

Evaluation of products for the control of bacterial leaf spot of bell peppers, 2006.

The experiment was conducted at the Ohio Agricultural Research and Development Center, Snyder Farm in Wooster, OH on Wooster silt loam. Prior to planting, 400 lb/A 19-19-19 (N-P-K) was broadcast, top dressed and incorporated into the test field on 23 May. 'Paladin' pepper seeds were treated by agitating them in a 20 % Clorox (sodium hypochlorite) solution for 1 min, followed by a 5 min rinse in running tap water and air-drying, and sown on 10 Apr into 200-cell plug trays containing Fafard seedling mix. The herbicide Treflan EC (2 pt/A) was applied on 30 May. Pepper seedlings were transplanted on 30 May; starter fertilizer (N-P-K 9-45-15; 1.65 lb/55 gal water) was applied to the transplants. Plots were arranged in randomized complete block design with four replications. Each plot consisted of 20 plants spaced 1 ft apart with 5 ft between rows. Treated rows were alternated with untreated border rows. Provado 1.6 F (3.5 fl oz/A), Asana XL (6 fl oz/A), and Sevin 75DF (0.5 lb/A) were applied on 16 and 26 Jun, 7 Jul, and 7 Sep, respectively for insect pests control. Treatments were applied using a tractor-mounted CO₂-pressurized sprayer (40 psi, 41.2 gal/A, 3 mph) on a 7-10 day schedule beginning 28 Jun and ending 6 Sep for a total of ten applications. Plants were inoculated with approximately 10⁹ CFU/fl oz (3x10⁸ CFU/ml) *Xanthomonas euvesicatoria* strain 110C (race T1P8, copper sensitive), in the evening of 30 Jun using a CO₂-pressurized backpack sprayer (40 psi, 78.9 gal/A). Plants were misted with water using a tractor-mounted CO₂-pressurized sprayer (40 psi, 41.2 gal/A, 3 mph) prior to inoculation. Plants were overhead irrigated on 12 and 16 Jun and 21 Aug with 0.5 in. water. The field was cultivated on 18 Jul and 2 and 14 Aug. Severity of bacterial leaf spot on foliage was evaluated on 17 and 25 Jul and 4, 11, 16, and 28 Aug using a modified Horsfall-Barratt rating scale. Fruits were harvested from the entire treatment row on 25 Sep and weights and numbers of marketable fruit, healthy cull fruit, fruit with bacterial leaf spot symptoms, fruit with other diseases (soft rot, white mold, etc.), and fruit with physiological (sunscald, blossom end rot) or insect damage were recorded. Average maximum temperatures for 30-31 May, Jun, Jul, Aug, and 1-25 Sep were 90.7, 78.2, 84.5, 83.4, and 72.6°F; average minimum temperatures were 62.4, 54.1, 63.3, 61.2, and 53.2°F; and rainfall amounts were 0.52, 4.08, 6.48, 1.26, and 1.58 in., respectively. Data were analyzed by ANOVA using SAS statistical software. Means were separated using Fisher's protected least significant difference test.

Bacterial leaf spot developed aggressively in this trial and plants remained small throughout the season. There were no significant differences between treatments and the untreated control in disease severity at the end of the trial, AUDPC, total or marketable yield or percentage of symptomatic fruit. Yields of fruit with other diseases or physiological or insect damage were low and there were no differences among treated plots and the untreated control (data not shown). Plants treated with Tanos 50DF plus Manex plus DPX-GFJ52 WG alternated with Manex plus DPX-GFJ52 WG produced significantly fewer healthy culls (small fruit) than the untreated control.

Treatment and rate/A (application time ^z)	Bacterial leaf spot ^y		Total yield (ton/A)	Marketable yield (ton/A)	% bacterial leaf spot-diseased fruit	% healthy culls
	Severity (%)	AUDPC				
Tanos 50DF 10 oz + Manex 37F 1.6 qt + Kocide 2000 DF 2 lb (1,3,5,7,9)						
alt Manex 37F 1.6 qt + Kocide 2000 DF 2 lb (2,4,6,10).....	22.6 a ^x	1064.1 a	2.9 a	1.0 a	23.0 a	36.5 a
Tanos 50DF 10 oz + Manex 1.6 qt + DPX-GFJ52 WG 1.17 lb (1,3,5,7,9)						
alt Manex 37F 1.6 qt + DPX-GFJ52 WG 1.17 lb (2,4,6,10).....	28.9 a	945.4 a	2.5 a	0.5 a	31.2 a	27.4 b
Manex 37F 1.6 qt + Kocide 2000 DF 2 lb (1-10).....	17.8 a	1002.8 a	2.6 a	0.7 a	28.5 a	35.6 a
Kasumin 2L 54 fl oz/100 gal (1-10).....	31.6 a	1139.5 a	3.0 a	0.7 a	22.5 a	35.7 a
Kasumin 2L 54 fl oz/100 gal (1,3,5,7,9)						
alt Kocide 2000 DF 1.5 lb (2,4,6,8,10).....	23.8 a	978.5 a	3.0 a	0.8 a	24.2 a	32.9 ab
Untreated control.....	26.1 a	992.2 a	3.0 a	0.8 a	27.7 a	35.6 a
<i>P</i> value	0.6797	0.9343	0.5289	0.2220	0.5912	0.0093

^zApplication timings were: 1= 28 Jun; 2= 6 Jul; 3= 14 Jul; 4= 21 Jul; 5= 31 Aug; 6= 8 Aug; 7= 15 Aug; 8= 22 Aug; 9= 30 Aug; 10= 6 Sep.

^yDisease ratings and area under the disease progress curves (AUDPC) were based on the midpoint values of a modified Horsfall-Barratt rating scale where 1=0%, 2= 1-3%, 3= 4-6%, 4=7-12%, 5= 13-25%, 6=26-50%, 7=51-75%, 8= 76-87%, 9=88-94%, 10= 95-97%, 11=98-99% and 12= 100% bacterial leaf spot. AUDPC was calculated according to the formula: $\sum[(x_i+x_{i-1})/2](t_i-t_{i-1})$ where x_i is the rating at each evaluation time and (t_i-t_{i-1}) is the time between evaluations.

^xValues are the means of four replicate plots; treatments followed by the same letter within a column are not significantly different at $P \leq 0.05$. Means were separated using Fisher's protected least significant difference test.