

(E56)

PEPPER (JALAPEÑO): *Capsicum annuum* L., 'Milta'

CONTROL OF SILVERLEAF WHITEFLY IN PEPPER WITH HORTICULTURAL MINERAL OIL AND OTHER INSECTICIDES, 2004

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Silverleaf whitefly: *Bemisia argentifolii* Bellows & Perring

The whitefly *B. argentifolii* = *B. tabaci* biotype "B" has become an increasing problem on pepper in south Florida in recent years. The present trial tested the whitefly-suppressive activity of horticultural mineral oil (HMO) and various pesticide regimes directed primarily at pepper weevil. Greenhouse-raised pepper plants were transplanted on 31 Mar at 10-inch spacing in single rows on four sets of three beds 240 ft in length and covered with polyethylene film mulch. Water and fertilizer were provided through Netafim drip tape with 12-inch emitter spacing. The center bed in each set of three was left untreated to serve as the untreated check and a source of weevils. Each treated bed was divided into plots 30 ft long to which treatments were assigned in an RCB design with four replications. Eight weekly applications of the HMO, PureSpray Green Oil, were made starting 14 Apr using a high clearance sprayer operating at 200 psi. Spray was delivered through two vertical booms, each fitted with two ceramic yellow Albuz hollow cone nozzles for a total of 44 gpa until 25 May when one nozzle was added to each boom for an output of 66 gpa. Applications of Novaluron and Dimilin were made on 28 Apr, 12 and 25 May. Applications of TD-2472-01, and three different Assail treatments were made on 12 and 25 May. Seven weekly evaluations of whitefly adults were made beginning 19 Apr by beating one side of four plants at three 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. Immature stages were monitored 11 and 24 May, and 1 Jun using one mature leaf removed from eight centrally located plants in each plot. All whitefly stages were counted that appeared in a 2-cm² ring placed twice on each side of the midrib (total 4 cm²) from each leaf collected. All marketable fruit was harvested 8 Jun. Weight of marketable fruit was determined by dissecting a random sample of 50 harvested fruit per plot, (200 per treatment), to obtain a percentage infested with weevils and adjusting the total weight accordingly. Data were subjected to ANOVA and means were separated using LSD ($P \leq 0.05$).

Significantly fewer whitefly adults were seen 17 May on plants treated with 2% PureSpray Green Oil compared to the untreated check with the other oil treatments intermediate (Table 1). Only plants treated with Assail 70WP at 1.2 oz product/acre had fewer adults than the control on 24 May. However, on 1 Jun all treatments resulted in fewer adults than the control, with fewest seen on plants treated with 2% PureSpray Green Oil. Fewer large nymphs were seen on plants treated with all but the lowest rate of PureSpray Green Oil and with Novaluron on 11 May (Table 2). A similar pattern was seen with pupae. Fewer eggs were seen with all treatments compared to the control on 24 May except Sunspray Ultrafine and Assail, and all treatments exerted control over small nymphs. Fewest large nymphs were seen with 2% PureSpray Green Oil, although not less than the lower rates, Sunspray Ultrafine and Novaluron. A similar pattern was seen with pupae. Fewest eggs were seen 1 June on plants sprayed

with the mixture of Assail and 1% PureSpray Green Oil, although not significantly different from the other rates except the lowest (0.25%) or Sunspray. Fewest large nymphs and pupae were seen with the two highest rates of PureSpray Green Oil, and the Assail + 1% PureSpray Green Oil tank mix, although not significantly fewer than the lower rates, Sunspray or Novaluron. No phytotoxicity was observed with any treatment. Thus, the horticultural mineral oils added to each spray provided an extra measure of protection against silverleaf whitefly in pepper.

Table 1.

