatment									
FMC 30980	(Cypermethrin)	210	2.68	.003	.003 - .004	6.00	.014	.010 - .022	3.36
PP 383	(Cypermethrin)	210	2.44	.003	.002 - .004	6.00	.015	.011 - .025	3.13
48 Hours After Treatment									
FMC 30980	(Cypermethrin)	210	3.11	.004	.003 - .004	4.25	.012	.009 - .019	3.75
PP 383	(Cypermethrin)	210	2.55	.003	.002 - .004	5.67	.013	.009 - .020	3.46
72 Hours After Treatment									
FMC 30980	(Cypermethrin)	210	3.01	.003	.003 - .004	5.00	.012	.009 - .021	3.83
PP 383	(Cypermethrin)	210	2.39	.002	.002 - .003	7.50	.012	.012 - .019	3.83

¹1976 Permethrin (Expt. #62, Table #62), used to calculate relative toxicities.

Table 98. Toxicity of Insecticides to Field Collected Sixth Instar Spruce Budworm Larvae (1978)

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative Toxicity	LD ₉₅ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative Toxicity ¹
24 Hours After Treatment									
S-5602	(Fenvalerate)	210	1.79	.014	.010 - .018	1.29	.115	.066 - .321	.41
WL 43467	(Cypermethrin)	210	1.83	.004	.003 - .006	4.50	.032	.017 - .125	1.47
48 Hours After Treatment									
S-5602	(Fenvalerate)	210	2.06	.014	.011 - .018	1.21	.087	.055 - .204	.52
WL 43467	(Cypermethrin)	210	2.01	.002	.001 - .003	8.50	.015	.010 - .037	3.00
72 Hours After Treatment									
S-5602	(Fenvalerate)	210	2.57	.012	.009 - .015	1.25	.053	.038 - .095	.87
WL 43467	(Cypermethrin)	210	2.06	.002	.002 - .003	7.50	.013	.008 - .028	5.75

¹1976 Permethrin (Expt. #62, Table #62), used to calculate relative toxicities.

Table 99. Toxicity of Insecticides to Field Collected Sixth Instar Spruce Budworm Larvae (1980)

Insecticide	Alternate Name	No. of Insects	Slope	LD ₅₀ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative Toxicity	LD ₉₅ $\mu\text{g}/\text{cm}^2$	Fiducial Limits	Relative ¹ Toxicity
24 Hours After Treatment									
WL 43467	(Cypermethrin)	420	1.74	.003	.001 - .005	6.00	.023	.009 - 1.556	2.04
48 Hours After Treatment									
WL 43467	(Cypermethrin)	420	1.78	.002	.0004-.003	8.50	.015	.006 - .820	3.00
72 Hours After Treatment									
WL 43467	(Cypermethrin)	420	1.91	.002	.0005-.003	7.50	.013	.006 - .422	3.54

¹1976 Permethrin (Expt. #62, Table #62), used to calculate relative toxicities.

TABLE 100

Year	Insecticide & Commercial Formulation	Type	Date Rec'd.	Laboratory Formulation (1% Stock Solution)	Source	Insect Code
1974	Cismethrin (NRDC 119) 100% Tech.	Pyrethroid	Nov. 16/73	1 g A.I. in 100 cc AR-60	Chipman	SBW SBWS
1975	Cismethrin (NRDC 119) 100% Tech.	Pyrethroid	Nov. 16/73	1 g A.I. in 100 cc AR-60	Chipman	SBL
1972	Resmethrin (SBP 1382) 84.5% Tech.	Pyrethroid	June 15/72	1.10 g A.I. in 40% Mix A & 60% AR-60	S.B. Penick & Co.	SBA SBWS
1973	Resmethrin (SBP 1382) 84.5% Tech.	Pyrethroid	June 15/72	1.10 g A.I. in 40% Mix A & 60% AR-60	S.B. Penick & Co.	SBL SBW
1974	Resmethrin (SBP 1382) 84.5% Tech.	Pyrethroid	June 15/72	1.10 g A.I. in 40% Mix A & 60% AR-60	S.B. Penick & Co.	SBW SBWS
1977	Resmethrin (SBP 1382) 84.5% Tech.	Pyrethroid	June 15/72	1.10 g A.I. in 40% Mix A & 60% AR-60	S.B. Penick & Co.	SBL
1972	Bioethanomethrin RU 11679 100% Tech.	Pyrethroid	Dec. 21/72	1.0 g A.I. in 100 cc AR-60	MGK, Co.	SBL
1973	RU 11679 100% Tech.	Pyrethroid	Dec. 21/72	1.0 g A.I. in 100 cc AR-60	MGK, Co.	SBE SBWS
1974	RU 11679 100% Tech.	Pyrethroid	Dec. 12/72	1.0 g A.I. in 100 cc AR-60	MGK, Co.	SBW SBWS
1975	RU 11679 100% Tech.	Pyrethroid	Dec. 12/72	1.0 g A.I. in 100 cc AR-60	MGK, Co.	SBL
	Bioethanomethrin	(racemic form)				
1972	RU 11483 100% Tech.	Pyrethroid	Nov. 13/72	1.0 g A.I. in 100 cc AR-60	MGK, Co.	SBL
1973	RU 11483 100% Tech.	Pyrethroid	Nov. 13/72	1.0 g A.I. in 100 cc AR-60	MGK, Co.	SBL SBWS
1974	RU 11483 100% Tech.	Pyrethroid	Nov. 13/72	1.0 g A.I. in 100 cc AR-60	MGK, Co.	SBW SBWS
1975	RU 11483 100% Tech.	Pyrethroid	Nov. 13/72	1.0 g A.I. in 100 cc AR-60	MGK, Co.	SBL
1976	RU 11483 100% Tech.	Pyrethroid	Nov. 13/72	1.0 g A.I. in 100 cc AR-60	MGK, Co.	SBL SBW

