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TOMATO: *Lycopersicon esculentum*Mill., 'Tygress' and 'Florida 47'

CONTROL OF SWEETPOTATO WHITEFLY WITH SOIL APPLIED INSECTICIDES ON TYLCV RESISTANT AND SUSCEPTIBLE STAKED TOMATOES, 2011

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Sweetpotato whitefly: *Bemisia tabaci* (Gennadius) – biotype B

SWF biotype B also known as *Bemisia argentifolii* causes tomato irregular ripening (TIR) and is the vector of tomato yellow leaf curl virus (TYLCV). The disorder and the disease can cause dramatic loss of fruit quality and yield respectively. Seedlings of 'Tygress' a TYLCV resistant variety to track virus movement and 'Florida 47' a susceptible variety to track whitefly populations were obtained from a commercial greenhouse and transplanted 2 Mar at the Southwest Florida Research and Education Center in Immokalee Florida. Plants were spaced 18-inches apart in 2 sets of 3 beds 420 ft in length covered with black polyethylene film mulch after incorporating approximately 25% of the fertilizer (10-2-10 NPK). Remaining fertilizer was later injected as liquid 7-0-7 through drip tapes (2 per bed) with 4 inch emitter spacing. An RCB split plot design was used with 4 replicates, one in each outside row of both sets of 3 rows. Main plots split into 2 subplots, each with 10 plants of one or the other variety separated by a single TYLCV infected plant obtained in a local commercial field. Three 'Florida 47' plants were left between plots as a buffer. Soil drenches were made by delivering a 120 ml suspension to the base of each plant using an EZ-Dose® sprayer operating at a pressure of 45 psi and a flow rate of 3.7 gpm. Drip applications were conducted by sectioning off each treated plot with a ball valve and pressurizing the tape using a 12 volt pump operating at 0.23 gpm to inject 2 liters of water, followed by 3 liters of suspension and finally 3 liters of water (Table 1). Whitefly adults were evaluated weekly 30 Mar to 4 May by inspecting a sample of five leaflets per mid-canopy level true leaf from 5 plants per subplot. Immature stages from 3 plants in each subplot were counted on 6, 20 Apr and 4 May under a stereoscope microscope by observing eight 0.5 square inch discs cut from each of three leaflets of one terminal 7th node trifoliate. Fruit of marketable size was harvested from 6 plants in each sub-plot on 2 and 13 May. Data were subjected to ANOVA and means separated using LSD ($P = 0.05$).

Only the Venom and BYI02960 drenches provided significant suppression of adults on the first two sample dates (Table 2). Not until the last sample on 4 May were there fewer adults in response to all treatments. Fewest adults were seen on all sample dates in response to the 21 oz drench application of BYI02960, although not significantly fewer than the two high rates of the drip applications of this product after 30 Mar, the Venom drench until 20 Apr, Admire Pro on 30 Mar and 6 Apr or Admire Pro followed by Durivo on 6, 13 Apr and 4 May, however some of these treatments were also not significantly different than the untreated control. All products regardless of application method significantly reduced the number of nymphs from the untreated plants on 13 Apr with the BYI02960 drench application having significantly fewer nymphs than all other treatments except for the 21 and 28 oz drip rates of that same product (Table 4). On 27 Apr, only the 21, 28 oz drip and drench application of BYI02960 had a significant impact on the nymphal population. On 11 May, the 28 oz drip and 21 oz drench of BYI02960 and the Admire Pro application provided significant reduction of nymphs compared to the untreated check. Incidence of TYLCV symptomatic 'FL-47' plants was reduced compared to the control only by drenches of Venom or BYI02960 on 20 Apr and the BYI02960 drench on 4 May. Due to poor weather conditions near harvest and the general health of the plants, most fruit in both varieties were culled but total weight was greater for 'Tygress' (606 ± 31.2 boxes per acre) compared to 'FL-47' (466 ± 22.1 boxes per acre) with no differences among insecticide treatments. No phytotoxicity was observed for any of the treatments. This research was supported by industry gift(s) of pesticide and/or research funding.

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Table 1.

