(E47)

PEPPER (BELL): *Capsicum annuum* (L.), 'X3R Lancelot'

MANAGEMENT OF PESTS OF BELL PEPPER WITH HORTICULTURAL MINERAL OIL, 2004

Philip A. Stansly
University of Florida/ IFAS
Southwest Florida Res. and Ed. Center
2686 State Road 29 North
Immokalee, FL 34142-9515
Phone: (239) 658-3427
Fax: (239) 658-3469
E-mail: pstansly@ufl.edu

James M. Conner

Beet armyworm: *Spodoptera exigua* (Hübner)
Broad mite: *Polyphagotarsonemus latus* (Banks)
Green peach aphid: *Myzus persicae* (Sulzer)
Silverleaf whitefly: *Bemisia argentifolii* (Bellows & Perring)
Southern armyworm: *Spodoptera eridania* (Cramer)
A ladybeetle *Cycloneda sanguinea* (L.)
Bacterial spot: *Xanthomonas campestris* pv. v*esicatoria* (ex Doidge)

Horticultural mineral oil is an inexpensive, environmentally safe pest management alternative, acceptable, in the case of the product tested here, for organic production. However, there is yet insufficient efficacy information for vegetables, including peppers in south Florida. Greenhouse-raised pepper plants were transplanted on 20 Sep at 10-inch spacing in single rows on two 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. Each bed was divided into 8 plots × 30 ft long making two replicates for a total of four replications. The treatments were assigned in an RCB design. Sixteen weekly applications of the HMO, PureSpray Green Oil tank mixed with Kocide 2000 at 2.25 lb/acre and Maneb at 1.75 qt/ acre, were made starting 21 Sep 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. Seven weekly evaluations of whitefly adults were made beginning 11 Oct by beating one side of six 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. Bacterial spot was rated weekly for seven wks on 25 plants from 4 Oct to 19 Nov. Ratings of 0-3 were assigned based on the following criteria per plant, 0 = no damage; 1 = 1-2 spots, light damage; 2 = 3-5 spots, moderate damage; 3 = > 5 spots, severe damage. Numbers of Southern and Beet armyworm larva were recorded on 25 plants in four weekly evaluations from 15 Oct to 4 Nov. Green peach aphids and broad mite infestations were evaluated in three weekly samplings from 28 Oct to 18 Nov on 25 plants per plot. The number of plants with a total of 10 or more aphids from three expanded leaves per plant was recorded. Broad mites were evaluated by recording the number of plants that were showing moderate or severe broad mite damage. On 18 Nov, a count from 25 plants per plot for ladybeetle adults and larvae was made. All fruit larger than 2 inches was harvested from 30 plants per plot on 3 Dec and again on 10 Jan 2005 from the same plants. Fruit was graded as marketable, unmarketable insect, unmarketable disease and unmarketable shape. Data were subjected to ANOVA and means were separated using LSD ($P = 0.05$).

Pressure from whiteflies and armyworms was light. No significant treatment effects were observed in numbers of adult whiteflies over all sample dates (Table 1). Most armyworms were observed on untreated plants, with none seen on plants receiving the highest (2%) rate of PureSpray Green Oil. However, about 10 times more untreated plants were seen with moderate to heavy broadmite damage than treated plants, with no significant differences between rates of oil. Fewest aphids were seen on plants treated with the 2% rate of oil, but there was no difference between the 1% rate and the untreated check. That may have been because the lack of treatment was compensated by a higher ladybeetle population on untreated plants compared to treated plants. Most bacterial spot was seen on plants treated with 2% oil, with no difference among the other rates or between them and the check. In terms of number, greatest

yield came from plants treated at the 2% rate, and fewest from plants treated at the 1% rate (Table 2). In terms of weight, plants treated at 0.5% produced most, but not different from other treatments except 1% oil. Culls considered unmarketable because of disease were least prevalent from plants treated with 2% oil.

Table 1.

		Mean no. insects over all dates						
Treatment/ formulation	Rate % v/v[a]	Whitefly adults[b]	Armyworms[c]	Broad mites[d]	Aphids[e]	Ladybeetle larvae[f]	Ladybeetle adults[g]	Bacterial spot
Untreated check	--	1.2a	1.7a	35a	66a	0.35a	0.38a	0.27b
PureSpray Green Oil	0.5	1.7a	0.7b	3b	33b	0.02b	0.02b	0.26b
PureSpray Green Oil	1.0	1.7a	0.2b	7b	60ab	0.05b	0.02b	0.31b
PureSpray Green Oil	2.0	1.8a	0.0b	3b	18c	0.00b	0.02b	0.56a

Means in columns followed by the same letter are not significantly different (LSD, $P > 0.05$).
[a]Applied in 44 gpa spray volume.
[b]Total from beating 1 side of 6 plants.
[c]Total per plant, total over 4 dates.
[d]Percentage of plants with moderate or more damage, mean over 3 dates.
[e]Percentage of plants with 10 or more aphids, mean over 3 dates.
[f]Number of larva observed from 3 leaves per plant, 18 Nov.
[g]Number of adults observed from 3 leaves per plant, 18 Nov.

Table 2.

		Harvest[a]				
		Marketable		Number		
Treatment/ formulation	Rate % v/v[b]	Number	Weight (lbs)	Insect	Disease	Shape
Untreated Check	--	98.3 bc	36.0 ab	0.0 b	5.8 ab	14.3 ab
PureSpray Green Oil	0.5	129.8 ab	48.7 a	0.8 ab	4.0 bc	11.5 ab
PureSpray Green Oil	1.0	93.3 c	29.3 b	1.5 a	7.5 a	9.8 b
PureSpray Green Oil	2.0	132.5 a	41.3 ab	0.8 ab	3.5 c	22.0 a

Means in columns followed by the same letter are not significantly different (LSD, $P > 0.05$)
[a]Combined totals from two harvests.
[b]Applied in 44 gpa spray volume.