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

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Introduction

Phytophthora blight, caused by *Phytophthora capsici* Leonian, is a serious disease of peppers in Illinois and worldwide. The objective of this study was to evaluate resistance in some bell pepper cultivars to Phytophthora blight in Illinois.

Materials and Methods

A trial was conducted in an irrigated field near Shawneetown, IL, to evaluate Phytophthora blight disease development in bell pepper cultivars. The field was naturally infested with *P. capsici*. Five cultivars with some resistance (Alliance, Aristotle, Enza 9006, Paladin, Revolution) with some resistance and two susceptible cultivars (California Wonder, King Arthur) were included in this trial (Table 1).

Soil was plowed in the fall of 2004 and 25 lb of 18-46-0 fertilizers were incorporated. Planting beds were made 3-ft apart and covered with black plastic mulch in the fall. Seedlings of the above-mentioned cultivars were grown in a greenhouse. Eight-week-old seedlings were kept outside the greenhouse for 7 days, and then transplanted in the field on 12 May. The experiment was performed in a complete randomized block design with four replications, each with 10 plants. The seedlings in each plot were planted in two staggered rows with plants spaced 12 inches apart within rows. The plots were spaced 36 inches apart. Weeds were controlled by hand weeding. The liquid nitrogen fertilizer UAN-28 was injected at 9 lb/A into the irrigation system once a week. Plants received 0.3 in. water once a week or as frequently needed through the drip. Average monthly high and low temperatures (°F) were 78/54, 88/64, and 88/69, in May, June, and 1-7 July, respectively. Recorded precipitation in the field was 2 days (2.35 in.) in May, 3 days (3.7 in.) in June, and 1 day (0.5 in.) in 1-7 July. Disease incidence was determined as percent wilted or dead plants on 19 May, 26 May, 2 June, 9 June, 16 June, 23 June, 30 June, and 7 July.

Results and Discussion

Phytophthora lesions were observed at the base of stems of the plants one week after transplanting. Defoliation, wilting, and death of the plants followed lesion development in the lower section of stems. Percent asymptomatic plants in susceptible cultivar California Wonder was significantly lower than those of resistant cultivars Alliance, Aristotle, Enza 9006, Paladin, and Revolution throughout the season. The final stand of asymptomatic plants in the field ranged from 7% for susceptible cultivar (California Wonder) to 70% to the most resistant cultivar Paladin (Table 1).

Table1. Incidence of Phytophthora blight (*Phytophthora capsici*) in bell pepper cultivars in Illinois in 2005.

Cultivar	Seed source[w]	Plant stand[x] (%)								
		12 May	19 May	26 May	2 June	9 June	16 June	23 June	30 June	7 July
Alliance	HM	100	100 a[y]	97 a	83 a	73 a	43 bc	37 bc	23 bc	23 b
Aristotle	SE	100	100 a	93 ab	83 a	67 a	57 ab	50 ab	40 a-c	40 ab
California Wonder	RU	100	77 b	73 b	50 b	27 b	10 c	10 c	7 c	7 b
Enza 9006	EZ	100	100 a	100 a	97 a	90 a	63 ab	60 ab	43 a-c	43 ab
King Arthur	PS	100	100 a	100 a	80 ab	60 ab	47 a-c	23 bc	17 bc	17 b
Paladin	RG	100	97 a	97 a	97 a	93 a	83 a	77 a	70 a	70 a
Revolution	HM	100	100 a	97 a	97 a	77 a	83 ab	50 ab	47 ab	43 ab
LSD (*P*=0.05)		***NS***[z]	***17.9***	***21.6***	***32.2***	***33.5***	***39.7***	***39.2***	***39.0***	***38.4***

[w] EZ = Enza Zaden; HM = Harris Moran; PS = Petoseed Co.; RG = Rogers Seed Co.; RU = Rupp Seeds Inc.; SE = Seminis Inc.

[x] Asymptomatic plants.

[y] Values within each column with a letter in common are not significantly different (*P*=0.05) from each other according to Fisher's protected LSD test.

[z] Not significant.