

Evaluation of fungicides for the control of bacterial leaf spot of bell peppers, 2004.

The experiment was conducted at the North Central Agricultural Research Station in Fremont, OH on Colwood fine sandy loam. Corn stalks planted in 03 were mowed off on 9 Apr and residue was disked and plowed under on 12 Apr. Potassium (210 lb/A K₂O), phosphorous (69 lb/A P₂O₅), nitrogen (96 lb urea/A) and granular boron (7 lb/A) were incorporated into the test field on 22 Apr. The test field was disked and beds were prepared on 5 ft centers on 6 May. The herbicides Dual II Magnum (1 pt/A) and Command ME (1.5 pt/A) were applied on 5 Jun. Ridomil Gold EC (1 pt/A) was applied and incorporated into the top 2 in. of the soil using a 5 ft Rotovator on 5 Jun. 'Paladin' pepper seeds were sown on 16 Apr into 200-cell plug trays containing Metromix 360 seedling mix. Pepper seedlings were transplanted on 5 Jun; transplant water contained starter fertilizer (N-P-K 10-34-0) at 0.7 qt/50 gal water. Treatments were arranged in a randomized complete block design with four replications. Each plot was a row of 25 plants spaced 1 ft apart. Treatment rows were alternated with untreated border rows. The insecticide Asana XL (7 fl oz/A) tank mixed with Manex 37F (2 qt/A), and alone was applied by aircraft on 18 Jun and 25 Jun respectively. The insecticide Mustang Max (4 fl oz/A) was applied on 30 Jul. For weed control the field was cultivated on 21 and 30 Jun, 8 and 13 Jul and hand weeded on 30 Jun and 8, 13, and 29 Jul. Plants were inoculated with approximately 10⁶ CFU/ml *Xanthomonas campestris* pv. *vesicatoria* strain 110C (race TIP8, copper sensitive), in the evening of 1 Jul using a tractor mounted CO₂-pressurized sprayer (55 psi, 39.3 gal/A). Plants were misted with water using an FMC sprayer with a PTO-driven pump (200 psi, 32.6 gal/A) prior to inoculation. Plants were overhead irrigated with 1.0 in. of water on 23 Jul. Treatments were applied (55 psi, 42.9 gal/A) on a 5-10 day schedule beginning 27 Jun and ending 23 Aug using a tractor mounted CO₂-pressurized sprayer for a total of 10 applications. The surfactant Biotune (QRD602, 0.125%) was added to Serenade Max treatments. Severity of bacterial leaf spot on foliage was evaluated on 29 Jul, 8 and 25 Aug and 2 Sep using a modified Horsfall-Barratt rating scale. Disease ratings were converted to midpoints (% disease) prior to statistical analysis. Fruit were harvested from the center 10 plants of each treatment row on 16 Aug and 7 Sep, and mean disease incidence (# diseased fruit/total) and marketable yield were determined for each treatment. Means were separated using Fisher's protected least significant difference test. Average maximum temperatures for 5-30 Jun, Jul, Aug and 1-7 Sep were 78.2, 81.1, 78.5, and 82.7 °F; minimum averages were 55.1, 58.7, 54.0, and 56.4 °F; and rainfall was 5.0, 2.7, 4.0 and 0.0 in., respectively.

Disease pressure was moderate, and bacterial leaf spot developed relatively slowly throughout the season in the untreated control. All of the treatments significantly reduced bacterial leaf spot symptoms compared to the untreated control. The treatments most effective in reducing bacterial spot severity on foliage were Manex 37F + Kocide 2000 and all three rates of Tanos 50DF + Manex 37F alternated with Manex 37F + Kocide 2000. The proportion (incidence) and yield of fruit with bacterial spot were reduced significantly by all treatments except Serenade Max + Kocide 2000 alternated with Kocide 2000 + Manzate 75DF. However, none of the treatments significantly affected marketable yield.

Treatment and rate/A (application time ^z)	Bacterial leaf spot ^y		Marketable yield (ton/A)	Bacterial spot	
	% disease 2 Sep	AUDPC		Fruit disease incidence (%)	Diseased fruit yield (ton/A)
Control	79.3 a ^x	1182.6 a	8.8 a	18.6 a	2.6 a
Kocide 2000 2 lb + ^w Manzate 75DF 2 lb (1-10).....	13.1 bc	139.0 bc	8.5 a	9.8 bc	1.3 bc
Tanos 50DF 8 oz + Manex 37F 1.6 qt + Kocide 2000 2 lb (1,3,5,7,9) alt. ^v Manex 37F 1.6 qt + Kocide 2000 2 lb (2,4,6,8,10).....	7.3 cd	114.3 c	8.1 a	11.8 abc	1.4 bc
Tanos 50DF 10 oz + Manex 37F 1.6 qt + Kocide 2000 2 lb (1,3,5,7,9) alt. Manex 37F 1.6 qt + Kocide 2000 2 lb (2,4,6,8,10).....	4.3 d	128.1 bc	10.1 a	10.4 bc	1.5 bc
Tanos 50DF 12 oz + Manex 37F 1.6 qt + Kocide 2000 2 lb (1,3,5,7,9) alt. Manex 37F 1.6 qt + Kocide 2000 2 lb (2,4,6,8,10).....	8.4 cd	144.6 bc	9.3 a	6.6 bc	1.0 c
Manex 37F 1.6 qt + Kocide 2000 2 lb (1-10).....	5.4 d	120.6 bc	9.1 a	6.7 bc	1.0 c
Serenade Max 1 lb + Kocide 2000 2 lb (1-8).....	21.4 b	219.3 bc	7.0 a	5.1 c	0.7 c
Serenade Max 1 lb + Kocide 2000 2 lb (1,3,5,7) alt. Kocide 2000 2 lb + Manzate 75DF 2 lb (2,4,6,8).....	21.4 b	217.9 b	10.2 a	13.9 ab	2.0 ab

^zApplication times were: 1= 6 Jun-1 Jul; 2= 2-8 Jul; 3= 9-15 Jul; 4= 16-22 Jul; 5= 23-29 Jul; 6= 30 Jul-8 Aug; 7= 9-12 Aug; 8= 13-17 Aug; 9= 18-22 Aug; 10= 23-30 Aug.

^yDisease rating and area under the disease progress curve (AUDPC) 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.

^xValues are the means of four replicate plots; treatments followed by the same letter within a column are not significantly different at p<0.05.

^wTreatments tank mixed together.

^vTreatment alternated with each other.