Mix "A":

30% Absolute ETOH.
30% Acetone.
15% Xylene.
15% AR-60
10% Tween 80

MGK, Co.:

McLaughlin, Gormley, King Co.

(cont'd)

TABLE 100 (cont'd.)

Year	Insecticide & Commercial Formulation	Type	Date Rec'd.	Laboratory Formulation (1% Stock Solution)	Source	Insect Code
1973	SP 2539 96.7% Tech.	Pyrethroid	Oct. 11/72	1.03 g A.I. in 100 cc AR-60	Sumitomo	SBWS
1977	ABG 6070 95% Tech.	Pyrethroid	Sept. 29/76	1.05 g A.I. in 100 cc AR-60	Abbott Laboratory	SBL
1975	Permethrin (FMC 33297) 40% E.C.	Pyrethroid	May 22/75	2.5 cc A.I. in 97.5 cc AR-60	FMC Corp.	SBA SBL
1976	Permethrin (FMC 33297) 40% E.C.	Pyrethroid	May 22/75	2.5 cc A.I. in 97.5 cc AR-60	FMC Corp.	SBL
1977	Permethrin (FMC 33297) 40% E.C.	Pyrethroid	May 22/75	2.5 cc A.I. in 97.5 cc AR-60	FMC Corp.	SBL
1975	Permethrin (NRDC 143) 25% E.C.	Pyrethroid	June 11/75	4.0 cc A.I. in 96 cc AR-60	Chipman	SBA
1976	Permethrin (NRDC 143) 25% E.C.	Pyrethroid	June 11/75	4.0 cc A.I. in 96 cc AR-60	Chipman	SBA SBL SBLP SBW SBLD SBT SBWS
1977	Permethrin (NRDC 143) 50% E.C.	Pyrethroid	April 22/76	2.0 cc A.I. in 98 cc AR-60	Chipman	SBL SBWS SIA
1978	Permethrin (NRDC 143) 25% E.C.	Pyrethroid	June 9/75	4.0 cc A.I. and filled to the 100 cc level with AR-60	Chipman	SBL
1980	Permethrin (NRDC 143) 25% E.C.	Pyrethroid	June 9/75	4.0 cc A.I. and filled to the 100 cc level with AR-60	Chipman	SBL SBW
1981	Permethrin (NRDC 143) 25% E.C.	Pyrethroid	June 9/75	4.0 cc A.I. and filled to the 100 cc level with AR-60	Chipman	SBL
1975	FMC 40963 ¹ 5% E.C.	Pyrethroid	June 20/75	10.0 cc A.I. in 40 cc AR-60	FMC Corp.	SBA
1976	FMC 40963 ¹ 5% E.C.	Pyrethroid	June 20/75	10.0 cc A.I. in 40 cc AR-60	FMC Corp.	SBL
1977	FMC 40963 ¹ 5% E.C.	Pyrethroid	June 20/75	10.0 cc A.I. in 40 cc AR-60	FMC Corp.	SBL
1975	Fenvalerate (S-5602 TG) 95% Tech.	Pyrethroid	March 13/75	1.05 cc A.I. in 98.95 cc AR-60	Sumitomo	SBL
1976	Fenvalerate (S-5602) 20% E.C.	Pyrethroid	July 2/75	5.0 cc A.I. in 95 cc AR-60	Sumitomo	SBL SBW
1977	Fenvalerate (S-5602) 20% E.C.	Pyrethroid	July 2/75	5.0 cc A.I. in 95 cc AR-60	Sumitomo	SBL SBW

(cont'd)

¹Permethrin

TABLE 100 (cont'd.)

