

**Evaluation of late blight-resistant small-fruited tomato cultivars and experimental hybrids on Long Island, 2013.**

The objective of this experiment was to evaluate late blight-resistant cultivars and experimental hybrids developed at Johnny’s Selected Seeds (Winslow, ME). Seed of these entries as well as the susceptible entries included for comparison were provided by Emily Haga, Johnny’s tomato breeder. The experiment was conducted at the Long Island Horticultural Research and Extension Center (LIHREC) in Riverhead, NY, in a field with Haven loam soil that has been dedicated to research on organically-produced crops since 2001. Organic fertilizer was spread over rows to be planted, then incorporated. Three products were used each at 700 lb/A: Pro-Grow 5-3-4, Cheep Cheep 4-3-3, and 6-0-6 Cottonseed blend on 5 May. Drip tape was laid as the rows were covered with black plastic mulch. A living mulch was established by broadcasting a combination of annual ryegrass seed and clover seed with a hand-operated spreader between rows of plastic mulch, then lightly raking to incorporate on 21 May. The ryegrass plus weeds that grew were mowed routinely. Some weeds were removed by hand. Tomato seed were sown in an organic seeding mix in the greenhouse on 9 May. Seedlings were fertilized with BioLink 3-3-3 organic liquid fertilizer beginning at the sight of the first true leaf and continued weekly until transplanted to the field. Seedlings were transplanted by hand on 14 Jun into holes opened in the plastic mulch by a waterwheel transplanter that also placed in the holes a starter fertilizer, Neptune’s Harvest Benefits of Fish (2-4-1 N-P-K). A completely randomized block design with four replications was used. Plots consisted of 10 plants in a single row with 24-in. plant spacing and 68-in. row spacing. The ten plots in each replication were arranged in two adjacent rows. Following standard procedure for fresh-market tomato production on Long Island, plants were staked and trellised as they grew using the Florida weave trellising system with 4-ft stakes placed between plants. Water was provided as needed through drip tape laid beneath the plastic mulch. Thrips and tomato fruit worms were managed by applying Entrust (8 fl oz/A) on 16 and 23 Jul using a tractor-mounted boom sprayer equipped with twinjet (TJ60-11004VS) nozzles spaced 17 in. apart that delivered 68 gal/A at 65 psi and 2.3 mph. Leaves were examined for symptoms of any foliar disease on 31 Jul, 16 Aug, 21 Aug, and 6 Sep. Late blight and other diseases observed were assessed by estimating the percentage of leaves in each plot with symptoms (incidence) and the severity of symptoms on these affected leaves. Canopy severity was calculated by multiplying these values. Ripe fruit were harvested on 5, 16, 23, and 30 Aug. Fruit quality attributes assessed included taste rated on a 1-5 scale with 5 being excellent. Average monthly high and low temperatures (°F) were 78/61 in Jun, 86/71 in Jul, 80/64 in Aug, 74/57 in Sep, and 67/51 in Oct. Rainfall (inches) was 9.92, 3.07, 2.43, 2.62, and 0.19 for these months, respectively.

Late blight was first observed on Long Island, NY, in 2013 on 25 Jul in a commercial tomato crop in Riverhead. At LIHREC the first symptoms were observed on 16 Aug. Symptoms were found in this experiment on 21 Aug in five of the 40 plots. US-23 was the only genotype of *P. infestans* found in the region in 2013, including at LIHREC. Entries are listed in the table based on late blight severity. Late blight was effectively suppressed by Jasper (a Johnny’s cultivar), three experimental cultivars (JTO-838, JTO-939, and JTO-541), and Mountain Magic. Another experimental cultivar (JTO-1174) was not significantly more severely affected than these, but it also did not differ from the susceptible entries. Genetics of resistance has not been determined yet for two of these; the rest have the *Ph2* and/or *Ph3* gene for late blight resistance. Jasper rated highest for flavor: 4.9 out of 5 (data not shown). JTO-838, Supersweet 100, and Sakura also rated above 4 (4.2 or 4.3). The rest were rated 3 to 3.5.

Entry	Fruit type	Late blight resistance	Late blight severity (%) *	Yield (lb/plant) *		Fruit wt *
			6 Sep	marketable	total	oz/fruit
Sakura F1	cherry	none .....	99.3 a	6.9 a	7.8 a	0.80 b-e
Juliet F1	saladette	resistance reported .....	93.5 a	5.6 abc	5.7 bcd	1.20 abc
Verona F1	saladette	none .....	83.8 a	6.8 a	7.2 ab	1.52 a
Supersweet 100 F1	cherry	none .....	83.5 a	1.9 d	2.2 ef	0.36 de
JTO-1174	saladette	heterozygous <i>Ph2</i> + <i>Ph3</i> ..	47.5 ab	5.3 abc	5.4 bcd	1.24 ab
JTO-541	saladette	heterozygous <i>Ph3</i> .....	30.9 b	5.3 abc	5.3 bcd	1.04 a-d
JTO-939	cocktail	heterozygous <i>Ph3</i> .....	11.3 b	1.9 d	1.9 f	1.16 abc
JTO-838	cherry	unknown resistance .....	25.0 b	5.9 ab	5.9 abc	0.52 cde
Mountain Magic F1	cocktail	heterozygous <i>Ph2</i> + <i>Ph3</i> ..	9.5 b	3.8 c	3.9 de	1.28 ab
Jasper F1	cherry	unknown resistance .....	2.7 b	4.8 bc	4.9 cd	0.16 e
<i>P-value (treatment)</i>			<0.0001	<0.0001	<0.0001	<0.0001

\* Numbers in each column with a letter in common are not significantly different from each other (Tukey’s HSD, P=0.05).