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ORNAMENTAL PEPPER: *Capsicum annum* L. 'Masquerade'

Effect of Selective Foliar Insecticides on *Amblyseius swirskii* (Acari: Phytoseiidae), 2014*

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Pepper | *Capsicum annuum*

swirskii mite | *Amblyseius swirskii*

cis-3-(2,5-dimethylphenyl)-8-methoxy-2-oxo-1-azaspiro(4.5)dec-3-en-4-yl-ethyl carbonate; 2-[3-[2,6-dichloro-4-[(3,3-dichloro-2-pro- penyl)oxy]phenoxy]propoxy]-5-(trifluoromethyl); (2*R*,3a*S*,5a*R*,5b*S*,9*S*,13*S*,14*R*,16a*S*,16b*R*)-2-(6-deoxy-2,3,4-tri-*O*-methyl-α-L-mannopyranosyloxy)-13-(4-dimethylamino-2,3,4,6-tetradeoxy-β-D-erythropyranosyloxy)-9-ethyl-2,3,3a,5a,5b,6,7,9,10,11,12,13,14,15,16a,16b-hexadecahydro-14-methyl-1*H*-*as*-indaceno[3,2-*d*]oxacyclododecine-7,15-dione; (2*S*,3a*R*,5a*S*,5b*S*,9*S*,13*S*,14*R*,16a*S*,16b*S*)-2-(6-deoxy-2,3,4-tri-*O*-methyl-α-L-mannopyranosyloxy)-13-(4-dimethylamino-2,3,4,6-tetradeoxy-β-D-erythropyranosyloxy)-9-ethyl-2,3,3a,5a,5b,6,7,9,10,11,12,13,14,15,16a,16b-hexadecahydro-4,14-dimethyl-1*H*-*as*-indaceno[3,2-*d*]oxacyclododecine-7,15-dione; (10*E*,14*E*,16*E*)-(1*R*,4*S*,5′*S*,6*S*,6′*R*,8*R*,12*S*,13*S*,20*R*,21*R*,24*S*)-6′-[(*S*)-*sec*-butyl]-21,24-dihydroxy-5′,11,13,22-tetramethyl-2-oxo-(3,7,19-trioxatetracyclo[15.6.1.1^{4,8}.0^{20,24}]pentacosa-10,14,16,22-tetraene)-6-spiro-2′-(5′,6′-dihydro-2′*H*-pyran)-12-yl 2,6-dideoxy-4-*O*-(2,6-dideoxy-3-*O*-methyl-α-L-*arabino*-hexopyranosyl)-3-*O*-methyl-α-L-*arabino*-hexopyranoside and ≤ 20% (10*E*,14*E*,16*E*)-(1*R*,4*S*,5′*S*,6′,6*R*,8*R*,12*S*,13*S*,20*R*,21*R*,24*S*)-21,24-dihydroxy-6′-isopropyl-5′,11,13,22-tetramethyl-2-oxo-(3,7,19-trioxatetracyclo[15.6.1.1^{4,8}.0^{20,24}]pentacosa-10,14,16,22-tetraene)-6-spiro-2′-(5′,6′-dihydro-2′*H*-pyran)-12-yl 2,6-dideoxy-4-*O*-(2,6-dideoxy-3-*O*-methyl-α-L-*arabino*-hexopyranosyl)-3-*O*-methyl-α-L-*arabino*-hexopyranoside

Amblyseius swirskii is a generalist predator, widely known for its biocontrol potential against multiple pests (mites, thrips, and whiteflies) of nursery and greenhouse crops. The objective of this study was to evaluate susceptibility of *A. swirskii* to conventional insecticides known to be effective against various greenhouse pests. The trial was conducted on an ornamental pepper cultivar "Masquerade" at U.S. Horticultural Research Laboratory, Florida to identify *A. swirskii*-compatible pesticides. Pepper plants were grown from seed in Fafard Pro-Mix (Canadian Formula; Conrad Fafard, Inc., Agawam, MA 01001-2907) medium in seedling trays and transplanted in 10.1 cm-diameter plastic pots when seedlings were ∼5-wk old. Plants were watered as needed (approximately two times a wk) and fertilized weekly with 50 ml/pot of Peters Professional 20-10-20 (325 ppm) (Scotts Co., Marysville, OH). The greenhouse was maintained at 26 ± 3°C and 75–80% RH. Once host plants reached flowering stage, 10 *A. swirskii* adults were released on the top leaves of each plant. Two wks after predatory mite release, insecticide applications were made using a small hand held sprayer delivering 65.5 ml/ m^2 at 211 kPa (30.6 psi); treated potted plants were spaced at 1.5 × 1.5 ft. The trial was setup in a RCB design with five replicates. Treatment effects were evaluated by carefully inspecting five top leaves of each pepper plant using a 30× hand held lens. Count data were subjected to square root transformation prior to conducting ANOVA and mean separation procedures. The data presented are the untransformed means. Means separation was performed using the Least Significant Difference (LSD) test at the $P < 0.05$ level.

