

US EPA ARCHIVE DOCUMENT

## PERMETHRIN

ID #05004012

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1. CHEMICAL:

Multiple chemicals. See tables.

2. FORMULATION:

Technicals

3. CITATION:

Plapp, F.W., Jr., and D.L. Bull. 1978. Toxicity and selectivity of some insecticides to Chrysopa carnea, a predator of the tobacco budworm. Envir. Entomol. 7(3):431-434. FICHE/MASTER ID 05004012

4. REVIEWER:

Allen W. Vaughan  
Entomologist  
EEB/HED

5. DATE REVIEWED:

May 14, 1981

6. TEST TYPE:

Toxicity to insect predators and parasites

A. Test species:

Green lacewing (Chrysopa carnea)  
Parasitic wasp (Camponotus sonorensis)

7. REPORTED RESULTS:

Methomyl tested highly toxic to the insect predator and parasite as well as to the target insect, tobacco budworm. For numerical data on methomyl and other pesticides tested, see tables.

8. REVIEWER'S CONCLUSIONS:

This study is scientifically sound, and shows methomyl to be highly toxic to a green lacewing (C. carnea) and a tobacco budworm parasite (C. sonorensis).

See methomyl file for  
complete DER

Toxicity expressed as  
ug/Vial  
unable to  
translate to  
real world rat  
with this  
data

Table 1. - Toxicity of several insecticides to larvae of *Chrysopa carnea*.

Insecticide	LC <sub>50</sub> (ug/vial)	LC <sub>90</sub> (ug/vial)	Slope
<b>Organochlorines</b>			
DDT	>1000	---	---
Dieldrin	5.65	72.9	.50
Toxaphene	>1000	---	---
<b>Organophosphorothionates (P=S)</b>			
EPN	1.66	5.59	1.06
Ethyl parathion	.48	2.24	.83
Methyl parathion	.26	3.14	.51
Bolstar	3.18	14.4	.85
<b>Organophosphates and phosphorothiolates (P=O)</b>			
Trichlorfon	728	1000	.19
Monocrotophos	.52	6.82	.50
Acephate	5.57	36.2	.69
Curacron	.78	2.56	1.07
RH218	.35	1.40	.92
<b>Carbamate</b>			
Carbaryl	104	1894	.44
<b>Formamidine</b>			
Chlordimeform	>1000	---	---
<b>Pyrethroids</b>			
20% Pyrethrins	257	817	1.11
Pydrin	72.8	319	.87
Permethrin	9.87	120	.51
NRDC 161	17.4	237	.49

Table 2. - Toxicity of 2 insecticides to larvae of the tobacco budworm, larvae of *Chrysopa carnea* and adult male *Campoletis sonorensis*.

Insect		Endo- sulfan	Metho- myl
Tobacco budworm	LC <sub>50</sub> (ug/vial)	35.4	2.29
	LC <sub>90</sub> (ug/vial)	67.5	10.3
	Slope	1.98	.85
<i>C. carnea</i>	LC <sub>50</sub> (ug/vial)	1230	2.69
	LC <sub>90</sub> (ug/vial)	4630	7.43
	Slope	.97	1.26
<i>C. sonorensis</i>	LC <sub>50</sub> (ug/vial)	.67	.98
	LC <sub>90</sub> (ug/vial)	1.09	4.52
	Slope	2.60	.84

Table 3. - Selectivity of different insecticides against natural enemies of the tobacco budworm. Data are ratios of toxicities of insecticides to the budworm divided by toxicities to the predator and the parasite at LC<sub>50</sub> and LC<sub>90</sub> levels.

Insecticide	Selectivity			
	Tobacco budworm		Tobacco budworm	
	<i>C. carnea</i>		<i>C. sonorensis</i> <sup>a,b</sup>	
	LC <sub>50</sub>	LC <sub>90</sub>	LC <sub>50</sub>	LC <sub>90</sub>
<b>Organochlorines</b>				
DDT	.89	3.54	735	427
Dieldrin	9.17	6.76	2590	3287
Toxaphene	---	---	763	---
Endosulfan	.028	.0145	53	62
<b>Organophosphoro- thionates (P=S)</b>				
EPN	142	172	1815	1570
Ethyl parathion	163	173	975	2141
Methyl parathion	108	21.5	705	281
Bolstar	8.8	4.33	25	29

	Selectivity			
	Tobacco budworm		Tobacco budworm	
	<i>C. carnea</i>		<i>C. sonorensis</i>	
	$LC_{50}$	$LC_{90}$	$LC_{50}$	$LC_{90}$
Organophosphates and phosphorothiolates				
Trichlorfon	.76	.31	179	663
Monocrotophos	153	30.8	139	119
Acephate	6.41	3.95	10	9
Curacron	7.18	5.00	11	17
RH218	43.7	32.3	33	49
Carbamates				
Carbaryl	8.55	5.12	601	1296
Methomyl	.78	.98	2.1	1.6
Formamidine				
Chlordimeform	---	---	>100	---
Pyrethroids				
20% Pyrethrins	3.91	2.76	399	235
Pydrin	.037	0.52	1.5	4.9
Permethrin	.58	.18	18	20
NRDC161	.014	.0048	0.8	2

a Portions of selectivity data for tobacco budworm ÷ *C. sonorensis* from Plapp and Vinson (1977).

b Ratios > 1 represent insecticides more toxic to predator and parasite than to pest; ratios < 1 represent insecticides more toxic to the pest than to its natural enemies.