CUCUMBER (*Cucumis sativus*)
    Downy mildew; *Pseudoperonospora cubensis*

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Evaluation of cucumber cultivars resistant to downy mildew, 2017.

An experiment with field-grown cucumber was conducted at the Long Island Horticultural Research and Extension Center (LIHREC) in Riverhead, NY, in a field with Haven loam soil. The purpose of this experiment was to evaluate different cucumber cultivars for resistance to downy mildew. The field was plowed on 11 Apr and prepared for planting on 9 Jun. Controlled release fertilizer (N-P-K, 15-5-15) was broadcast and incorporated into the soil at 675 lb/A (101 lb/A N). Beds were formed, a single line of drip tape was laid over the top, and beds were covered with black plastic mulch in one pass. Holes were punctured through the plastic at 2 ft spacing on 25 Jul. Admire Pro insecticide was applied to the open holes at 10.5 fl oz/A on 26 Jul using a backpack sprayer. Strategy 3 pt/A, Sandea 0.5 oz/A and Roundup PowerMax 22 oz/A were applied prior to transplanting for weed control on 26 Jul using a tractor-mounted sprayer. Cucumbers were seeded in the greenhouse on 5 Jul, and transplanted into the field on 27 Jul. During the season, weeds were controlled by cultivating and hand weeding as needed. The primary source of initial inoculum in this area is considered to be long-distance wind-dispersed spores from affected plants. Plots consisted of one 18-ft row spaced 68 in. apart containing 9 plants. The 6-ft area between plots was not planted. A completely randomized design with four replications was used. Plots were inspected for downy mildew symptoms on 11 and 28 Aug, and 6 and 14 Sep. At each assessment, disease severity was estimated for the entire plot canopy as well as 9 randomly selected symptomatic leaves in each plot. Area Under Disease Progress Curve (AUDPC) values were calculated from 11 Aug through 14 Sep. Yield and fruit quality assessments were taken on 6, 15, and 21 Sep. All fruit was sorted by marketability and weighed per plot. Average monthly high and low temperatures (^{o}F) were 83/69 in Jul, 81/66 in Aug, and 77/64 in Sep. Rainfall (in.) was 3.45, 4.95, and 3.00 for these months, respectively.

Downy mildew was first observed in this experiment on 10 Aug, just two weeks after transplanting, in all plots. Disease pressure was very high and symptoms developed quickly, which resulted in severely limited yield in most cultivars in the experiment. Most of the cultivars produced less than one marketable fruit per plant throughout the season. Only Citadel, Bristol, and DMR 401 had significantly lower disease severity ratings across all measurements compared to the susceptible cultivar Straight Eight. These three cultivars were also the highest yielding, both in marketable and total fruit. In terms of both yield and disease resistance, DMR 401 was far and away the most successful cultivar in this experiment. It produced more than twice the fruit of the next highest yielding cultivar in both marketable and total fruit. AUDPC for the entire canopy was significantly negatively correlated with marketable fruit per plant (Corr = -0.7723, *P*<0.0001). Table sorted by AUDPC values. This material is based upon work that is supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, Hatch under NYC-153409.

	Downy mildew severity (%) [z,y]						Yield (fruit per plant) [z,y]	
	Entire canopy				Affected leaves			
Cultivar	28 Aug	6 Sep	14 Sep	AUDPC	14 Sep	AUDPC	Marketable	Total
Straight Eight	27 a	63 a	65 a	1255 a	76 a	1454 a	0.00 e	0.01 e
Speedway	25 ab	47 ab	56 ab	1038 ab	65 ab	1299 ab	0.00 e	0.71 cd
Marketmore 76	24 ab	44 b	53 abc	970 bc	66 ab	1254 abc	0.03 de	0.26 de
Diamondback	23 ab	38 bc	49 abc	845 bcd	61 abc	1080 bc	0.33 c	0.94 bcd
SV4719CS	17 bc	39 bc	56 ab	806 bcd	66 ab	1033 cd	0.25 cd	1.36 bc
SV3462CS	19 abc	34 bcd	51 abc	788 cd	65 ab	1018 cd	0.26 cd	1.29 bc
Citadel	17 bc	22 de	36 c	643 d	42 cd	823 d	1.01 b	2.09 b
Bristol	12 c	28 cd	42 bc	633 d	50 bcd	802 d	0.39 bc	1.83 bc
DMR 401	13 c	8 e	17 d	319 e	31 d	539 e	2.79 a	5.10 a
P-value (cultivar)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

[z] Numbers in each column with a letter in common are not significantly different from each other (Tukey's HSD, *P*=0.05).
[y] When data were not distributed normally, values were square root transformed before analysis. Table contains de-transformed values.