Treatment/ Formulation	Rate amt product/acre	Applied			
		Method	7 Mar	8 Mar	30 Mar
untreated					
Venom	6.0 oz	drip	x		
Venom	6.0 oz	drench	x		
Admire Pro	10.5 oz	drench	x		
Admire Pro	10.5 oz	drench	x		
Durivo	13.0 oz	drip			x
BYI02960	14.0 oz	drip		x	
BYI02960	21.0 oz	drip		x	
BYI02960	28.0 oz	drip		x	
BYI02960	21.0 oz	drench	x		

Table 2.

Treatment/ Formulation	Rate amt product/acre	Adult whiteflies per 5 leaflets						
		Method	30-Mar	6-Apr	13-Apr	20-Apr	27-Apr	4-May
untreated			0.58ab	0.35ab	0.73a	1.45a	2.03a	2.38a
Venom	6.0 oz	drip	0.55abc	0.15bc	0.45abc	1.43a	1.83ab	1.18bc
Venom	6.0 oz	drench	0.23cd	0.13c	0.28bc	1.13ab	1.43abc	1.60b
Admire Pro	10.5 oz	drench	0.30bcd	0.15bc	0.48ab	1.08ab	1.93a	1.50b
Admire Pro	10.5 oz	drench	0.58ab	0.18bc	0.35bc	1.28ab	1.95a	1.30bc
Durivo	13.0 oz	drip						
BYI02960	14.0 oz	drip	0.65a	0.48a	0.70a	0.98abc	1.10cd	1.53b
BYI02960	21.0 oz	drip	0.53abc	0.23bc	0.25bc	0.80bcd	1.18bcd	1.53b
BYI02960	28.0 oz	drip	0.45abcd	0.20bc	0.38bc	0.45cd	1.38abc	1.05bc
BYI02960	21.0 oz	drench	0.15d	0.03c	0.15c	0.38d	0.58d	0.83c

Means followed by same letter are not statistically different (LSD, P>0.05).

Table 3.

Treatment/ Formulation	Rate amt product/acre	Whitefly nymphs per 4 inch^2 (No.)			
		Method	13 Apr	27 Apr	11 May
untreated			10.83a	15.67a	25.71a
Venom	6.0 oz	drip	7.13b	15.79a	22.79ab
Venom	6.0 oz	drench	3.79de	11.71ab	24.83a
Admire Pro	10.5 oz	drench	6.50bc	13.13ab	17.54bc
Admire Pro	10.5 oz	drench	4.59cd	11.83ab	23.54ab
Durivo	13.0 oz	drip			
BYI02960	14.0 oz	drip	5.21bcd	14.71a	22.71ab
BYI02960	21.0 oz	drip	2.17ef	7.21bc	19.42ab
BYI02960	28.0 oz	drip	3.13def	3.88c	11.92cd
BYI02960	21.0 oz	drench	1.38f	2.33c	7.50d

Means followed by same letter are not statistically different (LSD, P>0.05).

Table 4.

Treatment/ Formulation	Rate amt product/acre	method	TYLCV Symptomatic Plants (%)					
			30 Mar	6 Apr	13 Apr	20 Apr	27 Apr	4 May
untreated			2.5	7.5	20.0bcd	70.0ab	90.0	97.5ab
Venom	6.0 oz	drip	0.0	10.0	32.5abc	53.8bc	87.5	90.0ab
Venom	6.0 oz	drench	0.0	5.0	17.5cd	40.0cd	75.0	92.5ab
Admire Pro	10.5 oz	drench	5.0	13.8	26.9abc	55.3bc	73.6	76.7bc
Admire Pro	10.5 oz	drench	7.5	17.5	40.0a	52.5bc	80.0	90.0ab
Durivo	13.0 oz	drip						
BYI02960	14.0 oz	drip	2.5	17.5	37.5ab	77.5a	92.5	100.0a
BYI02960	21.0 oz	drip	2.5	17.5	32.5abc	47.5bc	75.0	95.0ab
BYI02960	28.0 oz	drip	7.5	10.0	25.0abc	42.5c	57.5	77.5bc
BYI02960	21.0 oz	drench	0.0	0.0	5.0d	17.5d	52.5	62.5c

Means followed by same letter are not statistically different (LSD, P>0.05).