

Evaluation of powdery mildew resistant muskmelon cultivars, 2010.

The objective of this study was to evaluate cultivars of muskmelon with resistance to race 1 or race 1 and 2 of the powdery mildew fungus. 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 17 Jun in the greenhouse. Seedlings were transplanted by hand into single rows in the mulch-covered beds on 2 Jul, 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 °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 to preventively control downy mildew (*Pseudoperonospora cubensis*) and Phytophthora blight (*Phytophthora capsici*): ProPhyt (3 qt/A) on 21 Jul; Ranman 400 SC (2.75 fl oz/A) on 7 Aug; Forum (6 fl oz/A) on 14 and 21 Aug; and Tanos (8 oz/A) on 28 Aug. 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. Ripe fruit were harvested, weighed, and measured on 24 and 30 Aug. Many 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 and 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 (°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.

The resistant cultivars evaluated were moderately effective providing 69-89% suppression of powdery mildew on upper leaf surfaces and 70-95% control on lower. Diva is not advertised as having resistance; however, results from this experiment and an experiment conducted in 2009 suggest that it does have resistance. Severity of powdery mildew on all these cultivars in 2010 was substantially greater than in 2009 and 2008 when similar experiments were conducted with many of the same cultivars (PDMR 4:V020 and PDMR 3:V117). On 25 Aug 09, which was 1 week after the first harvest, very few symptoms of powdery mildew were found on the resistant cultivars with none found on leaves of Eclipse or Strike, and severity well below 1% on the others, while severity was 20% and 16% on upper and lower leaf surfaces, respectively, of Superstar. On 15 Aug 08, severity was well below 1% for cultivars with resistance to race 1 and 2, 5% and 34% on upper and lower leaf surfaces, respectively, for Eclipse, and 40% and 50% for Superstar. Results from the 2008-2010 experiments suggest that a new race was present on Long Island in 2010. Races 1, 2, and 3 of the cucurbit powdery mildew fungus (*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 more severe in commercial fields in NY in 2010 than previous years. The highest yielding cultivars, based on total fruit weight, were Wrangler and Grand Slam. The cultivar with the best taste rating (7 of 9) and the highest sucrose concentration (9%) was Athena.

Cultivar (resistance) ^y	Powdery mildew severity (%) on 19 Aug ^z		Marketable fruit			Total estimated fruit yield		
	Upper leaf surface	Lower leaf surface	No./ plant	Wt/ plant (lb)	Wt/ fruit (lb)	No./ plant	Wt/ plant (lb)	Sucrose (%)
Wrangler (R1,2).....	9.25 b ^x	2.81 b	1.96 a	5.92 a	3.03	3.73 a	8.75 a	6.5
Eclipse (R1).....	9.60 b	3.48 b	1.43 ab	5.12 ab	3.77	2.26 b	6.11 a	8.0
Goddess (R1,2).....	17.75 b	6.65 b	0.06 c	0.45 c	4.04	2.67 ab	0.73 b	4.0
Athena (R1,2).....	17.77 b	11.84 b	0.90 bc	4.29 abc	4.88	2.06 b	5.13 ab	9.0
Grand Slam (R1,2)...	24.38 b	10.00 b	0.85 bc	4.07 abc	4.92	2.33 b	7.78 a	5.0
Rockstar (R1,2).....	26.85 b	16.30 b	0.35 c	2.01 bc	5.78	2.48 ab	4.46 ab	5.5
Diva (S).....	19.50 b	5.15 b	0.50 c	2.26 abc	4.64	1.92 b	3.74 ab	5.0
Superstar (S).....	87.50 a	54.38 a	0.95 bc	3.29 abc	4.28	2.41 b	5.70 a	7.0
<i>P</i> -value (treatment)	<.0001	0.0003	<.0001	0.0033	0.1241	0.0069	0.0007	0.5798

^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).