MUSKMELON (*Cucumis melo*)
Powdery mildew; *Podosphaera xanthii*

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Evaluation of powdery mildew resistant muskmelon cultivars producing personal-sized fruit, 2010.

The objective of this study was to evaluate muskmelon cultivars that were released recently with resistance to powdery mildew. Only cultivars bred to produce small fruit were examined since these are in demand by organic growers because standard-sized fruit add too much weight to boxes for CSA (community supported agriculture) customers and can damage other produce when they roll. They were compared to Passport, a cultivar lacking genetic resistance. Fruit type for most of the cultivars tested is cantaloupe; Arava is a galia and Sivan is a charentais. A field experiment was conducted at the Long Island Horticultural Research and Extension Center in Riverhead on Haven loam soil. Fertilizer (N-P-K 10-10-10) at 1000 lb/A was broadcast and incorporated on 10 May. Black plastic mulch and drip tape were laid on 11-13 May. Seeds were sown on 4 Jun in the greenhouse. Seedlings were transplanted by hand into single rows in the mulch-covered beds on 23 Jun, one day after a waterwheel transplanter was used to open the holes and apply starter fertilizer plus insecticide. During the season, water was provided as needed via drip irrigation lines located beneath the mulch. Additional fertilizer (N-P-K 46-0-0) at 30 lb/A was injected through the drip irrigation system twice. Weeds were controlled between the rows of mulch by applying a tank mix of Strategy (3 pt/A), Sandea (0.5 oz/A) and Roundup (16 fl oz/A) on 7 Jun and Select 2EC (8 oz/A) with 1% COC on 20 Jul to control weedy grasses, and by hand weeding. Select was applied when air temperature was 85 ^{o}F and resulted in damaged foliage. Cucumber beetles were managed with AdmirePro (7.5–10 fl oz/treated A) applied with the transplanter and Asana XL (9.6 oz/A) applied to foliage on 23 Jul. No fungicides were applied to control powdery mildew. The following fungicides were applied preventively for downy mildew (*Pseudoperonospora cubensis*) and Phytophthora blight (*Phytophthora capsici*): ProPhyt (3 qt/A) on 23 and 30 Jul; Curzate (3.2 oz/A) on 23 Jul; Ranman 400 SC (2.75 fl oz/A) on 7 Aug and 2 Sep; Forum (6 fl oz/A) on 30 Jul and 21 Aug; and Revus (8 fl oz/A) on 28 Aug and 11 Sep. Plots were 10-ft long with three adjacent rows each with four plants spaced 24 in. apart. Rows were spaced 68 in. apart. Two plants of Multipik, a susceptible summer squash cultivar, were planted between each plot in each row to separate plots and provide a source of inoculum. A randomized complete block design with four replications was used. Upper and lower leaf surfaces were assessed for powdery mildew on 19 Aug. Powdery mildew colonies (spots) were counted; severity was estimated when colonies had coalesced or were too numerous to count. Colony counts were converted to severity values using the conversion factor of 30 colonies/leaf = 1% severity. Average severity for the entire canopy was calculated from the individual leaf assessments. Yield assessments were done on 9, 16, 24 and 30 Aug. Ripe fruit were harvested and weighed. Several fruit were unmarketable at each harvest date because they had over-ripened; therefore, total yield for each plot was estimated using total fruit count and average fruit weight of marketable fruit. Characteristics of marketable fruit were also evaluated. Overall appearance and flavor were rated on a scale of 1 to 9 with 1= poor and 9 = best. Fruit sucrose levels were measured using a refractometer. Average monthly high and low temperatures (^{o}F) were 81/64 in Jun, 87/70 in Jul, and 83/67 in Aug. Rainfall (in.) was 1.63, 3.46, and 2.02 for these months, respectively.

Most of the resistant melon cultivars did not effectively suppress powdery mildew. Among the cultivars, powdery mildew was significantly less severe than the susceptible cultivar on upper leaf surfaces of Lil' Loupe (53% control) and on lower surfaces of Arava (75%). All resistant cultivars had numerically less severe powdery mildew than Passport. Severity of powdery mildew on all resistant cultivars in 2010 was substantially greater than in a similar experiments conducted in 2009 with many of the same cultivars (PDMR 4:V019). Results from these experiments suggest that a new race was present on Long Island in 2010. Races 1, 2, and 3 of *Podosphaera xanthii* were present in 2010 with race 1 the dominant race based on severity of powdery mildew on the differentials (Hale's Best Jumbo, PMR 45, PMR 5, and MR 1) in a near-by planting. There were reports of powdery mildew becoming severe in commercial fields in NY in 2010. The highest yielding cultivars based on total fruit weight were Lil' Loupe and Head Start, though three other cultivars had statistically similar yields. The best tasting cultivar was HSR 4370 (rating of 7). The cultivar with the numerically highest sucrose concentration was Pixie (11.8%)

	Powdery mildew severity (%) on 19 Aug [z]		Total estimated fruit yield			
Cultivar (resistance)[y]	Upper leaf surface	Lower leaf surface	No./ plant	Wt/ plant (lb)	Wt/ fruit (lb)	Sucrose (%)
Lil' Loupe (R1,2)……..	34.19 b[x]	18.19 ab	5.33 ab	11.97 a	2.23 cd	10.5
Arava (R1,2)…….	38.00 ab	15.30 b	3.12 cde	11.24 ab	3.73 a	8.5
HSR 4402 (R1,2)……..	40.88 ab	31.43 ab	3.06 cde	7.49 cd	2.48 bcd	11.3
HSR 4307 (R1,2)……..	47.80 ab	25.30 ab	6.17 a	10.38 abc	1.67 d	11.0
Head Start (R1,2)……..	51.53 ab	26.58 ab	4.48 bc	11.74 a	2.63 bc	7.5
HSR 4370 (R1,2)……..	63.75 ab	37.35 ab	3.79 bcd	7.69 bcd	2.01 cd	8.8
Sugar Cube (R1,2)……	60.85 ab	43.50 ab	3.98 bc	10.52 abc	2.65 bc	9.0
Pixie (R1,2)……..	63.40 ab	44.85 ab	3.73 bcd	8.12 bcd	2.20 cd	11.8
Sivan (R1,2)…….	67.18 ab	41.88 ab	2.25 de	7.26 cd	3.25 ab	10.5
Passport (S)……..	73.20 a	61.20 a	1.71 e	6.13 d	3.60 a	7.3
P-value (treatment)	0.0153	0.0386	<.0001	<.0001	<.0001	0.7550

[z] Exact colony counts were made when possible and severity was estimated using the conversion factor of 30 colonies/leaf = 1% severity.

[y] R1 indicates resistance to Race 1; R1,2 = resistance to Race 1 and 2; S = susceptible to powdery mildew.

[x] Numbers in each column followed by the same letter are not significantly different from each other according to Tukey's HSD (*P*=0.05).