

(E78)

**TOMATO:** *Lycopersicon esculentum* (Mill.), 'HA 3073'

## **CONTROL OF SILVERLEAF WHITEFLY AND SOUTHERN ARMYWORM IN STAKED TOMATO WITH SOIL-APPLIED INSECTICIDES AND FOLIAR SPRAYS, 2004**

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Silverleaf whitefly (SLW): *Bemisia argentifolii* (Bellows & Perring)  
Southern Armyworm (SAW): *Spodoptera eridania* (Cramer)

Populations of silverleaf whitefly (SWF) and incidence of whitefly-borne TYLCV continue to increase in southwest Florida; whereas, southern armyworm (SAW) is a perennial problem, particularly in the fall. It is therefore of interest to examine additional options to supplement the standard insecticides used to control these pests. For this trial, greenhouse-raised seedlings were planted 31 Aug at 18-inch spacing on 12 raised beds 250 ft long on 6-ft centers, each covered with whiteface polyethylene film. Plants were irrigated and fertilized using Netafim drip tape with 12-inch spacing between emitters. The center bed of each set of 3 beds was planted with alternating tomato and *Amaranthus viridis* plants and left untreated to serve as a source of pest inoculum. The treated beds were divided into plots 40 ft long to which 12 treatments were assigned in a RCB design with four replications. Admire 2F and two rates of Belay 16WSG were applied as soil drenches on 2 Sep in 10 ml of solution per plant. The treatment receiving horticultural mineral oil (HMO), PureSpray Green, was tank mixed with the weekly fungicide applications of Kocide 2000 and Manzate. The initial application of HMO began 7 Sep at 0.5% v/v and the rate was increased 0.5% every two weeks until 2.0% was reached on 19 Oct, the rate used to finish the crop season. The other treatments were applied in two applications on 26 Oct and 2 Nov at 88 gpa. Penetrator, a nonionic adjuvant, was tank mixed with the Proclaim and Warrior treatments at 0.25% v/v. All sprays were applied using a high clearance sprayer with two vertical booms each fitted with ceramic yellow Albuz hollow cone nozzles operating at 200 psi with outputs of 33 gpa, 44 gpa, 66 gpa and 88 gpa on 7 Sep, 21 Sep, 6 Oct and 20 Oct, respectively. An application of Avaunt 30WG at 3.5 oz product was made 2 Nov to control a developing southern armyworm population in the Admire and Belay treatments. Disease was rated significant if 10% or more of the lower one-third of the plant was infected. A pre-count on 22 Oct showed 3% of 192 plants, sampled from 6 plots per rep across the trial, had larvae or egg masses of southern armyworm present. Rep 2 had significantly fewer egg masses than rep 1 at 4.6 and 0.5%, respectively. There were no other significant differences between reps. Number of larvae and damage on 8 plants per plot was monitored 4 times weekly starting 29 Oct. Damage was rated as 0 = no damage, 1 = 1% leaflets with damage, 2 = 2 to 5%, 3 = 6 to 15%, 4 = 16 to 30% and 5 > 30%. Weekly evaluations of whitefly adults were made beginning 11 Oct in the Belay, Admire, HMO and untreated control treatments by beating one side of eight plants at two locations per plot with a 9 × 13 inch pie pan painted black and coated with a 9:1 mixture of vegetable oil and liquid detergent. All plants were evaluated for disease and phytotoxicity 4 times, starting 22 Oct, after the rate of the oil was increased to 2% and the first incidence of bacterial spot was noted. All fruit of marketable size was harvested from the 16 plants per plot on 15 and 29 Nov. The number and weights of marketable fruit and culls caused by damage from insect, disease, or other causes were recorded. Data were subjected to ANOVA and means were separated using LSD ( $P = 0.05$ ).

Whitefly counts on treated plants significantly different from the control were observed on 25 Oct, when fewest whiteflies were observed on plants treated with Admire or with PureSpray Green (Table 1). No effect was seen with Belay. The same result occurred over all dates. All treatments provide significant control of SAW larvae although more were seen on plants treated only with drenches of Admire or Belay compared to the remaining treatments

(Table 2). All treatments provided protection from damage from SAW compared to the control, with least damage seen on plants treated with PureSpray Green, Warrior, Avaunt, the high rate of Intrepid 2F, and the low rate of E2Y45 though not significantly different from the low rate of Intrepid 2F, the high rate of E2Y45, or Proclaim. The highest number and weight of marketable fruit were harvested from plants treated with PureSpray Green, though not significantly different than all other treatments except for drench treatments. Only plants treated with Proclaim, Avaunt, and PureSpray Green yielded significantly fewer unmarketable fruit than the control, with fewest seen on the latter. Thus, PureSpray Green HMO provided as good or better protection against both whitefly and SAW as the other products tested that specifically targeted these pests.

