

Evaluation of butternut squash experimental cultivars for resistance to Phytophthora blight and downy mildew, 2019.

A field experiment was conducted at the Long Island Horticultural Research and Extension Center (LIHREC) in Riverhead, NY, on Haven loam soil. The purpose of the experiment was to evaluate three butternut experimental cultivars from Starke Ayres seed company for resistance to *Phytophthora* blight. They were compared to Waltham, a standard butternut cultivar known to be susceptible to *Phytophthora capsici*. Impetus for this experiment was observations of lower incidence of *Phytophthora* fruit rot when these experimental cultivars were grown in commercial fields with other cultivars. The field for the experiment was chosen because it has a history of *Phytophthora* blight. The field was plowed on 25 Apr. A vacuum seeder was used to sow seed on 19 Jun. The seeder applied fertilizer in two bands about 2 in. away from the seed. Controlled-release fertilizer (N-P-K, 15-5-15) was used at 675 lb/A (101 lb/A N). Strategy 3 pt/A, Sandea 0.5 oz/A, and Curbit EC 1 pt/A were applied after seeding for weed control. During the season, weeds were managed by hand weeding and water was provided via overhead irrigation as needed. Powdery mildew was managed by applying Quintec 6 fl oz/A with Badge 1.5 lb/A on 9 Aug and Procure 8 fl oz/A with Badge on 15 Aug. Plots were three 40-ft rows with approximately 24-in spacing between plants in row and 68-in spacing between rows. A Latin square design with four replications was used. Plots were evaluated for *Phytophthora* fruit rot by counting the number of affected fruit per plot. Evaluations were conducted on 12, 16, and 24 Sep and 21 Oct. The total number of rotten fruit per plot was catalogued over the season by marking affected fruit with colored spray paint. The experiment was subjected to a severe outbreak of cucurbit downy mildew in late Aug with some plots quickly becoming almost completely defoliated. Downy mildew severity was rated visually on a plot by plot basis on 4 Sep. Data were analyzed with one-way ANOVA and Tukey's HSD to separate means using JMP statistical software. Average monthly high and low temperatures (°F) were 86.3/71.3 in Jul, 82/68.8 in Aug, 76/66.1 in Sep, and 66.9/54.5 in Oct. Rainfall (in.) was 3.00, 1.52, 1.83 and 6.94 for these months, respectively.

Symptoms of *Phytophthora* fruit rot were first observed in this experiment on 9 Sep. Definitive foliar symptoms were not observed. All of the experimental cultivars had numerically fewer affected fruit than Waltham. MO907 had what seemed to be substantially fewer affected fruit than Waltham, but statistical analysis did not reveal the difference to be significant. This may be due to large variability in disease occurrence among plots not associated with treatment that is typical with *Phytophthora* blight, for which the Latin square design did not successfully block. However, regarding resistance to downy mildew, all three of the experimental cultivars had significantly reduced disease severity compared to the susceptible control and they all differed significantly from each other. Again, MO907 performed very well. This report includes work that is supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, Hatch under NYC-153409.

Cultivar	Total no. fruit with <i>Phytophthora</i> fruit rot per plot *				Downy mildew severity (%) *
	12 Sep	16 Sep	24 Sep	21 Oct	
Waltham	3.9	5.0	10.5	43.8	94 a
MO921	3.6	4.2	8.9	31.5	79 b
MO925	2.1	2.1	8.8	30.3	49 c
MO907	0.7	0.9	1.4	16.0	28 d
<i>P-value (cultivar)</i>	0.798	0.7808	0.6735	0.6226	<0.0001

*Numbers in each column with a letter in common or no letter are not significantly different from each other (Tukey's HSD, $P=0.05$).