Treatment regime	Treatment/formulation	Rate amt product/acre	Application dates	Mean whitefly adults per beat sample ^a		
				17 May	24 May	1 Jun
1.	Untreated check	--	--	61.9 a	50.3 abc	316.3 a
2.	Novaluron 0.83EC	14 fl oz	28 Apr, 11, 25 May	--	--	--
	Vydate 2L	3 pt	4, 18 May, 1 Jun			
3.	Dimilin 25WP	6 oz	4, 18 May, 1 Jun	--	--	--
	Vydate 2L	3 pt	28 Apr, 11, 25 May			
4.	PureSpray Green Oil	0.25% v/v	14, 21, 28 Apr	28.3 ab	41.1 abcd	149.4 cd
	PureSpray Green Oil + Vydate 2L	0.25% v/v + 3 pt	4, 18 May			
	PureSpray Green Oil + Actara 25WG	0.25% v/v + 4 oz	11, 25 May, 1 Jun			
5.	PureSpray Green Oil	0.5% v/v	14, 21, 28 Apr	33.6 ab	54.3 ab	117.5 d
	PureSpray Green Oil + Vydate 2L	0.5% v/v + 3 pt	4, 18 May			
	PureSpray Green Oil + Actara 25WG	0.5% v/v + 4 oz	11, 25 May, 1 Jun			
6.	PureSpray Green Oil	1.0% v/v	14, 21, 28 Apr	26.2 ab	39.2 bcd	128.3 cd
	PureSpray Green Oil + Vydate 2L	1.0% v/v + 3 pt	4, 18 May			
	PureSpray Green Oil + Actara 25WG	1.0% v/v + 4 oz	11, 25 May, 1 Jun			
7.	PureSpray Green Oil	2.0% v/v	14, 21, 28 Apr	14.3 b	34.0 cd	53.4 e
	PureSpray Green Oil + Vydate 2L	2.0% v/v + 3 pt	4, 18 May			
	PureSpray Green Oil + Actara 25WG	2.0% v/v + 4 oz	11, 25 May, 1 Jun			
8.	SunSpray Ultrafine Oil	2.0% v/v	14, 21, 28 Apr	34.6 ab	53.1 abc	185.6 bc
	SunSpray Ultrafine Oil + Vydate 2L	2.0% v/v + 3 pt	4, 18 May			
	SunSpray Ultrafine Oil + Actara 25WG	2.0% v/v + 4 oz	11, 25 May, 1 Jun			
9.	TD-2472-01 30WDG	4.0 oz	28 Apr, 11, 25 May	--	60.0a	229.4 b
	Vydate 2L	3 pt	4, 18 May, 1 Jun			
10.	Assail 70WP	1.2 oz	28 Apr, 11, 25 May	--	24.3 d	145.6 cd
	Vydate 2L	3 pt	4, 18 May, 1 Jun			
11.	Assail 70WP	1.7 oz	28 Apr, 11, 25 May	--	49.6 abc	136.6 cd
	Vydate 2L	3 pt	4, 18 May, 1 Jun			
12.	Assail 70WP + PureSpray Green Oil	1.2 oz + 1.0 % v/v	28 Apr, 11, 25 May	--	37.6 bcd	184.3 bc
	Vydate 2L	3 pt	4, 18 May, 1 Jun			

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

^aTotal from beating one side of four plants at three 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.

Table 2.

