

Evaluation of powdery mildew resistant muskmelon cultivars, 2008.

The objective of this study was to evaluate some of the cultivars of muskmelon that were released recently with resistance to powdery mildew. They were compared to Athena, a resistant cultivar that is grown commonly, and to Superstar, a standard cultivar lacking genetic resistance. 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 500 lb/A was broadcast and incorporated on 5 May. Black plastic mulch and drip tape were laid on 6 May. Seeds were sown on 31 May in the greenhouse. Prior to transplanting, pre and post-emergent weed control between the plastic mulch strips was achieved by roto-tilling on 29 May and then applying Strategy (3 pt/A) on 30 May followed by overhead irrigation (about 0.5 in.) on 31 May to activate the herbicide. Seedlings were transplanted into the plastic-covered beds on 11 Jun. Water was provided as needed through 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 on 2 and 17 Jul. Weeds were controlled during the season by hand weeding and by applying Roundup WeatherMax (3%) + Scythe (1%) + Succeed (1%) on 27 Jun with a hand-held shielded sprayer to soil between plastic mulch strips and Select 2E (8 oz/A) with 1% COC on 8 Aug. Cucumber beetles were managed with Admire 2F applied after transplanting as a soil drench around transplants (0.0007 fl oz/plant) on 18 Jun and with Asana XL (9.6 oz/A) applied to foliage on 13 Jun, 30 Jul, and 14 Aug. No fungicides were applied specifically for powdery mildew control. The following fungicides were applied preventively for downy mildew (*Pseudoperonospora cubensis*) and Phytophthora blight (*Phytophthora capsici*): Curzate 60 DF (3.2 oz/A) on 30 Jul and Ranman 400 SC (2.75 fl oz/A) on 19 Jul and 14, 23, and 30 Aug. Plots were three adjacent rows each with three plants spaced 24-in. apart. Rows were spaced 68 in. apart. A single 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 22 Jul. Fifty old leaves were selected in each plot on 22 Jul based on leaf appearance and position in the canopy. On 29 Jul and 7 Aug fewer leaves were examined in plots where symptomatic leaves were common. The last assessment was made on 15 Aug just before the first harvest. More assessments were not made because of the impact on the canopy of harvesting. Powdery mildew colonies (spots) were counted; severity was assessed by visual estimation of percentage leaf area affected 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 10 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 15 Aug relative to the average value for Superstar. Melon fruit were harvested, weighed, and measured when they reached maturity. Harvesting was done on 15, 19, 22, 25, and 29 Aug and 3 Sep. Fruit characteristics were also evaluated and rated on a scale of 1 to 9 with 1= poor and 9 = best. Average monthly high and low temperatures (°F) were 80/63 in Jun, 84/67 in Jul, and 79/63 in Aug. Rainfall (in.) was 3.88, 3.67, and 3.76 for these months, respectively.

Powdery mildew was first observed on 15 Jul at a very low level in the susceptible cultivar (3 affected leaves out of 200 older leaves examined). Severity increased greatly on this cultivar. All of the cultivars tested suppressed powdery mildew on upper leaf surfaces relative to Superstar. In the table cultivars are listed by ascending average AUDPC value. Eclipse, the only cultivar tested with resistance to just race 1, did not suppress powdery mildew on upper leaf surfaces as well as most of the other cultivars that all have resistance to both races 1 and 2. Eclipse did not suppress powdery mildew on lower leaf surfaces based on the 15 Aug assessment and AUDPC; powdery mildew was significantly less severe than on Superstar at the 7 Aug assessment. These results indicate that both race 1 and 2 of the pathogen were present, which was confirmed by an adjacent planting of cucurbit differentials. Sarah's Choice did not exhibit the level of suppression expected considering the resistance genes it was bred to contain. Suppression of powdery mildew on lower leaf surfaces based on AUDPC values was 75% for Sarah's Choice, and 98-100% for the other varieties. Wrangler had the greatest yield. Fruit weight was lower than expected for all cultivars (average below 5 lb/fruit), except Pixie, which produces personal-sized melons (averaged 2.7 lb/fruit).

Cultivar	Powdery mildew severity (%) ^z						Marketable fruit		Unmarketable fruit number/plant					
	Upper leaf surface		Lower leaf surface		Number/plant	Weight/plant (lb)								
	15-Aug	AUDPC	15-Aug	AUDPC										
Hannah's Choice	0.00	d ^y	0.04	c	0.00	c	0.05	c	2.17	b	7.49	ab	0.64	bc
Strike	0.00	d	0.05	c	0.00	c	0.04	c	1.31	d	5.90	bc	0.92	abc
Athena	0.09	d	0.39	c	0.09	c	0.40	c	1.58	abc	3.77	c	1.17	a
Wrangler	0.08	d	0.35	c	0.16	c	0.67	c	2.92	a	9.04	a	0.92	abc
Halona	0.14	d	0.57	c	0.15	c	0.61	c	2.03	ab	7.00	ab	1.22	a
Pixie	0.57	cd	2.28	c	1.35	bc	5.44	c	2.11	ab	5.64	bc	1.17	a
Sarah's Choice	3.57	bc	17.36	b	8.36	b	58.03	b	1.44	bc	5.42	bc	1.06	ab
Eclipse	4.93	b	21.38	b	33.50	a	138.07	a	1.50	abc	6.65	ab	0.58	c
Superstar (susceptible)	40.44	a	203.02	a	50.30	a	235.98	a	1.47	abc	6.36	bc	1.06	ab
<i>P</i> -value (treatment)	<0.0001		<0.0001		<0.0001		<0.0001		0.0015		0.0312		0.0495	

^z Exact colony counts were made when possible and severity was estimated using the conversion factor of 30 colonies/leaf = 1%. Data were transformed from percentages by a square root transformation when needed to obtain normality of variance before analysis of variance was performed. The table has de-transformed means.

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