

Evaluation of Bell Peppers for Resistance to Phytophthora Blight (*Phytophthora capsici*)

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Pepper is an important vegetable grown throughout Illinois. Phytophthora blight, caused by *Phytophthora capsici*, is one of the important diseases of peppers, particularly bell pepper cultivars. Yield losses up to 100% occur in commercial pepper fields. The objective of this study was to evaluate reaction of selected bell pepper cultivars to *P. capsici* in the field.

Materials and Methods

Ten bell pepper cultivars, Alliance, Aristotle XR3, California Wonder, Declaration, King Arthur, Paladin, Polaris, Revolution, Snapper F1, and 9941819 SVR (Table 1) were tested for resistance to Phytophthora blight. Seedlings were grown in a greenhouse. Six-week old seedlings were kept outside the greenhouse for six days, and then transplanted in a commercial field near Bradley (Kankakee county), Illinois, on 10 May. The field was naturally infested with *P. capsici*. The soil was a silt clay loam with pH 6.5. Soil was deep-tilled in October 2007 after tomato crop was harvested and was disked on 8 May, 2008. Raised beds with drip irrigation and black plastic mulch were prepared on 9 May, 2008. The experiment was performed in a completely randomized block design with four replications. Seedlings (10/plot) were planted in one straight row with plants spaced 18 inches apart within rows centered 6 feet apart. Weeds were controlled by hand weeding. Plants received 0.3 inch of water every week or as needed through the drip. Recorded precipitation in the area was 12 days (2.60 inches) during 10-31 May, 12 days (1.86 inches) in June, 12 days (2.84 inches) in July, 7 days (1.81 inches) in August, and 5 days (3.41 inches) during 1-8 September. Average monthly high and low temperatures (°F) were 66/44, 81/59, 81/59, 79/56, and 74/55, during 10-31 May, June, July, August, and 1-14 September, respectively. The percent plants wilted or dead was determined on 19 and 26 May; 2, 9, 16, 23, and 30 June; 7, 14, 21, and 28 July; 4, 11, 18, and 25 August; and 1 and 8 September. Data were analyzed using the LSD test.

Results and Discussion

Phytophthora lesions were observed on the crowns and at the bases of stems beginning seven days after transplanting the seedlings. Symptomatic plants gradually wilted and died. A significantly higher percentage of plants of cultivar California Wonder, a susceptible pepper to *P. capsici*, were lost during the season (Table 1). In cultivars Aristotle XR3, Declaration, Paladin, Revolution, and Snapper F1, 90% or more of the plants were asymptomatic at the end of the season. The percentage of asymptomatic plants of cultivars Declaration (97.50%) was the highest at the end of the season.

Average weight of marketable fruit ranged from 11.46 pounds (California Wonder) to 27.90 pounds (Aristotle XR3) per plot (Table 1). Marketable fruit weight of cultivars Aristotle XR3, Paladin, Polaris, and Snapper F1 were more than 26 pounds per plot. Total yield and marketable yield of cultivar California Wonder was significantly lower than those of other cultivars, except cultivar 9941819 SVR.

Table 1. Reaction of bell pepper cultivars to *Phytophthora capsici* in field in Illinois in 2008.

Cultivar	Seed Source ^z	Plant Stand (%) ^y							Fruit Yield/Plot			
		10 May	9 June	30 June	21 July	11 August	8 September	Total		Marketable		
								Number	Weight (lb)	Number	Weight (lb)	
Alliance	HM	100	100 a ^x	100 a	97.50 ab	95.00 a	85.00 abc	79.00 a	28.17 a	68.75 a	25.26 a	
Aristotle XR3	SM	100	100 a	100 a	100 a	97.50 a	95.00 ab	75.25 a	29.91 a	67.00 a	27.90 a	
California Wonder	ST	100	97.50 ab	92.50 b	85.00 c	72.50 b	60.00 c	43.75 c	12.60 b	38.25 c	11.46 c	
Declaration	HM	100	100 a	100 a	100 a	97.50 a	97.50 a	77.75 a	27.46 a	68.00 a	24.96 a	
King Arthur	SM	100	100 a	97.50 ab	87.50 bc	82.50 ab	70.00 abc	62.50 abc	21.22 ab	58.75 ab	20.19 ab	
Paladin	SY/RG	100	97.50 ab	97.50 ab	95.00 abc	95.00 a	90.00 ab	82.00 a	29.31 a	70.75 a	26.35 a	
Polaris	WN	100	97.50 ab	97.50 ab	97.50 ab	90.00 ab	82.50 abc	75.00ab	29.59 a	66.00 a	27.18 a	
Revolution	HM	100	95.00 b	95.00 ab	95.00 abc	95.00 a	95.00 ab	80.00 a	29.78 a	68.50 a	25.57 a	
Snapper F1	EZ	100	100 a	97.50 ab	97.50 ab	97.50 a	92.50 ab	78.00 a	27.72 a	74.25 a	26.61 a	
9941819 SVR	SM	100	100 a	100 a	92.50 abc	72.50 b	67.50 bc	52.75 bc	17.82 b	43.50 bc	15.12 bc	
LSD (P=0.05)		<i>NS</i>	4.75	6.85	10.79	17.79	28.40	22.28	9.30	20.16	8.47	

^z HM = Harris Moran; SM = Seminis; ST = Stokes; SY/RG = Syngenta, Rogers Brands; EZ = Enza Zaden; WN = Western.

^y Symptomless plants.

^x Values within each column followed with the same letter are not significantly different ($P=0.05$) from each other according to Fisher's protected LSD test.