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**ORANGE:** *Citrus sinensis* (L.) Osbeck, 'Hamlin'

**SOIL APPLIED INSECTICIDAL CONTROL OF CITRUS LEAFMINER , 2010**

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

CLM causes significant damage to young leaves which also exposes leaf cuticle to the bacterium *Xanthomonas citri* responsible for the citrus canker disease. Therefore, CLM remains a major concern in Florida citrus production. The trial was conducted at the University of Florida Southwest Research and Education Center in Immokalee, Florida, on 2 year old 'Hamlin' trees

planted at 140 trees per acre in double-row beds running north-south and separated by a swale. Three adjoining rows were used for a completely randomized block design with 12 treatments replicated 4 times. Each plot consisted of 5 trees that were pruned approximately once a month throughout the trial to encourage new growth (flushes) and provide suitable habitat for leafminer larvae.

Liquid treatments were applied by drench or foliar spray and granulars by incorporation into soil once on 25/26 Feb or a second time on 19/20 May (Table 1). Weeds, debris and leaf litter were removed from beneath each tree prior to soil applications. Granulars were applied in a 16 inch furrow on the bed top side of each tree approximately 6-12 inches from the base of the tree. Soil drench applications were made by spraying 8 ounces of solution to bare soil within 12 inches of all sides of the tree trunk using an EZ-Dose® sprayer operating at 45 PSI and a flow rate of 3.7 gpm. The same sprayer was used for foliar applications with a T-Jet 8003 nozzle and 8 fl. oz of solution per tree canopy applying Movento 2 SC at a concentration of 20 oz/100 gal.

CLM larvae were monitored at approximately two-week intervals depending on availability of suitable flush (Table 2). Five young shoots were taken per plot and 3 mid-stem leaves on each examined under a stereoscopic microscope. No leafminer larvae were observed on 1 and 15 Apr in any of the plots. On 29 Apr, all treatments except for number 9, 10 and 11 (initial Temik 15 g and Movento 2 SC applications) had significantly fewer CLM larvae than the untreated check, with a similar trend seen on 14 May except for treatment 9 (Temik 15 g). On 4 Jun, treatments 2, 3 (single Platinum applications) 7 (Suscon 5 G), and 11, 12 (May applications of Movento 2SC) were not significantly different from the untreated control in contrast to the remaining

treatments. The same situation was observed on 18 Jun except that treatments 3 and 7 (Platinum 75 SG and Suscon 5 G) had fewer CLM larvae than the untreated control. On 16 Jul, treatments 5,6 (HGW 86 20SE), 7 (Suscon 5G) and 8 (Admire Pro 4.6 SC) resulted in significantly fewer larvae than the untreated control. The same four treatments along with 10 and 11 (May application of Admire Pro 4.6 SC or Movento 2SC) had significantly fewer larvae than the untreated check on 20 Aug. Only treatments 5 and 6 (low rate May and high rate Feb applications of HGW 86 20SE) showed significant reduction in CLM larvae on 30 Jul. All treatments except 2, 8, and 12 were showing significant reduction in CLM larvae on 3 Sept. In general, the split applications of Admire and Platinum outperformed the single applications of these products and no difference in effect was observed between 20 oz and 10 oz rate of HGW 86. However, a single application of the slow release formulation of imidacloprid, Suscon 5G at 0.5 lb ai/ac provided longer lasting control than two applications of AdmirePro with a total of 0.33 lb ai imidacloprid. Movento and Temik provided little to no CLM control regardless of the timing of the application.

