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(D7)

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

FOLIAR APPLICATIONS OF SULFOXAFLOR, BYI02960, AND SOME COMMONLY USED INSECTICIDES FOR CONTROL OF ASIAN CITRUS PSYLLID AND CITRUS LEAFMINER IN ORANGES: SUMMER, 2011

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

ACP and CLM are two economically important pests of citrus due in large part to their role in the spread of greening disease or "huanglongbing" and citrus canker caused by *Xanthomonas axonopodis* pv. *Citri* respectively. Therefore, control of both ACP and CLM is key to reduce spread of the associated diseases in Florida citrus. The experimental block at the Southwest Florida Research and Education Center (SWFREC), Immokalee, Florida consisted of 16-yr-old sweet orange '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. Selected branches were pruned 3 weeks prior to application to encourage growth of new shoots essential for reproduction of ACP and CLM. Eleven treatments and an untreated check were randomly distributed across 4 replicates in 3 rows separated by a buffer row. Each replicate contained 12 five-tree plots. Treatments were applied on 16 Jun 2011 using a Durand Wayland AF100-32 air blast speed sprayer operating at 1.9 mph and 400 psi with four John Beane Ceramics nozzles (#4, #4, #3 and #3) delivering 120 gpa. Evaluations were made at 5, 12, 19, 26, 33, and 40 days after treatment (DAT). Twelve randomly selected shoots per plot were collected and examined under a stereomicroscope in the laboratory to count ACP nymphs. Five of the twelve shoots were examined for CLM by checking three fully expanded leaves on each shoot under the microscope to count CLM larvae. Density of ACP adults was assessed from three of the four trees in each plot by counting adult insects falling on a white clipboard placed under randomly chosen branches which were then struck three times with the PVC pipe to make a count for one "tap" sample. Four tap samples were conducted per tree. Data were subjected to ANOVA and means separated using LSD (P = 0.05) are presented.

All treatments reduced nymphs compared to the untreated check through 33 DAT. At that time, most reduction was observed with Sulfoxaflor 20 SC at 4.28 or 5.7 oz/ac, both with citrus oil, and BYI 02960 200 Sl at14 oz/ac with Induce (Table 1). However, none of these was significantly better than any other treatment except for Sulfoxaflor 20 SC at the low (2.85 oz) rate alone. All treatments except Sulfoxaflor 20 SC applied at 2.85 oz alone reduced adults through 19 DAT at which time Sulfoxaflor 20 SC + citrus oil at the two higher rates were the best treatments with no nymphs observed in the sample. No significant treatment effects were seen at 26 DAT but were again observed through 40 DAT. Effective treatments at that time were Danitol 24 EC at 16 oz/ac, Delegate 25 WG at 4 oz/ac, Sulfoxaflor 20SC at 4.28 oz/ac and BYI02960 at 10.5 and 12 oz/ac, all with citrus oil. Thus, data from two sample dates (5 DAT for nymphs and 19 DAT for adults) suggest that Sulfoxaflor worked better on ACP with citrus oil than without, with no advantage for the 5.7 oz/ac rate over the 4.28 oz/ac rate and the 10.5 oz/ac rate seemed to be adequate for BYI02960. Significantly fewer CLM larvae compared to untreated check were observed in all treatments at 5 DAT except for Movento MPC + Citrus oil (Table 2). However, only Delegate 25 WG + Citrus oil was still providing control at 12 DAT.

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Treatment/ formulation	Rate (product/ acre or % v/v)	ACP nymphs/shoot					ACP Adults/tap sample					
		5 DAT	12 DAT	19 DAT	26 DAT	33 DAT	5 DAT	12 DAT	19 DAT	26 DAT	33 DAT	40 DAT
Untreated check		13.45a	24.50a	26.21a	13.29a	3.50a	0.81a	0.73a	0.40a	0.29a	0.44ab	0.50ab
Danitol 2.4 EC + Citrus Oil	16 oz + 2%	0.60bc	1.46d	3.33bc	1.23c	0.94bc	0.04c	0.02b	0.00b	0.06a	0.04c	0.04c
Delegate 25 WG + Citrus oil	4 oz + 2%	1.06bc	2.33cd	4.06bc	5.56b	1.25bc	0.04c	0.06b	0.08b	0.17a	0.27abc	0.10c
Sulfoxaflor 20 SC	2.85 oz	2.71b	6.02bc	5.33bc	3.81bc	1.73b	0.10c	0.29b	0.42a	0.23a	0.19abc	0.21bc
Sulfoxaflor 20 SC + Citrus oil	2.85 oz + 2%	0.54c	3.77bcd	2.83bc	4.13bc	0.75bc	0.00c	0.23b	0.02b	0.21a	0.31abc	0.25bc
Sulfoxaflor 20 SC + Citrus oil	4.28 oz + 2%	0.02c	2.35cd	1.08c	0.90c	0.48c	0.13c	0.10b	0.00c	0.13a	0.06c	0.08c
Sulfoxaflor 20 SC + Citrus oil	5.7 oz + 2%	0.63bc	3.15bcd	3.98bc	3.31bc	0.44c	0.06c	0.19b	0.00c	0.23a	0.10c	0.19bc
BYI02960 200 SL + Citrus oil	10.5 oz + 3%	0.44c	0.88d	3.10bc	1.92c	0.60bc	0.04c	0.04b	0.02b	0.02a	0.08c	0.10c
BYI02960 200 SL + Citrus oil	12 oz + 3%	0.35c	1.40d	4.04bc	2.60bc	1.02bc	0.17bc	0.19b	0.04b	0.06a	0.10c	0.10c
BYI02960 200 SL + Citrus oil	14 oz + 3%	1.15bc	2.04cd	4.71bc	2.73bc	1.13bc	0.44b	0.15b	0.10b	0.21a	0.48a	0.15bc
BYI02960 200 SL + Induce	14 oz + 0.25%	0.52c	0.81d	3.83bc	3.25bc	0.35c	0.15bc	0.13b	0.04b	0.17a	0.15bc	0.83a
Movento MPC + Citrus oil	16.0 oz + 3%	1.52bc	6.92b	6.31b	5.46b	0.56bc	0.29bc	0.29b	0.10b	0.17a	0.08c	0.21bc

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

Treatment/ formulation	Rate (product/ acre or % v/v)	Larvae	
		5 DAT	12 DAT
Untreated check		1.20a	1.60ab
Danitol 2.4 EC + Citrus oil	16 oz + 2%	0.00e	0.95bc
Delegate 25 WG + Citrus oil	4 oz + 2%	0.00e	0.20c
Sulfoxaflor 20 SC	2.85 oz	0.45bcde	2.10a
Sulfoxaflor 20 SC + Citrus oil	2.85 oz + 2%	0.20cde	1.65ab
Sulfoxaflor 20 SC + Citrus oil	4.28 oz + 2%	0.20cde	1.65ab
Sulfoxaflor 20 SC + Citrus oil	5.7 oz + 2%	0.45bcde	1.35ab
BYI02960 200 SL + Citrus oil	10.5 oz + 3%	0.55bc	2.00a
BYI02960 200 SL + Citrus oil	12 oz + 3%	0.05de	1.45ab
BYI02960 200 SL + Citrus oil	14 oz + 3%	0.50bcd	1.30ab
BYI02960 200 SL + Induce	14 oz + 0.25%	0.25cde	1.55ab
Movento MPC + Citrus oil	16.0 oz + 3%	0.90ab	0.95bc