

Evaluation of Byotrol for control of bacterial leaf spot caused by *Xanthomonas campestris* pv. *vesicatoria* on Tomato.

C.R. Semer IV and R.J. McGovern, Plant Pathology Department, Plant Medicine Program, IFAS, University of Florida

A field (Kendrick Loamy sand) at the University of Florida- IFAS Plant Science Research and Education Unit (PSEU) in Citra, Florida was used for experimentation. Tomato transplants (Florida 47) were received and transplanted into prepared field plots on May 17, 2007. The first pesticide application was made on June 5, 2007. Additional pesticide applications were made on June 20, 2006; July 5, 2007; July 17, 2007; August 2, 2007; August 16, 2007. A suspension of bacterial cells of *Xanthomonas campestris* pv. *vesicatoria* was prepared in the laboratory, adjusted to a final concentration of 5.25×10^6 cells per ml on July 7, 2007. The plots were irrigated using Rain Bird overhead sprinklers for 30 minutes before 300 milliliters of bacterial suspension were applied to each plot using a Premier series model 2122 sprayer. The plots were examined for leaf infection on July 19, 2006. Twenty leaves were randomly collected from each plot and evaluated for incidence of infection and severity of infection on July 19, 2007; August 1, 2007 and again on August 15, 2007. Due to low rainfall levels (Table 2) throughout the duration of the plot overhead irrigation was applied weekly for 60 to 90 minutes weekly after the inoculation of the plot. A single fruit harvest was made on August 29, 2007. Disease incidence was determined as the number of leaves with lesions out of the twenty leaves sampled. Disease severity was rated using the Barratt-Horsfall rating scheme (0=0 and 11=100). Data were analyzed using SAS 9.1. Percent data was arcsine transformed prior to analysis and means separation for transformed data was conducted using Fisher's lsd ($P > 0.05$) and AUDPC data and yield data means separation was conducted using Duncan's multiple range test.

Figure 1. Bacterial leaf spot on tomato



Figure 2. Overhead watering of tomatoes.



Conclusions: The inoculum produced up to 92 percent incidence of infection within two weeks of application. The severity of disease was initially low and increased on the second and third sampling date. On the last sampling date Kocide had significantly lower disease incidence compared to the remaining treatments and Byotrol and Byotrol alternated with Kocide had significantly lower disease incidence than the untreated check and Byotrol alternated with Actigard, however they were not significantly different from Actigard by itself and Byotrol alternated with Kocide and Actigard. All treatments were statistically different from the untreated check but not from each other when examining the severity of disease present. Similar responses can be seen when the Area Under the Disease Progress Curve (AUDPC) values are examined. The yield was not significantly different for any treatment.

In summary Kocide 3000 consistently shows the lowest disease incidence and severity but often Byotrol or Byotrol alternated with Kocide provide the same level of control. The use of Byotrol as an alternation compound will reduce the possibility of the pathogen becoming resistant to the control products and reduce possible copper toxicity in the tomato crop.

Table 1. Bacterial Leaf spot incidence, severity, AUDPC and yield of tomatoes

Treatment/ Sampling	Application schedule	07/19/2007		08/01/2007		08/15/2007		AUDPC		Yield (Lbs)
		% inc	% sev	% inc	% sev	% inc	% sev	inc	sev	
T1- Check		92A**	3.66A	91A	7.69A	93A	7.7A	2477.5A	181.5A	11.99A
T2- Byotrol (175 ppm)	abcdef*	80AB	2.3B	80BC	4.05B	81B	4.12B	2167C	98.46BC	10.72A
T3- Kocide 3000 9lb/A	abcdef	74B	2.35AB	70C	3.86B	72C	3.92B	1930D	94.83C	8.33A
T4- Actigard 0.75oz/A	abcdef	81AB	3.3AB	83AB	4.9B	86AB	4.93B	2249C	122.1B	14.39A
T5-Byotrol / Kocide	ace/bdf	81AB	2.11B	83AB	4.12B	84B	4.15B	2235C	98.38BC	10.81A
T6- Byotrol/ Actigard	ace/bdf	84AB	2.54AB	92A	4.13B	93A	4.15B	2439AB	101.3BC	9.3A
T7- Byotrol/Kocid/Actigard	ad/be/cf	887AB	2.9AB	87AB	4.77B	88AB	4.64B	2356B	115.7BC	8.2A

* Pesticide application dates a=June 5, 2007; b=June 20, 2007; c=July 5, 2007; d=July 17, 2007; e=August 2, 2007 and f=August 16, 2007

** Values followed by the same letter are not statistically significantly different $P>0.05$. Incidence and severity data was arcsine transformed prior to analysis and means separation was conducted using Fisher's LSD. AUDPC and Yield data means separation were conducted using Duncan's multiple range test. All data analysis was carried out using SAS 9.1 Values presented for Incidence and severity readings are the percent values recorded at the sampling time.

Table 2. Rainfall (in inches) and Relative humidity at PSEU Citra Florida

Month	Rainfall		Relative Humidity	
	5 Year Average at Citra	2007 actual	5 Year Average at Citra	2007 actual
May	1.15	0.16	70.4	68
June	6.44	4.36	79.2	78
July	7.09	6.49	80.6	80
August	5.42	2.94	81.8	79
September	6.78	5.69	81	83