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LEMON: *Citrus volkameriana* Pasquale "**Volkamer Lemon"**

SOIL APPLIED INSECTICIDAL CONTROL OF CITRUS PSYLLID AND LEAFMINER , 2008

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Asiatic citrus psyllid (ACP): *Diaphorina citri* (Kuwayama)

Citrus leafminer (CLM): *Phyllocnistis citrella* (Stainton)

The Asian citrus psyllid (ACP) adults and nymphs feed on and damage new growth and can acquire and transmit the bacterium *Candidatus* Liberibacter asiaticus responsible for the citrus greening or huanglongbing disease. Citrus leafminer (CLM) also damages young leaves and

exposes leaf cuticle to the bacterium *Xanthomonas citri* which is responsible for the citrus canker disease. Therefore, both insects are serious pest in the Florida citrus and need to be controlled to reduce spread of these diseases.

The trial was conducted at the University of Florida Southwest Research and Education Center in Immokalee, Florida, on 3 year old 'Volkamer' lemon trees planted at 15 X 22 ft spacing in double-row beds separated by a swale and running north-south. Four adjoining rows were used for a completely randomized block design with 4 treatments replicated 4 times. Each plot consisted of 5 trees that were trimmed approximately every two weeks throughout the trial to encourage new growth (flushes) and provide suitable habitat for psyllid nymphs.

Weeds, debris and leaf litter were removed from beneath each tree prior to application. Materials were applied on 16- May in 8 ounces of solution to bare soil within 18 inches of the trunk of the tree using an EZ-Dose® sprayer with a pressure of 45 PSI and a flow rate of 3.7 gallons per minute.

Weekly evaluations were made by examining 5 flushes on each of five trees for the presence of psyllid eggs and/or nymphs. CLM larvae were counted on 5 leaves on each new shoot.
For observations occurring after 27- Jun, the oldest stage of the nymph (instar) was recorded along with an estimation of the population density based on the following scale: 0 = no infestation; 1= less than 5 nymphs; 2 = between 6 and 10 nymphs; 3 = between 11 and 20 nymphs; and 4= more than 21 nymphs. Adults were monitored on each of five trees per plot by

a “tap sample” obtained by gently striking the foliage three times with the hand and counting the adults that fell onto an 8 x 11 inch white surface held underneath.

Adult populations were initially low and no statistical differences were seen until 48 days after treatment (DAT) when numbers were significantly reduced by Admire Pro and Platinum compared to the check (Table 1). All treatments differed from the check at 55 DAT with significantly fewer on trees treated with Admire Pro compared to Venom which again was not different from the check at 63 DAT. All treatments reduced percentage infested flush at 14 DAT and 21 DAT with no effects seen from 28 to 42 DAT (Table 2). All treatments reduced flush infestation thenceforward through 92 DAT except Venom which only produced a significant response at 55 DAT. Differences between Admire Pro and Platinum were not significant on any date. No differences were seen at 86 DAT but Admire Pro and Platinum were again providing significant control at 92 DAT. Significant differences in density rating between Venom and the check were seen only on 55 and 92 DAT, again with no difference between Admire Pro and Platinum. The oldest instar rating gave similar results with differences between Venom and the control only at 55, 86 and 92 DAT with the two other treatments providing significant control except at 14, 28, 42 and 48 DAT. All treatments suppressed CLM at 14 and 21 DAT afterwhich Venom failed to provide control nor did any of the treatments at 86 DAT. Numbers of CLM were lower on trees treated with Admire Pro compared to Platinum at 21 and 48 DAT.

In conclusion drenches of Admire and Platinum provided equal levels of ACP control for 3 months whereas control with Venom was more variable and short lived, possibly because of the greater solubility of this product. Leafminer control did not last as long and appeared to be somewhat better with Admire Pro compared to Platinum.

Table 1

		Adults per tap sample									
		30-May	6-Jun	13-Jun	20-Jun	27-Jun	3-Jul	10-Jul	18-Jul	1-Aug	8-Aug
Treatment	Rate										
Control		0.30 a	0.40 a	0.25 a	0.85 a	0.25 a	2.00 a	2.55 a	2.65 a	0.70 a	1.15 ab
Admire Pro	4.67 Fl. oz	0.05a	0.05 a	0.11 a	0.20 a	0.10 a	0.25 b	0.20 c	0.70 bc	0.50 a	0.45 bc
Venom 70 SG	3.83 oz	0.05 a	0.10 a	0.40 a	0.50 a	0.35 a	1.15 ab	1.15 b	1.65 ab	0.65 a	1.30 a
Platinum 75 SG	3.65 oz	0.05 a	0.25 a	0.10 a	0.20 a	0.10 a	0.20 b	0.40 bc	0.40 c	0.70 a	0.25 c