Table 1.

Treatment/ formulation	Rate amt product/acre	Whitefly adults <sup>a</sup>							Overall <sup>b</sup>
		11 Oct	18 Oct	25 Oct	1 Nov	8 Nov	15 Nov	22 Nov	
Belay 16WSG	15.0 oz	3.1a	5.8a	8.1a	8.9a	8.1ab	11.0a	7.8a	7.5a
Belay 16WSG	20.0 oz	4.3a	5.3a	8.3a	8.9a	9.9a	10.3a	8.5a	7.9a
Admire 2F	16.0 fl oz	2.5a	5.1a	2.9b	5.1a	4.6c	7.9ab	6.8ab	5.0b
PureSpray Green	0.5 to 2.0% <sup>c</sup>	3.4a	5.5a	3.4b	6.5a	5.5bc	4.9b	3.3b	4.6b
Untreated check	--	4.9a	7.1a	7.1a	8.0a	6.6bc	7.6ab	4.5ab	6.6a

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

<sup>a</sup>Mean of one beat from eight plants per plot.

<sup>b</sup>Mean over seven weekly evaluations.

<sup>c</sup>The initial application of PureSpray Green oil began 7 Sep at 0.5% v/v and the rate was increased 0.5% every two weeks until 2.0% was reached on 19 Oct, the rate used to finish the crop season.

Table 2.

Treatment/ formulation	Rate amt product/acre	Larvae <sup>a</sup>	Damage <sup>a</sup>	Mean <sup>b</sup> number and weight of fruit			
				Marketable		Unmarketable <sup>c</sup>	
				No.	Wt (lb)	No.	Wt (lb)
Proclaim 5SG	2.4 fl oz	0.02c	0.52de	295.3a-d	114.5a-d	43.3cde	18.1bc
Warrior Zeon 1CS	3.8 fl oz	0.09c	0.45e	366.3ab	138.0ab	42.8cde	18.6abc
E2Y45 1.7SC	8.3 fl oz	0.33c	0.43e	334.5abc	135.2abc	53.0a-d	22.9ab
E2Y45 1.7SC	33.2 fl oz	0.15c	0.52de	327.8a-d	126.6a-d	61.3a-d	19.8abc
Belay 16WSG	15 oz	1.16b	0.76cd	200.0cd	85.1cd	80.3abc	32.8ab
Belay 16WSG	20 oz	1.41b	1.10b	224.8bcd	90.9bcd	86.0a	34.5a
Admire 2F	16 fl oz	1.04b	0.90bc	245.3a-d	89.4bcd	82.5ab	31.6ab
PureSpray Green	0.5 to 2.0% <sup>d</sup>	0.10c	0.30e	388.8a	153.5a	15.0e	5.6c
Intrepid 2F	6.0 fl oz	0.08c	0.79cd	318.7a-d	129.3abc	66.7a-d	28.4ab
Intrepid 2F	8.0 fl oz	0.27c	0.52de	285.0a-d	121.8a-d	46.8b-e	20.2abc
Avaunt 30WG	3.4 oz	0.04c	0.40e	336.8abc	139.8ab	36.0de	17.1bc
Untreated check	--	2.45a	2.00a	187.3d	78.7d	81.0abc	29.1ab

Means in columns followed by the same letter are not significantly different (LSD,  $P > 0.05$ ).

<sup>a</sup>Mean per plant over four evaluations, 29 Oct, 5 Nov, 10 Nov and 19 Nov.

<sup>b</sup>Sum of small, medium, large and X-large fruit from 16 plants over two harvests.

<sup>c</sup>Culls due to insect damage.

<sup>d</sup>The initial application of PureSpray Green oil began 7 Sep at 0.5% v/v and the rate was increased 0.5% every two weeks until 2.0% was reached on 19 Oct, the rate used to finish the crop season.