Table 1

Treatment	Product	Rate/acre	Date	Method	Product	Rate/acre	Date	Method
1	untreated	na	na	na	na	na	na	na
2	Platinum 75 SG	3.67 oz.	25-Feb	drench	na	na	na	na
3	Platinum 75 SG	5.33 oz	25-Feb	drench	na	na	na	na
4	Platinum 75 SG	1.83 oz	25-Feb	drench	Platinum 75 SG	1.83 fl. oz	19-May	drench
5	HGW86 20 SE	10.00 fl. oz	25-Feb	drench	HGW86 20 SE	10.00 fl. oz	19-May	drench
6	HGW86 20 SE	20.00 fl. oz	25-Feb	drench	na	na	na	na
7	SuSCon 5G	10.0 lbs	26-Feb	Incorporation	na	na	na	na
8	Admire Pro 4.6 SC	4.60 fl. oz	25-Feb	drench	Admire Pro 4.6 SC	4.60 fl. oz	19-May	drench
9	Temik 15 G	17.5 lbs	26-Feb	Incorporation	Admire Pro 4.6 SC	4.60 fl. oz	19-May	drench
10	Movento 2 SC	20.0 fl oz	26-Feb	Spray to Runoff	Admire Pro 4.6 SC	4.60 fl. oz	19-May	drench
11	Citrus 435 Oil	3% v/v						
	Movento 2 SC	20.0 fl. oz	26-Feb	Spray to Runoff	Movento 2 SC	20.0 fl. oz	20-May	Spray to Runoff
	Citrus 435 Oil	3% v/v			Citrus 435 Oil	3% v/v		
12	Admire Pro 4.6 SC	4.6 fl. oz	26-Feb	drench	Movento 2 SC	20.0 fl. oz	20-May	Spray to Runoff
					Citrus 435 Oil	3% v/v		

Table 2

Treatment	CLM Larvae per 3 leaves							
	29-Apr	14-May	4-Jun	18-Jun	16-Jul	30-Jul	20-Aug	3-Sep
1	4.00 a	3.24 a	4.58 a	6.40 a	2.35 ab	4.09 ab	5.95 a	7.90 ab
2	2.35 bcde	1.93 bc	4.74 a	5.33 abc	2.15 ab	2.00 bcd	4.95 abcd	8.50 a
3	1.93 def	1.68 bcd	5.31 a	2.63 cde	2.30 ab	2.67 abcd	5.30 abc	4.85 cd
4	1.35 ef	1.50 bcd	0.40 c	1.21 de	0.80 c	3.95 abc	2.30 de	6.30 bc
5	1.52 def	0.67 de	1.33 c	2.67 cde	0.55 c	0.45 d	3.00 cde	6.00 c
6	0.38 f	0.00 e	1.12 c	1.00 de	0.85 c	1.90 cd	3.10 cde	5.45 c
7	1.42 def	1.62 bcd	3.60 ab	1.18 de	0.40 c	2.00 bcd	2.84 de	2.85 e
8	2.55 bcde	1.50 bcd	0.13 c	0.70 e	2.00 b	2.20 bcd	5.55 a	6.35 bc
9	2.79 abcd	1.10 cde	0.25 c	0.83 e	2.70 ab	2.89 abc	5.05 abcd	5.80 c
10	3.10 abc	3.23 a	1.57 bc	3.43 bcde	2.10 b	3.20 abc	2.13 e	3.75 de
11	3.70 ab	2.43 ab	3.62 ab	5.68 ab	1.85 b	4.58 a	3.35 bcde	5.90 c
12	2.33 bcde	1.89 bcd	4.53 a	3.82 abcd	3.05 a	4.13 ab	5.00 abcd	8.15 a

Means followed by the same letter within a column are not significantly different (LSD  $P > 0.05$ )

**Part II: Materials Tested for Arthropod Management**

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Brand	Formulation	Common name	Composition	Manufacture/source
Admire Pro	4.6 SC	imidacloprid	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
Platinum	75 SG	thiamethoxam	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
HGW 86	20 SE	Cyantraniliprole	3-bromo-1-(3-chloro-2-pyridinyl)-N-[4-cyano-2-methyl-6-[(methylamino)carbonyl]phenyl]-1H-pyrazole-5-	DuPont Company Stine-Haskell Research Center Dupont Crop Protection Newark, DE 19711

			carboxamide	
Movento	2 SC	spirotetramat	<i>cis</i> -4-(ethoxycarbonyloxy)-8-methoxy-3-(2,5-xyl-1-azaspiro[4.5]dec-3-en-2-one	Bayer CropScience LP P.O. Box 12014 1 T.W. Alexander Drive Research Triangle Park, North Carolina 27709
Temik	15 G	aldicarb	2-methyl-2-(methylthio)propanal <i>O</i> -[(methylamino)carbonyl]oxime	Bayer CropScience LP P.O. Box 12014 1 T.W. Alexander Drive Research Triangle Park, North Carolina 27709
Suscon	5 G	imidacloprid	1-((6-Chloro-3-pyridinyl)methyl)-N-nitro-2-imidazolidinimine	Nufarm Americas Inc. 150 Harvester Drive. Suite 200 Burr Ridge Ill. 60527