		Mean number immature whiteflies in 4 cm ² per leaf											
Treatment regime	Treatment/formulation	Rate amt product/acre	Application dates	11 May		24 May				1 Jun			
				Large	Pupa	Egg	Small	Large	Pupa	Egg	Small	Large	Pupa
1.	Untreated check	--	--	1.5ab	1.0a	1.6a	5.3a	2.9a	4.9a	6.2ab	5.3abc	8.6a	4.4a
2.	Novaluron 0.83EC	14 fl oz	28 Apr, 11, 25 May	0.4c	0.2bcd	0.6b	2.9bc	0.7bcd	0.2e	3.3cde	8.0a	1.8cde	1.1cde
	Vydate 2L	3 pt	4, 18 May, 1 Jun										
3.	Dimilin 25WP	6 oz	4, 18 May, 1 Jun	0.7bc	0.7abc	0.4b	2.8bc	1.7abc	2.8bc	6.4a	4.9abc	5.0b	2.9b
	Vydate 2L	3 pt	28 Apr, 11, 25 May										
4.	PureSpray Green Oil	0.25% v/v	14, 21, 28 Apr	1.9a	0.8ab	0.3b	1.9bc	0.7bcd	0.9de	3.8bcd	6.8ab	2.0cde	1.4cde
	PureSpray Green Oil + Vydate 2L	0.25% v/v + 3 pt	4, 18 May										
	PureSpray Green Oil + Actara 25WG	0.25% v/v + 4 oz	11, 25 May, 1 Jun										
5.	PureSpray Green Oil	0.5% v/v	14, 21, 28 Apr	0.4c	0.2bcd	0.7b	1.9bc	0.5cd	1.1de	2.1cde	7.2ab	2.6cde	1.6bcde
	PureSpray Green Oil + Vydate 2L	0.5% v/v + 3 pt	4, 18 May										
	PureSpray Green Oil + Actara 25WG	0.5% v/v + 4 oz	11, 25 May, 1 Jun										
6.	PureSpray Green Oil	1.0% v/v	14, 21, 28 Apr	0.4c	0.1d	0.3b	1.8bc	0.4d	0.3e	1.6cde	5.1abc	1.2e	0.3e
	PureSpray Green Oil + Vydate 2L	1.0% v/v + 3 pt	4, 18 May										
	PureSpray Green Oil + Actara 25WG	1.0% v/v + 4 oz	11, 25 May, 1 Jun										
7.	PureSpray Green Oil	2.0% v/v	14, 21, 28 Apr	0.3c	0.2cd	0.5b	1.8bc	0.1d	0.1e	1.7cde	5.6ab	1.0e	0.3e
	PureSpray Green Oil + Vydate 2L	2.0% v/v + 3 pt	4, 18 May										
	PureSpray Green Oil + Actara 25WG	2.0% v/v + 4 oz	11, 25 May, 1 Jun										
8.	SunSpray Ultrafine Oil	2.0% v/v	14, 21, 28 Apr	1.4ab	1.2a	1.2ab	3.3bc	0.5cd	0.6de	1.2de	4.2abc	1.4de	0.8de
	SunSpray Ultrafine Oil + Vydate 2L	2.0% v/v + 3 pt	4, 18 May										
	SunSpray Ultrafine Oil + Actara 25WG	2.0% v/v + 4 oz	11, 25 May, 1 Jun										
9.	TD-2472-01 30WDG	4.0 oz	28 Apr, 11, 25 May	--	--	0.6b	2.3bc	1.9ab	2.0bcd	4.0abc	6.0ab	4.0bc	1.9cd
	Vydate 2L	3 pt	4, 18 May, 1 Jun										
10.	Assail 70WP	1.2 oz	28 Apr, 11, 25 May	--	--	1.1ab	1.6bc	1.7abc	3.3b	2.8cde	4.8abc	2.4cde	2.4bc
	Vydate 2L	3 pt	4, 18 May, 1 Jun										
11.	Assail 70WP	1.7 oz	28 Apr, 11, 25 May	--	--	0.7ab	3.4b	2.3a	2.1bcd	3.4cde	3.6bc	3.5bcd	1.7bcde
	Vydate 2L	3 pt	4, 18 May, 1 Jun										
12.	Assail 70WP + PureSpray Green Oil	1.2 oz + 1.0 % v/v	28 Apr, 11, 25 May	--	--	0.9ab	1.3c	0.5cd	1.7cde	0.7e	1.7c	1.2e	0.6de
	Vydate 2L	3 pt	4, 18 May, 1 Jun										

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