A. swirskii populations varied greatly, however significant reduction in mite numbers were observed in all the pesticide treatments compared to the untreated check. Overall Spintor, Epimek and Movento were found to be most lethal on the three life stages (eggs, nymphs, adults) of mites. No significant difference in number of mite eggs was observed 24-h post application of treatments (Table 1). However, significant reduction in number of mite eggs was observed (compared with the untreated check) in Spintor (76–97%), Epimek (78–91%), and Movento (69–83%) on DAT 5, 10, and 15. Similar results were obtained while evaluating different treatments for *A. swirskii* nymphs and adults, where Spintor,

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Epimek, and Movento provided significant reduction in the number of compared with the untreated check on all sampling dates, except DAT 1 (Tables 2 and 3). Overture was found to be most benign on three life stages of *A. swirskii* among all of the insecticide treatments. No significant difference in the number of any of the life stages was observed in Overture treated plants compared with the untreated control on DAT 1 and 15. No phyto-toxicity symptoms were observed following any of the insecticide treatments.

Table 1

		Mean no. of eggs/five leaves				
Treatment/formulation	Rate amt product/acre	DAT 0 (pre-spray)	DAT 1	DAT 5	DAT 10	DAT 15
Untreated check	–	8.60	10.20 (0)	16.80a (0)	33.0a (0)	40.0a (0)
Movento	5 oz	13.20	6.40 (59.1)	5.0b (80.6)	15.60b (69.2)	10.40bc (83)
Overture 35 WP	8 oz	11.80	6.80 (51.4)	7.0b (69.6)	10.40b (77)	22.40ab (59.1)
Spintor	6 oz	8.80	5.40 (48.3)	4.0b (76.8)	1.0c (97)	4.0c (90.2)
Epimek 0.15 EC	15 oz	10.20	9.20 (23.9)	4.20b (78.9)	3.40c (91.3)	6.60c (86)
	F value	0.85	1.01	4.49	18.65	6.99
	Pr > *F*	0.5149	0.4329	0.0127	<.0001	0.0019

Means in a column followed by the same letter are not significantly different ($P > 0.05$, LSD test)
Henderson-Tilton's corrected percent mortality is presented in parentheses after each mean.

Table 2

		Mean no. of nymphs/five leaves				
Treatment/formulation	Rate amt product/acre	DAT 0 (pre-spray)	DAT 1	DAT 5	DAT 10	DAT 15
Untreated check	–	1.60b	2.40a (0)	6.40a (0)	6.40a (0)	15.0a (0)
Movento	5 oz	1.80b	0.60b (77.8)	0.80b (88.9)	2.0b (72.2)	1.40b (91.7)
Overture 35 WP	8 oz	5.40a	1.80ab (77.8)	1.60b (92.6)	1.40b (93.5)	7.20a (85.8)
Spintor	6 oz	2.0b	0.60b (80)	0.40b (95)	0.0c (100)	1.0b (94.6)
Epimek 0.15 EC	15 oz	2.80b	0.80ab (80.9)	0.80b (92.8)	0.60bc (94.6)	0.80b (96.9)
	F value	6.01	2.02	4.50	12.03	5.66
	Pr > *F*	0.0038	0.0139	0.0126	0.0001	0.0049

Means in a column followed by the same letter are not significantly different ($P > 0.05$, LSD test)
Henderson-Tilton's corrected percent mortality is presented in parentheses after each mean.

Table 3

		Mean no. of adults/five leaves				
Treatment/formulation	Rate amt product/acre	DAT 0 (pre-spray)	DAT 1	DAT 5	DAT 10	DAT 15
Untreated check	–	3.80	2.80a (0)	4.80a (0)	5.0a (0)	9.80a (0)
Movento	5 oz	3.40	1.20ab (52.1)	1.60b (62.7)	1.80bc (59.8)	1.40b (89.6)
Overture 35 WP	8 oz	3.20	1.60ab (32.1)	0.21c (94.8)	2.0b (52.5)	7.60a (43)
Spintor	6 oz	3.40	0.60b (76)	0.0c (100)	0.40c (91)	0.20b (92.5)
Epimek 0.15 EC	15 oz	3.60	0.60b (77.3)	0.0c (100)	0.60c (87.3)	0.80b (94.3)
	F value	0.08	2.79	15.92	7.27	14.39
	Pr > *F*	0.9861	0.0622	<0.0001	0.0015	<0.0001

Means in a column followed by the same letter are not significantly different ($P > 0.05$, LSD test)
Henderson-Tilton's corrected percent mortality is presented in parentheses after each mean.