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ORANGE: *Citrus Citrus sinensis* (L. Osbeck.) 'Valencia'

**PERSISTANCE OF LIQUID AND GRANULAR SLOW RELEASE FORMULATIONS
OF SOIL APPLIED INSECTICIDES FOR CITRUS PSYLLID CONTROL, 2007**

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

Soil application of the systemic insecticide imidacloprid to citrus in Florida is limited by label restrictions to 1 lb active ingredient/acre/year, which is insufficient to provide year-round protection for this pest year-round even on small trees. Therefore, we investigated the feasibility using aldicarb for this purpose or extending the period of control using a slow release

formulation of imidacloprid The trial was conducted at the University of Florida Southwest Research and Education Center in Immokalee, Florida, on 5 year old 'Valencia' orange trees planted at 15 X 22 ft spacing in double-row beds separated by a swale and running north-south. A complete randomized block design was used with each plot consisting of 4 trees. Trees were trimmed approximately every two weeks throughout the trial to encourage new growth (flushes) and provide a suitable substrate for oviposition and habitat for psyllid nymphs. Weeds, debris and leaf litter were removed from beneath each tree prior to application. NUQ 05054 was applied by scattering 1.25 oz (10 lb/acre) in a four foot circle around the base of each tree on 19-Jun. The 1.0 and 2.0 oz per tree Temik applications were made on 10-Jul by placing a weighed amount of product within two, three foot furrows approximately 2 feet from the base of the on two opposing sides of tree. Furrows were covered with soil after application. Admire pro was applied on 12-Jul at a rate of 14 oz per acre (0.11 oz/tree) in 16 ounces of solution as a drench to bare soil at a radius of 24 inches around the trunk of the tree with an EZ-Dose® sprayer with a pressure of 45 PSI and a flow rate of 3.7 gallons per minute. Evaluations were conducted on 18-Jul, 2, 16, 29 –Aug, 13, 27 –Sep, 11-24 Oct, 8-Nov and 12-Dec. when suitable new terminal growth (flush) was available. Ten shoots on each of three trees per plot were observed for the presence/absence of psyllid eggs and/or nymphs. One shoot of each of the three trees was removed on each of the dates listed plus on 24-Jan 2008 and the number and stage of the psyllid nymphs were assessed in the laboratory using a stereoscopic microscope. The adults were monitored on each of three trees per plot using a "tap sample": 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. The toxic response of psyllid was further evaluated Oct -11 by placing an organdy cage on two branches per tree in each plot Oct after counting all psyllid nymphs on each branch.

Branches were clipped on 01- Nov and placed in a freezer for 24 hours after which adults were removed and counted.

Both formulations of imidacloprid significantly reduced the percentage of shoots infested compared to the control from 2-Aug until 8 Nov except for a lapse on 27 Sep. (Table 1). A significantly lower infestation rate was seen with NUQ05054 on 8 Nov. compared to Admire Pro. Similarly, fewer nymphs were counted on individual shoots from trees treated with imidacloprid over the whole period (Table 2). Emergence in sleeve cages was significantly less on branches from trees treated with imidacloprid than the low rate of Temik although not the high rate or the control (Table 2). The number of adults observed with the tap sample was reduced by imidacloprid from 2 Aug until 12- Dec. In contrast, reduction of percentage infestation on trees treated with either of the two rates of Temik was only observed on 2 Aug and no difference was seen in numbers of psyllids from infested branches. However Temik did a better job on adults, causing significant reduction at the 2 oz/tree rate though 8 Nov, and at the 1 oz/tree rate through 24 Oct. with a lapse on 11 Oct. Thus, imidacloprid provided better control of nymphs than aldicarb, with some evidence at the end of the trial for greater persistence of the slow release product.

Table 1:

Treatment	Rate/tree	Percentage of shoots infested									
		18-Jul	2-Aug	16-Aug	29-Aug	13-Sep	27-Sep	11-Oct	24-Oct	8-Nov	12-Dec
Untreated	N/A	100.00 a	88.13 a	93.33 a	97.62 a	95.00 a	100.00 a	92.50 a	90.00 a	97.50 a	98.21 a
Temik	1.0 oz	100.00 a	39.83 b	81.82 a	75.91 ab	57.14 ab	100.00 a	84.54 ab	83.18 a	96.67 a	N/A
Temik	2.0 oz	100.00 a	55.54 b	83.94 a	88.96 a	67.17 ab	90.63 a	79.17 ab	78.33 a	84.47 b	N/A
Admire Pro	0.11 oz	85.00 a	35.83 b	47.68 b	60.28 bc	45.42 b	33.33 a	60.79 bc	60.83 b	77.50 b	77.71 a
NUQ05054	1.25 oz	100.00 a	45.56 b	44.17 b	48.49 c	35.83 b	61.90 a	45.94 c	46.67 b	65.00 c	65.74 a

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

Table 2

Treatment	Rate/tree	No Nymphs/ infested flush	No of Adults collected*
Untreated	N/A	24.05 a	46.67 ± 13.67 ab
Temik	1.0 oz	22.02 a	95.58 ± 45.05 a
Temik	2.0 oz	16.18 ab	59.17 ± 19.94 ab
Admire Pro	0.11 oz	13.01 b	9.08 ± 3.91 b
NUQ05054	1.25 oz	7.88 b	6.75 ± 4.02 b

* caged 11OCT07; collected 1NOV07

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

Table 3

		Adult Psyllids per tap sample									
Treatment	Rate/tree	18-Jul	2-Aug	16-Aug	29-Aug	13-Sep	27-Sep	11-Oct	24-Oct	8-Nov	12-Dec
Untreated	N/A	1.00 a	4.42 a	4.50 a	2.08 a	2.41 a	2.67 a	1.67 a	1.17 a	1.25 a	5.75 a
Temik	1.0 oz	1.50 a	0.67 b	0.58 bc	0.92 b	1.08 b	0.67 b	1.00 ab	0.25 b	0.59 ab	N/A
Temik	2.0 oz	2.25 a	0.92 b	1.50 b	0.92 b	0.59 b	0.67 b	0.42 bc	0.00 b	0.33 b	N/A
Admire Pro	0.11 oz	2.75 a	0.92 b	0.25 c	0.17 bc	0.50 b	0.42 b	0.25 bc	0.00 b	0.33 b	0.75 b
NUQ05054	1.25 oz	1.75 a	1.67 b	0.50 bc	0.00 c	0.59 b	0.17 b	0.08 c	0.00 b	0.17 b	1.17 b

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

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
imidacloprid	NUQ05054	granular	1_((6-Chloro-3-pyridinyl)methyl)-N-nitro-2-imidazolidinimine	Nufarm Americas Inc. 150 Harvester Drive. Suite 200 Burr Ridge Ill. 60527
Aldicarb	Temik	15 G	2 – Methyl – 2 (Methylthio) propionaldehyde O (methylcarbaoyl) - oxime	Bayer CropScience LP P.O. Box 12014 1 T.W. Alexander Drive Research Triangle Park, North Carolina 27709