Table 2

		Percent of Flush with infestation (nymphs only)									
		30-May	6-Jun	13-Jun	20-Jun	27-Jun	3-Jul	10-Jul	18-Jul	1-Aug	8-Aug
Treatment	Rate										
Control		57.34 a	30.67 a	27.00 a	30.00 a	52.63 a	58.00 a	61.50 a	56.00 a	62.00 a	91.33 a
Admire Pro	4.67 Fl. oz	8.00 bc	2.81 b	11.11 a	26.00 a	45.00 a	29.00 b	18.50 b	19.65 b	26.00 b	64.00 bc
Venom 70 SG	3.83 oz	17.00 b	11.58 b	19.50 a	40.00 a	55.00 a	63.00 a	33.00 b	51.37 a	63.16 a	80.25 ab
Platinum 75 SG	3.65 oz	0.00 c	9.67 b	13.50 a	24.00 a	37.00 a	37.50 b	19.00 b	16.00 b	39.00 b	58.00 c

Table 3

Mean of Population Density Rating

		27-Jun	3-Jul	10-Jul	18-Jul	1-Aug	8-Aug
Treatment	Rate/acre						
Control		1.62 a	1.59 a	1.45 a	1.14 a	1.30 a	2.34 a
Admire Pro	4.67 Fl. oz	0.72 b	0.36 b	0.23 c	0.31 b	0.50 b	1.53 c
Venom 70 SG	3.83 oz	1.35 a	1.35 a	0.72 b	0.99 a	1.29 a	1.95 b
Platinum 75 SG	3.65 oz	0.57 b	0.54 b	0.30 c	0.23 b	0.78 b	1.45 c

Table 4

		Mean of Oldest Instar									
		30-May	6-Jun	13-Jun	20-Jun	27-Jun	3-Jul	10-Jul	18-Jul	1-Aug	8-Aug
Treatment	Rate										
Control		2.92 a	2.67 a	2.64 a	2.94 a	2.94 a	3.27 a	3.41 a	2.66 a	3.01 a	3.92 a
Admire Pro	4.67 Fl. oz	3.00 a	1.00 b	1.90 a	2.11 b	2.44 a	2.93 a	2.24 b	2.56 a	1.92 c	2.70 b
Venom 70 SG	3.83 oz	2.36 a	2.00 ab	2.54 a	3.16 a	2.87 a	3.07 a	2.61 b	3.03 a	2.49 b	3.09 b
Platinum 75 SG	3.65 oz	no nymphs	1.40 b	1.54 a	2.00 b	2.32 a	2.37 b	2.26 b	2.13 a	2.33 bc	3.05 b

Table 5:

		Leafminer per 5 leaves					
Treatment	Rate	30-May	6-Jun	3-Jul	10-Jul	18-Jul	1-Aug
Control		5.19 a	3.03 a	2.14 a	1.32 a	0.81 a	2.91 a

Admire Pro	4.67 fl.oz	0.15 c	0.10 c	0.87 c	0.79 b	0.39 b	2.43 a
Venom 70 SG	3.83 oz	2.62 b	1.10 b	2.09 ab	1.30 a	0.70 a	2.27 a
Platinum 75 SG	3.65 oz	0.02 c	0.72 b	1.54 b	1.07 ab	0.25 b	2.67 a

Part II: Materials Tested for Arthropod Management

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Common name	Trade name/ Cultivar	Concentration/ Formulation	Chemical name/resistance	Manufacture/source
imidacloprid	Admire Pro	4.6 SC	1_((6-Chloro-3-pyridinyl)methyl)-N-nitro-2-imidazolidinimine	Bayer CropScience LP P.O. Box 12014 1 T.W. Alexander Drive Research Triangle Park, North Carolina 27709
thiamethoxam	Platinum	75 SG	4H-1,3,5-Oxadiazin-4-imine,3-((2-chloro-5-thiazolyl)methyl)tetrahydro-5-methyl-N-nitro-	Syngenta Crop Protection P.O. Box 18300 Greensboro, NC 27419
Dinotefuran	Venom	70 SG	N-methyl n-nitro n((tetrahrydo-3-furanyl)methyl)guanidine	Valent Biosciences Corporation 870 Technology Way Suite 100 Libertyville IL 60048