On-Farm Evaluation of Tomato Cultivars for Disease Resistance, 2007

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Introduction

Bacterial spot of tomatoes (*Xanthomonas campestris* pv. *vesicatoria)* causes lesions on leaves, stems, and fruit. Under hot, humid, rainy conditions, defoliation can result in a loss of yield. In addition, lesions on fruit result in a direct loss of marketability. This disease is managed primarily with applications of fixed copper bactericides, crop rotations, greenhouse sanitation, and healthy seed/transplants. Even in properly managed commercial fields, however, bacterial spot can cause yield losses.

Although there are no varieties with complete resistance to bacterial spot, we report here the results of an on-farm trial that indicate some varieties may have partial resistance.

Methods

Seeds of 20 varieties were planted in the greenhouse facilities of Butch Zandstra in Lake County, Indiana. Transplants were planted in the field on June 7, 2007 in a completely randomized block design with three replications. Each replication consisted of 50 plants. The plants were placed on 4-foot-wide black plastic and were staked and weaved. A contact fungicide and fixed copper bactericide were applied approximately weekly from early July through mid-September.

On August 29 and September 24, each plot was rated for bacterial spot using the Horsfall-Barratt scale (J.G. Horsfall and R.W. Barratt, Phytopathology 35:655). Vigor of the plants in each plot was rated on August 29. The Horsfall-Barratt scale is used to assign percent foliage affected into one of 11 severity classes. Because the scale is based on human ability to detect the percent of leaf area affected by a disease, disease severity ratings representing low and high severities correspond to relatively narrower percentage ranges than ratings representing moderate disease severity. The ratings were analyzed by ANOVA and means were separated using Fisher's protected least significant difference at P=0.05. The Horsfall-Barratt ratings were converted back into percentages for presentation using the Elanco Conversion Tables (Eli Lilly Company, Indianapolis, Indiana).

Results and Discussion

There were significant differences in the amount of disease present on the varieties on September 24. The percent of disease ranged from a mean of 15 percent for 'RFT 6153' to 70 percent for 'Applause.' Since disease ratings were performed relatively late in the season, the percentages shown below are a snapshot of the amount of disease present and do not reflect the amount of disease that occurred over the entire season. However, the size of the differences shown here suggests that partial resistance to bacterial spot could play a part in the management of this disease. It is interesting to note that the lowest vigor rating ('Sunshine' 2.3) and the highest vigor rating ('Mountain Fresh Plus' 8.3) are associated with high and low amounts (respectively) of

bacterial spot on September 24. In a similar trial published in this bulletin last year, 'Applause' and 'Mountain Fresh' held similar ranking as to the amount of bacterial spot present.

Table 1. *Plant vigor and disease ratings for fresh market tomato varieties grown in Lake County, Indiana, 2007.*

Variety	Seed Source	Plant Vigor[y]	HB Rating[z]	
			Aug. 29	Sept. 24
Applause	Seminis	4.3 def[x]	19	70 a
Sunshine	Seminis	2.3 g	15	70 a
Red Defender	Harris Moran	5.3 cdef	19	70 a
Bella Rosa	Sakata	4.0 efg	9	63 ab
SVR 0170 1236	Seminis	3.7 fg	15	55 abc
RFT 4974	Syngenta	6.7 bc	12	45 abcd
Crista F1	Harris Moran	7.0 bc	19	45 abcd
STM 6701	Sakata	9 a	9	38 abcde
Linda	Sakata	5.7 cde	7	38 abcde
Redline	Syngenta	6.0 cd	7	38 abcde
Talladega	Syngenta	7.0 bc	7	38 abcde
BHN 589	Seedway	7.0 bc	6	30 bcde
Reba	Sakata	6.0 cd	7	30 bcde
Biltmore	Rispens	9 a	12	30 bcde
Scarlet Red	Harris Moran	5.7 cde	13	30 bcde
Florida 91	Rispens	8 ab	9	24 cde
Red Pride	Sakata	6.0 cd	5	24 cde
Phoenix	Rispens	ND	ND	24 cde
Mountain Fresh Plus	Rispens	8.3 ab	5	19 de
RFT 6153	Seedway	8.0 ab	6	15 e
P-value		0.0001	0.1491	0.0359

[z]Plots were rated for severity of bacterial spot using the Horsfall-Barratt scale. Ratings converted to percent foliage affected.
[y]Plant vigor was rated August 29 on a 1 to 9 scale, with 1 the least vigorous and 9 the most vigorous.
[x]Means within each column with a letter in common are not significantly different (P=0.05, LSD).