

Powdery Mildew Resistant Muskmelon and Specialty Melon Cultivar Evaluation, New York 2007

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Cultivars with resistance are a valuable tool for managing powdery mildew, a very common disease that can reduce yield (fruit quantity and/or size) and market quality (flavor, color, storability, etc). Races of the powdery mildew fungus have been differentiated on muskmelon. Several cultivars with resistance to races 1 and 2 have been commercially available for a few years. New resistant cultivars of muskmelon and of specialty melon types were released recently. The goal of this study was to evaluate some of these new cultivars compared to Athena, a resistant cultivar that is grown commonly, and to Superstar, a standard cultivar lacking genetic resistance. Growers need information on performance of resistant cultivars in terms of disease suppression and yield to guide their selection of the most appropriate cultivars for their operations. An additional reason this experiment was conducted is the need to monitor resistant cultivars in order to detect new races when they develop.

Materials and Methods

A field experiment was conducted at the Long Island Horticultural Research and Extension Center in Riverhead on Haven loam soil. Seeds were sown on May 31 in the greenhouse. Seedlings were transplanted into black plastic mulch on June 11. Fertilizer (N-P-K 10-10-10) at 1,000 lbs./A was broadcast and incorporated on May 11. Water was provided as needed through drip irrigation lines placed beneath the mulch.

During the season, weeds were controlled with Strategy (2 pt/A) applied on May 21 and Roundup WeatherMax (22 oz./A) applied June 29 with a shielded sprayer to soil between plastic, and by hand weeding. Cucumber beetles were managed with Admire 2F applied after transplanting as a soil drench around transplants (0.02 ml/plant) on June 18 and with Asana XL (9.6 oz./A) applied to foliage on July 16. No fungicides were applied specifically for powdery mildew. The following fungicides were applied preventively for downy mildew (*Pseudoperonospora cubensis*) and Phytophthora blight (*Phytophthora capsici*): Forum 4.16SC (6 oz./A) on July 16, Ranman 400 SC (2.75 fl. oz./A) on August 12, Acrobat 50 WP (6.4 oz./A) on August 19, and Previcur Flex 6 F (1.2 pt/A) on August 29. Neither disease developed before the end of this experiment.

Plots were three adjacent rows each with four plants spaced 24 inches apart. Rows were spaced 68 inches apart. A plant of Multipik summer squash, a susceptible variety, was 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 surfaces of leaves were assessed for powdery mildew beginning on July 26. Fifty old leaves were selected on July 26 in each plot in one replication based on leaf appearance

and position in the canopy. On August 14, eight old and eight mid-aged leaves were assessed. Powdery mildew colonies (spots) were counted; severity was assessed when colonies could not be counted accurately because they had coalesced and/or were too numerous. Colony counts were converted to severity values using the conversion factor of 30 colonies/leaf = 1%. Average severity for the entire canopy was calculated from the individual leaf assessments. Powdery mildew control was calculated for upper and lower leaf surfaces using average canopy severity values for August 14 relative to the average value for Superstar.

Melon fruit were harvested, weighed, and measured when they reached maturity. Fruit characteristics were also evaluated and overall appearance was rated on a scale of 1 to 5, with 1 = poor and 5 = best.

Results and Discussion

Powdery mildew was first observed on July 26 at a very low level (one spot in two plots). On August 14, powdery mildew severity on the susceptible cultivar Superstar averaged 48% on upper leaf surfaces and 20% on the lower surfaces. All of the cultivars tested with powdery mildew resistance exhibited at least 48% suppression of mildew on upper leaf surfaces. Crème de Menthe was the only cultivar not significantly less severely affected by powdery mildew than Superstar on lower leaf surfaces. The specialty melons, most of which are not advertised as having resistance to both races 1 and 2, exhibited less suppression of powdery mildew than the muskmelons, which all have resistance to both races. Four of the six muskmelons exhibited a very high level of suppression (at least 99%). Strike and Goddess contain two different sources of resistance in contrast with Athena.

Acknowledgments

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Table 1. Yield and control of powdery mildew for muskmelon and specialty melon cultivars compared on Long Island, New York, 2007. The last entry is the standard, susceptible cultivar included for comparison.

Cultivar (resistance) ^y	Seed Source	Melon Type	Powdery Mildew Control (%)		Marketable Yield		Total Yield	
			Upper Leaf Surface	Lower Leaf Surface	Number/ Plant	Weight (lbs.)/Plant	Number/ Plant	Weight (lbs.)/Plant
Goddess (PM 1,2)	HM	muskmelon	100.0 d ^z	100.0 d	1.54 def	9.39 c	1.94 d	10.97 bc
Strike (PM 1,2)	HL	muskmelon	100.0 d	100.0 d	2.19 cd	12.53 ab	2.63 cd	14.59 a
Maverick (PM 1,2)	HM	muskmelon	99.0 d	99.6 d	3.21 b	10.63 abc	3.77 b	12.01 ab
Lil' Loupe (PM 1,2)	HM	muskmelon	74.9 c	93.6 cd	5.46 a	9.49 c	6.06 a	10.19 bcd
Athena (PM 1,2)	SI	muskmelon	65.4 bc	84.6 cd	2.13 cd	10.51 bc	2.69 c	12.76 ab
Bolero (PM)	SI	Crenshaw melon	72.9 c	79.3 cd	0.90 fg	6.29 d	1.13 e	7.92 de
Dorado (PM 1,2)	SI	canary melon	57.0 bc	72.3 cd	1.10 efg	5.03 d	1.17 e	5.23 ef
Vicar (PM 1)	SI	Galia melon	58.5 bc	60.1 bc	1.75 de	5.19 d	2.81 c	9.04 cd
Crème de Menthe (PM)	SI	honeydew melon	48.2 b	31.8 ab	0.63 g	4.20 d	0.69 e	4.46 f
Superstar (Std)	HM	muskmelon	0 a	0 a	2.65 bc	13.60 a	2.98 c	14.61 a
<i>P</i> -value			< .0001	< .0001	< .0001	0.0001	< .0001	< .0001

^yGenetic resistance as specified in the catalogue. "PM 1, 2" indicates resistance to races 1 and 2. "PM" used when information on race not specified in the catalogue.

^zNumbers in each column followed by the same letter are not significantly different from each other according to Fisher's protected LSD ($P=0.05$).