

CONTACT TOXICITY OF AZINPHOSMETHYL AND ENDOSULFAN TO FIELD-COLLECTED STRIPED CUCUMBER BEETLE, *Acalymma vittatum* (F.)

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Striped cucumber beetle (SCB), *Acalymma vittatum* (F.), is a serious pest of cucurbit crops with an economic value exceeding \$24 million in Ontario in 2001 (Anonymous 2003). For many years foliar application of endosulfan (THIODAN® 4EC [1.5 L/ha]) and azinphosmethyl (GUTHION® 240SC, SNIPER® 240E [2.25 L/ha]), cyclodiene and organophosphorus insecticides respectively, has been the principal method for SCB-control by commercial Ontario growers of squash, cucumbers, melons and pumpkins (OMAF 2002).

In 1999, as a result of the increasing concern of Ontario growers about the decreasing effectiveness of these insecticides in the field (Anonymous 1999), the susceptibility to endosulfan and azinphosmethyl of SCB-populations from 11 representative Ontario cucurbit fields was surveyed. Individual field-collections of SCB were maintained in 30 cm³ mesh cages in walk-in insectaries (25 ± 1°C; 65 ± 5% RH; 16L:8D) at SCPFRC-London. All bioassays were performed within 48 hours of collection; due to low numbers, only two bioassays, each comprising 2 x 10 insects, were completed at each concentration for each field-collected population.

Groups of 20 adult SCB were anaesthetized with CO₂ for 10 seconds in clean, waxed pasteboard cups. Ten anaesthetized SCB were subsequently transferred to 9 cm Petri dishes and placed in the Potter spray tower. Five ml aliquots of the desired concentration of each technical grade insecticide solution ([1] endosulfan - 97.9% purity, Aventis CropScience Canada, Regina, SK; and [2] azinphosmethyl - 97% purity, Bayer Inc. Agriculture Division, Crop Protection, Toronto, ON) in 19:1 acetone-olive oil (Harris & Turnbull 1986) were then sprayed onto the beetles. Treated SCB were transferred into clean pasteboard cups containing a dental wick (4 cm long x 1 cm dia.) dipped in RO-water. Control insects treated with acetone-olive oil were included in each test. A glass Petri dish lid prevented SCB-escape. Bioassays were held at 27 ± 1°C and 65 ± 5% RH under continuous light. Mortality was assessed after 24 hrs; data were corrected for mortality in control bioassays (<15 % for all cases) using Abbott's correction (1925).

While limited numbers of field-collected SCB precluded statistical comparison of toxicity among populations, some trends were apparent. Azinphosmethyl was one order of magnitude more toxic than endosulfan (Table I). In population one, a few individual SCB survived the highest applied concentration of both insecticides (Table I), indicating that this population should be monitored more closely over the next few years. Finally, there did not appear to be any major differences among the other populations in toxicity of either endosulfan or azinphosmethyl. With the possible exception of population one, these data may indicate that reported SCB-control failures were not due to the development of insecticide resistance but were rather a result of short persistence of foliar insecticides on rapidly growing cucurbit-seedlings (MacIntyre-Allen et al. 2001). The collected information does, however, provide baseline data for comparison should Ontario SCB-management problems develop in the future.

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TABLE I: Corrected % mortality of eleven populations of striped cucumber beetle, *Acalymma vittatum* (F.), collected from Ontario cucurbit-fields in 1999 and treated with endosulfan and azinphosmethyl.

Pop'n No.	Average Corrected % Mortality at Indicated Concentration (ppm)							
	1.0 ¹	3.3	10	33	100	330	1000	3300
Endosulfan:								
1	– ²	– ²	– ²	5	13	43	77	85
2	--	--	--	36	28	89	84	100
3	--	--	--	0	16	53	90	100
4	--	--	--	0	0	65	75	90
5	--	--	--	0	5	47	68	100
6	--	--	--	0	24	36	95	90
7	--	--	--	0	6	68	90	100
8	--	--	--	15	45	65	85	100
9	--	--	--	0	5	48	82	95
10	--	--	--	0	22	6	77	100
11	--	--	--	0	10	5	50	100
Azinphosmethyl:								
1	3	3	8	45	85	– ²	– ²	– ²
2	9	0	100	100	100	--	--	--
3	0	0	42	100	100	--	--	--
4	0	0	70	100	100	--	--	--
5	0	0	37	100	100	--	--	--
6	15	0	33	100	100	--	--	--
7	0	0	21	100	100	--	--	--
8	11	16	47	90	100	--	--	--
9	* ³	*	*	*	*	*	*	*
10	0	5	50	65	100	--	--	--
11	0	0	52	100	100	--	--	--

¹ technical grade insecticide dissolved in 19:1 acetone:olive oil to establish stock solutions

² concentration not tested

³ Population not tested