

**Evaluation of downy 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 downy mildew of Edisto 47 and Trifecta by comparing them to two susceptible cultivars (Hales Best and Sugar Rush). Edisto 47 and Trifecta are also described as resistant to powdery mildew, which was managed in the experiment by applying fungicides targeted to powdery mildew to achieve focus on downy mildew. A parallel experiment was conducted to assess their resistance to powdery mildew (PDMR 16:V105). 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 13 Jul. Beds were formed with drip tape and covered with black plastic mulch on 13 Jul. Seeds were sown on 28 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 19 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 14 Jul with a tractor-sprayer and by hand weeding. The primary source of initial inoculum of *Pseudoperonospora cubensis* in this area is long-distance wind-dispersed spores from affected plants. Plots were three 8-ft rows spaced 68 in. apart with 9 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. Powdery mildew was controlled by applying Procure 8 fl oz/A on 20 Aug and 7 Sep, and Vivando 15 fl oz/A on 27 Aug. Severity of downy mildew was assessed on 4, 12, 20, 26 and 31 Aug; and 8 Sep by estimating incidence of symptomatic leaves in each plot and rating severity on nine representative affected leaves. Canopy severity was calculated by multiplying incidence by average severity. Area under disease progress curve (AUDPC) values were calculated from 4 Aug through 8 Sep using the formula  $\sum_{i=1}^{n-1} [(R_{i+1} + R_i)/2] [t_{i+1} - t_i]$ , where R = disease severity rating (% of leaf surface with symptoms) at the *i*th observation, *t<sub>i</sub>* = time (days) since the previous rating at the *i*th observation, and n = total number of observations. All 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.

Symptoms were first observed on 4 Aug, 16 days after transplanting. There were no significant differences in downy mildew incidence or severity between the two susceptible cultivars. There were significant differences between the resistant and susceptible cultivars starting with the third assessment on 20 Aug. There was significantly less defoliation in plots of the resistant cultivars than plots of the susceptible cultivars on 8 Sep and plots of Hales Best on 22 Sep (data not shown). There were no significant differences between the resistant cultivars. Control of downy mildew achieved was 47% for Edisto 47 and 52% for Trifecta based on AUDPC values for canopy severity relative to average value for the susceptible cultivars. There were no significant differences among the four cultivars in quantity of fruit produced indicating similar yielding ability (data not shown); however, the impact of downy mildew on foliage health can result in reduced fruit quality (not assessed). Yield and fruit quality were assessed in another experiment with these cultivars (PDMR 16:V105). This report includes work that is supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, Hatch under NYC-153409.

Cultivar (reaction to downy mildew)	Occurrence of downy mildew *						Defoliation (%) *
	Incidence of symptomatic leaves (%)			Canopy severity (%)			
	20 Aug	8 Sep	AUDPC	20 Aug	8 Sep	AUDPC **	
Hales Best (susceptible)	23.8 ab	93 a	1597 ab	4.9 ab	22 a	431 a	39 a
Sugar Rush (susceptible)	30.0 a	94 a	1652 a	6.9 a	23 a	446 a	28 a
Edisto 47 (resistant)	17.5 b	78 b	1309 c	2.7 b	9 b	230 b	6 b
Trifecta (resistant)	18.0 b	85 ab	1441 bc	3.0 b	11 b	211 b	1 b
<i>P-value (treatment)</i>	0.0243	0.0011	0.0003	0.0199	0.0003	<0.0001	<0.0001

\* Numbers in each column with a letter in common are not significantly different from each other (Tukey's HSD, *P*=0.05).

\*\* Values were square root transformed before analysis because raw data were not distributed normally. Table contains de-transformed values.