PEPPER, BELL (*Capsicum annuum*)
Phytophthora blight; *Phytophthora capsici*

M. T. McGrath[1], S. R. Menasha[2] and K. A. LaMarsh [1]
Dept of Plant Pathology & Plant-Microbe Biology, Cornell Univ[1], and Cornell Coop Ext[2], LIHREC, 3059 Sound Avenue, Riverhead, NY 11901

Evaluation of Phytophthora-resistant bell pepper cultivars with and without a fungicide program, 2012.

Two adjacent field experiments were conducted in a field where Phytophthora blight has been observed since 1991 at the Long Island Horticultural Research and Extension Center. Soil type is Haven loam. Phytophthora blight was severe and occurred throughout the field in 2011 when conditions were very favorable for the pathogen. Pepper seeds were sown on 11 May in the greenhouse. A few days before transplanting, herbicide Prowl H2O at 2 pt/A was applied to the entire experiment area. Controlled release fertilizer (N-P-K, 19-9-12 with 60% ESN slow release nitrogen) at 675 lb/A was spread over the rows to be planted. Herbicide and fertilizer were incorporated by cultivation. Seedlings were left outside in a protected area to harden for several days, then transplanted on 2 Jul by hand into holes opened in the bare-ground by a Waterwheel transplanter that also placed in the holes a starter fertilizer, 20-20-20 Nutri-Leaf. Plants were irrigated using drip tape laid on the soil surface running down the length of the row next to the plant main stem. During the season, weeds in the plots were controlled by hand weeding while weeds between rows were mowed. A completely randomized block design with four replications was used. Plots consisted of 15 plants in two adjacent rows with 15-in. plant spacing and 34-in. row spacing. There was 60-in. spacing between plots in a row and 68-in. spacing between adjacent plots. Host resistance is only to the crown rot phase in the pepper cultivars evaluated. Therefore, all plots in one experiment were treated approximately weekly with fungicides to improve control especially of the aerial phase of Phytophthora blight while the adjacent experiment was not treated. The foliar fungicide applications were made using a tractor-mounted boom sprayer equipped with D5-25 hollow cone nozzles spaced 17 in. apart that delivered 96 gal/A at 100 psi. Plants and their fruit were examined routinely for disease symptoms. Fruit were harvested on 30 Aug, 4 Oct, and 18 Oct. Average monthly high and low temperatures (°F) in Jun, 85/68 in Jul, 83/67 in Aug, 75/60 in Sep, and 66/52 in Oct. Rainfall (inches) was 4.35, 3.24, 3.75, and 2.17 for these months, respectively.

Phytophthora blight developed slowly in both pepper experiments for this study. Symptoms were not seen in this experiment until 23 Aug whereas blight was observed on 30 Jul in pumpkin in another research field at this facility. Symptom development was delayed in Revolution. This was the only cultivar with no symptoms on 23 Aug (data not shown). While there were no significant differences among cultivars in the No Fungicide experiment, the susceptible cultivar King Arthur had numerically more plants and more fruit affected than the resistant cultivars with one exception. Percentage of plants and fruit with symptoms were numerically lower in the Fungicide experiment than the No Fungicide experiment, suggesting that the fungicide program was effective. In contrast with the No Fungicide experiment, King Arthur in the Fungicide experiment did not have more plants or fruit affected by Phytophthora blight than the resistant cultivars, thus there was no evident benefit of using an integrated management program (fungicides applied to a resistant cultivar) over fungicides alone.

	Non-fungicide-treated					Fungicide-treated [z]				
	Phytophthora blight incidence (%)		Marketable fruit #/plant	Phytophthora fruit rot (%)		Phytophthora blight incidence (%)		Marketable fruit #/plant[y]	Phytophthora fruit rot (%)	
Cultivar	1-Oct	12-Oct	Total	18-Oct	Total	1-Oct	12-Oct	Total	18-Oct	Total
King Arthur ...	18.4	58.3	2.7	82.9	52.1	5.0	3.4	3.9 a	19.1 b	20.1 b
Archimedes …	8.3	28.3	4.3	67.2	37.1	8.4	10.0	4.8 a	29.9 ab	28.0 b
PS-0994 1819 ……	18.3	28.3	3.6	44.3	34.5	3.4	13.3	4.0 a	35.3 ab	34.3 ab
Intruder ……..	6.7	11.7	2.9	27.8	24.6	1.7	5.0	3.3 ab	22.1 b	19.4 b
Revolution …..	5.0	16.7	1.8	52.0	48.2	6.7	6.7	2.1 bc	19.3 b	28.4 b
Vanguard ……	15.0	21.7	1.8	59.4	55.4	5.0	6.7	1.2 c	70.0 ab	56.5 ab
Paladin ……	8.4	16.7	3.6	41.6	35.0	8.3	8.3	3.6 ab	36.3 ab	27.1 b
P-value	0.634	0.2047	0.2341	0.3229	0.447[9]	0.8549	0.7135	<0.0001	0.0152	0.0057

[z] The following fungicides were applied preventively for Phytophthora blight (*Phytophthora capsici*): ProPhyt (2 qts/A) on 18 Jul, Revus (8 oz/A) on 7 Aug, 14 Aug, 31 Aug, and 14 Sep; Presidio (4 fl oz/A) on 23 Aug and 7 Sep; and Forum 4.16SC (6 oz/A) on 21 Sep. Revus was applied with the nonionic surfactant Activator at 1 pt/100 gal or Sylgard at 6 oz/A.

[y] Numbers in each column followed by the same or no letter are not significantly different from each other (Tukey's HSD, P=0.05).

[x] King Arthur is a cultivar with no known genes for resistance to *P. capsici* and was included for comparison with the rest of the cultivars in this experiment that all have resistance to the crown rot phase of blight.