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## Evaluation of powdery mildew resistant cultivars of cantaloupe, 2021.

A field experiment was conducted at the Long Island Horticultural Research and Extension Center (LIHREC) in Riverhead, NY, on Haven loam soil. The objective was to assess degree of resistance to powdery mildew of Edisto 47 and Trifecta by comparing them to a susceptible cultivar and two resistant cultivars (Ambrosia and Sugar Rush) evaluated previously. Edisto 47 and Trifecta are also described as resistant to downy mildew, which was managed in the experiment by applying fungicides targeted to downy mildew to achieve focus on powdery mildew. A parallel experiment was conducted to assess their resistance to downy mildew (PDMR 16:V102). The field was moldboard plowed on 6 Apr and urea fertilizer (46-0-0) was applied at 80 lb/A N on 7 Apr. For management of Phytophthora blight, caused by Phytophthora capsici, a mustard biofumigant cover crop (cv. Rojo Caliente) was seeded at 10 lb/A by drilling on 9 Apr. On 14 Jun the mustard was flail-chopped, immediately incorporated by disking, and followed by a cultipacker to seal the soil surface; the field could not be irrigated to initiate biofumigation as is recommended, but the soil was moist. Controlled-release fertilizer (N-P-K, 19-10-9) at 525 lb/A (101 lb/A N) was broadcast over the bed area and incorporated on 30 Jun. Beds were formed with drip tape and covered with black plastic mulch on 30 Jun. Seeds were sown on 15 Jun in the greenhouse. A waterwheel transplanter was used to make planting holes in the beds and apply starter fertilizer (9-18-9). Seedlings were placed outdoors to harden for a few days before transplanting on 6 Jul by hand into the holes in the beds. During the season, water was provided as needed via drip irrigation lines. Weeds were managed between the mulched beds by applying Strategy 3 pt/A, Sandea 0.5 oz/A, and Curbit EC 1 pt/A on 30 Jun with a tractor-sprayer and by hand weeding. The primary source of initial inoculum of Podosphaera xanthii in this area is considered to be long-distance wind-dispersed spores from affected plants. Plots were three 8-ft rows spaced 68 in. apart with nine plants per plot at 2-ft spacing. The plots were 4 ft apart within the row initially until plants began to vine, partly filling the area. Vines were moved as needed to maintain plot separation. A randomized complete block design with four replications was used. Downy mildew and Phytophthora blight were managed by applying Presidio 4 fl oz/A on 16 Jul, Omega 24 fl oz/A on 23 Jul, Orondis Ultra 7 fl oz/A on 30 Jul, 20 Aug and 3 Sep, Revus 8 fl oz/A on 14 Aug, and Ranman 2.75 fl oz/A on 27 Aug. Plots were inspected for symptoms of powdery mildew on upper and lower leaf surfaces on 4, 12, 18, 26 and 31 Aug; and 8 Sep. For the first two assessments, 20 older leaves were rated in each plot starting with plots of the susceptible cultivar. These were the only plots examined on 4 Aug because no symptoms were found. For the remaining assessments, five leaves of young, mid-aged, and old leaves (selected based on leaf physiological appearance and position in the canopy) were rated for a total of 15 leaves in each plot. Colonies of powdery mildew were counted or the severity was assessed by visual estimation of percent leaf area affected when colonies could not be counted accurately because they had coalesced and/or were too numerous to count. Colony counts were converted to severity values using the conversion factor of 10 colonies/leaf = 1% severity. Average severity for the entire canopy was calculated from the individual leaf assessments. Values of the area under the disease progress curve (AUDPC) were calculated from 12 Aug through 31 Aug using the formula:  $\sum n_{i=1}[(R_{i+1} + R_i)/2][t_{i+1} - t_i]$ , where R = disease severity rating (% of leaf surface with symptoms) at the *i*th observation,  $t_i = time$  (days) since the previous rating at the *i*th observation, and n = total number of observations. Ripe fruit were harvested and rotten fruit were counted on 3, 8, and 14 Sep. Refractometer was used to measure sugar content (Brix) of one fruit per plot on 3 and 8 Sep. Fruit appearance, taste, texture, and marketability were rated by LIHREC staff and gardeners on a 1 (poor) to 5 (excellent) scale as interpreted by the rater. All remaining fruit were counted on 21 Sep. Average monthly high and low temperatures (°F) were 82.0 and 67.4 in Jul, 83.4 and 68.4 in Aug, and 77.1 and 62.5 in Sep. Rainfall (in.) was 6.2, 9.0 and 4.9 for these months, respectively. Data was analyzed with one-way ANOVA and Tukey's HSD to separate means using JMP statistical software.

Powdery mildew was first observed on 12 Aug in three plots of Hales Best and a plot of Edisto 47; no symptoms were found previously on 4 Aug. Severity was low throughout August especially on upper leaf surfaces, which may be partly due to some contact activity for powdery mildew from the pesticides applied for downy mildew. Severity did not differ significantly among the four resistant cultivars. Disease severity on Sugar Rush and Trifecta was significantly less than on the susceptible cultivar, Hales Best. Ambrosia and Edisto 47 were substantially but not significantly less severely affected. Lack of significance is due to considerably more powdery mildew developing in plots of these cultivars in replication one. All resistant cultivars had significantly lower AUDPC values than Hales Best when the data was analyzed without replication one (0.24-0.98 vs 98.9; P=<0.014). Results from this study support the conclusion that Ambrosia is resistant to powdery mildew which was reached from results of the cultivar evaluation conducted in 2020 in which Ambrosia was used as the susceptible cultivar (PDMR 15:V060). There are differing claims for resistance for this cultivar among seed catalogues. Edisto 47 had the least defoliation on 8 Sep, but not significantly less than Ambrosia and Trifecta. Ambrosia and Edisto 47 produced significantly larger (heavier) fruit than the other cultivars. Fruit of the resistant cultivars had significantly higher sugar content (Brix values) than Hales Best. Trifecta received highest average ratings for taste, texture, and internal appearance. This report includes work that is supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, Hatch under NYC-153409.

	Powdery mildew severity of leaves (%) <sup>z</sup>							
	Upper surface	Lower leaf surface			Defoliation (%) <sup>z</sup>	Yield and fruit quality <sup>z</sup>		
Cultivar	AUDPC	31 Aug <sup>y</sup>	AUDPC <sup>y</sup>	8 Sep <sup>x</sup>	8 Sep	# Fruit/plant	lb/fruit	Brix
Hales Best (susceptible)	0.015	12.6 a	69.0 a	32	84 a	4.3 a	6.3 b	8.7 b
Ambrosia	0.000	1.2 ab	3.5 ab	10	34 b	4.2 a	9.3 a	12.5 a
Sugar Rush	0.000	0.1 b	0.6 b		92 a	3.3 b	6.5 b	13.1 a
Edisto 47	0.021	0.7 ab	3.1 ab	16	15 b	3.6 ab	9.6 a	13.2 a
Trifecta	0.000	0.4 ab	1.1 b	13	44 b	4.0 ab	6.8 b	12.9 a
P-value (treatment)	0.4099	0.025	0.0308	0.5772	<0.0001	0.0045	<0.0001	0.0085

<sup>z</sup> Numbers in each column with a letter in common or no letters are not significantly different from each other (Tukey's HSD, *P*=0.05).
<sup>y</sup> Values were square root transformed before analysis because raw data were not distributed normally. Table contains de-transformed values.

<sup>x</sup> All plots of Sugar Rush and two plots of Hales Best were omitted due to too few leaves being alive in these plots at this assessment.