(D13)

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

SPRAYS OF GUAVA LEAF EXTRACT AND INSECTICDES TO CONTROL ASIAN CITRUS PSYLLID AND CITRUS LEAFMINER ON ORANGE, 2007

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Asian citrus psyllid (ACP): *Diaphorina citri* Kuwayama
Citrus leafminer (CLM), *Phyllocnistis citrella* Stainton

Management of ACP and CLM is critical for profitable orange production in Florida due to their roles in the spread of two devastating diseases. Huanglongbing or citrus greening is caused by the bacterium, *Candidatus* Liberibacter asiaticus is vectored by ACP while infection by citrus canker caused by the bacteria *Xanthomonas citri* is facilitated by feeding damage from CLM. The experimental block at the Southwest Florida Research and Education Center (SWFREC), Immokalee, Florida consisted of 12-yr-old sweet orange *Citrus sinensis* (L) Osbeck 'Valencia' trees planted on double-row raised beds at a density of 132 trees/acre. Trees were irrigated by micro-sprinklers and subjected to conventional cultural practices. Swale sides of the trees were pruned with a hand held tree trimmer to induce new flush and encourage ACP infestation. Eight treatments and an untreated check were randomly distributed across 4 replicates in 23 rows that included a buffer row after every treated row. Replicates contained 3 treated rows of 20 trees each divided into three plots of 6 trees. Treatments were applied on 25 Sept 2007 to the swale side of the trees using a tractor mounted Durand Wayland 3P-10C-32 air blast speed sprayer with an array of five # 5 T-Jet stainless steel cone nozzles per side operating in low range first gear at 1500 RPM delivering 200 gpa. A pre-treatment sampling was conducted on 24 Sept and treatment evaluations were made 3, 7, 14, and 21 DAT. One and four trees were observed per plot for pre- and post-treatment samplings, respectively. Adult ACP density was estimated on each of 3 trees per plot by counting the individuals falling on a clipboard covered by 8 ½ × 11 inch white paper sheet placed at random under the branches which were then tapped three times. Ten randomly selected shoots were examined and the number infested with ACP eggs or nymphs recorded. The infestation of each shoot was rated for ACP stages on a 0 to 3 scale: 0 = none, 1 = eggs and first instars, 2 = second and third instars, 3 = fourth and fifth instars. One infested flush of these was collected and examined in the laboratory under a microscope to count eggs and instars of *D. citri*. The number of ACP nymphs per flush was estimated by multiplying the proportion of 10 flush infested by the number counted from the collected flush. A well developed shoot with tender flush was randomly selected and all live CLM larvae were counted on five expanded leaves. At 28 DAT, one shoot was examined per tree for damage by ACP and CLM and rated on 0 to 3 scale: 0 = none, 1 = low, 2 = medium, 3 = high. Shoots were examined in the laboratory to record number of leaves damaged by ACP and CLM. All data were subjected to ANOVA to evaluate treatment effects on ACP and CLM and means were separated using LSD ($P = 0.05$).

Most nymphal ACP mortality (Table 1) was seen from Danitol + 435 oil at 3 DAT, although not different from both rates of Vydate and the low rate of QRD 416 with 435 oil. At 7 DAT, number of dead nymphs was still high in the Danitol + 435 oil treatment, although not significantly different from other treatments or untreated check. Fewest live nymphs per shoot were seen with Danitol + 435 oil at both 3 and 7 DAT, though not different from both rates of Vydate, or the low rate of QRD 416 alone or with 435 oil. Similar patterns were seen with infestation rating. Vydate and Danitol + 435 oil showed significant effects on adults at 3 DAT and all but the two QRD treatments alone and guava leaf extract were significantly lower than the check at 7 DAT. No significant effects were seen with the guava leaf extract on any day by any criterion. There was no treatment effect on ACP after the dates reported.

Only both rates of Vydate resulted in significantly fewer CLM larvae than untreated check at 3 DAT (Table 2) although percentage of CLM damaged leaves was significantly reduced with Danitol + 435 oil at 28 DAT. The rating on shoots

damaged by both CLM and ACP were significantly lower compared to the untreated check in Danitol and QRD 416 treatments applied with 435 oil and the low rate treatment of Vydate.

Table 1.

Treatment/ formulation	Rate amt product/ acre or % v/v	Dead ACP nymphs/ shoot (no.)		Live ACP nymphs/ shoot (no.)		Infestation rating*/shoot			ACP adults/ tap sample (no.)	
		3 DAT	7 DAT	3 DAT	7 DAT	3 DAT	7 DAT	14 DAT	3 DAT	7 DAT
Untreated check	---	0.0c	0.0a	24.1a	25.2a	1.7ab	2.1 bc	1.5a	1.1ab	1.4a
Guava leaf extract	2%	0.0c	0.0a	19.6ab	24.8a	1.8a	2.4ab	1.6a	1.4a	1.1ab
Danitol 2.4 EC + 435 Oil	21.3 fl oz + 3%	5.9a	2.9a	3.1e	2.9b	0.9c	1.2d	1.0b	0.2c	0.0d
Vydate 2L	32 fl oz	5.6a	0.8a	10.1cde	10.2b	1.0c	1.4d	1.3ab	0.4bc	0.3cd
Vydate 2L	64 fl oz	4.6a	0.2a	6.6de	7.4b	1.0c	1.3d	1.5a	0.3c	0.4bcd
QRD 416	96 fl oz	0.0c	0.3a	12.3bcd	20.7a	1.6ab	1.9c	1.6a	0.8abc	0.6bcd
QRD 416 + 435 Oil	96 fl oz + 3%	3.5ab	1.0a	10.6cde	7.2b	1.0c	1.2d	1.2ab	0.4bc	0.5bcd
QRD 416	192 fl oz	0.7bc	0.0a	23.5a	21.5a	1.6ab	2.5a	1.6a	0.1ab	0.8abc
QRD 400	192 fl oz	0.1c	0.0a	16.2abc	28.9a	1.4b	2.1c	1.5a	0.8abc	1.1ab

*0 = none, 1 = eggs and first instars, 2 = second and third instars, 3 = fourth and fifth instars
Means within columns followed by the same letter are not significantly different (LSD, *P* = 0.05).

Table 2.

Treatment/ formulation	Rate amt product/ acre or % v/v	CLM larvae/5 leaves 3 DAT	CLM damaged leaves (%) 28 DAT	CLM + ACP damage rating*/ shoot
Untreated check	---	0.9abc	36.7ab	2.8a
Guava leaf extract	2%	1.1ab	38.6ab	2.6abc
Danitol 2.4EC + 435 Oil	21.3 fl oz + 3%	0.3cd	16.5c	1.8d
Vydate 2L	32 fl oz	0.0d	43.8ab	2.6bc
Vydate 2L	64 fl oz	0.1d	30.6bc	2.7abc
QRD 416	96 fl oz	0.7bcd	43.6ab	2.7abc
QRD 416 + 435 Oil	96 fl oz + 3%	0.5bcd	28.3bc	2.5c
QRD 416	192 fl oz	0.4bcd	48.0a	2.8ab
QRD 400	192 fl oz	1.4a	31.9abc	2.6abc

*0 = none, 1 = low, 2 = medium, 3 = high
Means within columns followed by the same letter are not significantly different (LSD, *P* = 0.05).