Year	Insecticide & Commercial Formulation	Type	Date Rec'd.	Laboratory Formulation (1% Stock Solution)	Source	Insect Code
1978	Fenvalerate 20% E.C. (S-5602)	Pyrethroid	July 2/75	5.0 cc A.I. and filled to the 100 cc level with AR-60	Sumitomo	SBL SBW SBS
1979	Fenvalerate 20% E.C. (S-5602)	Pyrethroid	July 2/75	5.0 cc A.I. and filled to the 100 cc level with AR-60	Sumitomo	SBL
1980	Fenvalerate 20% E.C. (S-5602)	Pyrethroid	July 2/75	5.0 cc A.I. and filled to the 100 cc level with AR-60	Sumitomo	SBL
1981	Fenvalerate 20% E.C. (S-5602)	Pyrethroid	July 2/75	5.0 cc A.I. and filled to the 100 cc level with AR-60	Sumitomo	SBL
1976	Fenpropanate ² 20% E.C.	Pyrethroid	July 2/75	5.0 cc A.I. in 95 cc AR-60	Sumitomo	SBL SBW
1977	Fenpropanate ² 20% E.C.	Pyrethroid	July 2/75	5.0 cc A.I. in 95 cc AR-60	Sumitomo	SBL
1977	Fenpropanate ³ 30% E.C.	Pyrethroid	April 23/76	3.33 cc A.I. in 96.67 cc AR-60	Shell	SBL
1980	Fenpropanate ³ 95% Tech.	Pyrethroid	April 23/76	1.05 cc A.I. and filled to the 100 cc level with AR-60	Shell	SBL
1977	Fenvalerate 30% E.C. (WL 43775)	Pyrethroid	April 23/76	3.33 cc A.I. in 96.67 cc AR-60	Shell	SBL
1976	Cypermethrin 97% Tech. (PP 383)	Pyrethroid	Jan. 7/76	1.03 cc A.I. in 98.97 cc AR-60	Chipman	SBL SBWS
1977	Cypermethrin 97% Tech. (PP 383)	Pyrethroid	Jan. 7/76	1.03 cc A.I. in 98.97 cc AR-60	Chipman	SLA SBWS
1977	Cypermethrin ⁴ 40% E.C.	Pyrethroid	April 23/76	2.5 cc A.I. in 97.5 cc AR-60	Shell	SBA SBL
1978	Cypermethrin ⁴ 40% E.C.	Pyrethroid	April 23/76	2.5 cc A.I. and filled to the 100 cc level with AR-60	Shell	SBL SBW SBS
1980	Cypermethrin ⁴ 40% E.C.	Pyrethroid	April 23/76	2.5 cc A.I. and filled to the 100 cc level with AR-60	Shell	SBL SBW SBS
1981	Cypermethrin ⁴ 40% E.C.	Pyrethroid	April 23/76	2.5 cc A.I. and filled to the 100 cc level with AR-60	Shell	SBL
1977	Cypermethrin 20% E.C. (FMC 30980)	Pyrethroid	Aug. 5/76	5.0 cc A.I. in 95 cc AR-60	FMC Corp.	SBL SBWS

²(S-3602)³(WL 41706)⁴(WL 43467)

(cont'd)

TABLE 100 (cont'd.)

Year	Insecticide & Commercial Formulation	Type	Date Rec'd.	Laboratory Formulation (1% Stock Solution)	Source	Insect Code
1977	FMC 45812 ⁵ 20% E.C.	Pyrethroid	Aug. 5/76	5.0 cc A.I. in 95 cc AR-60	FMC Corp.	SBL
1977	FMC 45497 10% E.C. (NRDC 160)	Pyrethroid	Aug. 5/76	10.0 cc A.I. in 90 cc AR-60	FMC Corp.	SBL
1977	Decamethrin 2.5% E.C. (FMC 45498)	Pyrethroid	Aug. 5/76	19.23 cc A.I. in 30.77 cc AR-60	FMC Corp.	SBL
1977	Decamethrin 2.5% E.C. (NRDC 161)	Pyrethroid	April 6/76	19.23 cc A.I. in 30.77 cc AR-60	Procida	SBL
1977	NRDC 168 S 2.5% E.C.	Pyrethroid	Nov. 28/76	20.0 cc A.I. in 30 cc AR-60	Procida	SBL
1971	Pyrocide 20%	Pyrethroid	July 5/71	5.0 cc A.I. in 95 cc AR-60	MCK, Co.	SBW (Q)
1975	Permethrin 90% Tech. (SBP 1513)	Pyrethroid	Dec. 23/74	1.11 cc A.I. and filled to the 100 cc level with AR-60	S.B. Penick Co.	SBL
1975	ABC 6010 48% E.C.	Pyrethroid	Sept. 19/74	2.08 cc A.I. and filled to the 100 cc level with AR-60	Abbott	SBL
1978	Pay Off® 30% E.C. (AC 222 - 705)	Pyrethroid	June 20/78	3.33 cc A.I. and filled to the 100 cc level with AR-60	Cyanamid	SBL
1979	Pay Off® 30% E.C. (AC 222 - 705)	Pyrethroid	June 20/78	3.33 cc A.I. and filled to the 100 cc level with AR-60	Cyanamid	SBW SBS
1980	Pay Off® 31.2% E.C. (AC 222 - 705)	Pyrethroid	June 30/80	3.21 cc A.I. and filled to the 100 cc level with AR-60	Cyanamid	SBL
1981	Pay Off® 31.2% E.C. (AC 222 - 705)	Pyrethroid	June 30/80	3.21 cc A.I. and filled to the 100 cc level with AR-60	Cyanamid	SBL

⁵(NRDC 148)