

Susceptibility to downy mildew of slicer-type cucumber cultivars, 2008.

The purpose of this study was to evaluate select cucumber cultivars that have exhibited relatively low susceptibility to downy mildew, compared to other cultivars, in cucumber evaluations conducted at North Carolina State University since 2005. The evaluation was conducted as a component of an integrated management program for organically-produced cucumber by regularly applying an OMRI-listed botanical oil plus a copper fungicide. An integrated approach was taken because cucumber cultivars bred with resistance to pathogen strains present before 2004 are recognized as no longer providing sufficient suppression of downy mildew to achieve adequate control without also applying fungicides. Cucumber was seeded on 11 Aug and transplanted on 22 Aug into bare-ground in a field with Haven loam soil at the Long Island Horticultural Research and Extension Center in Riverhead. A late planting date was used to increase the likelihood of downy mildew developing during the experiment. Organic production practices were used. On 20 Aug Pro-Gro 5-3-4 organic fertilizer at 1000 lb/A was spread over the rows to be planted and then incorporated by disking. Neptune's Harvest hydrolyzed fish emulsion fertilizer (0.094 fl oz in 6 fl oz water) was poured into the transplant hole before planting. On 12 Sep plants were side-dressed with Bio-Diversity 8-2-8 organic fertilizer at 375 lb/A and incorporated by cultivation. Weeds were controlled by cultivating and hand weeding as needed. Plots consisted of two 12-ft rows spaced 34 in. apart each with 6 plants at 24-in spacing. A randomized complete block design with four replications was used. Organocide at 1 oz/gal + Kocide 3000 at 1 lb/A were applied on 3, 11, 18, and 25 Sep and 4 Oct using a tractor-mounted boom sprayer operated at 100 psi and 96 gal/A (D5-25 hollow cone nozzles spaced 17 in. apart). Downy mildew severity was assessed on 2 and 9 Oct by estimating incidence of symptomatic leaves and then rating average severity on the affected leaves. These measurements were used to estimate canopy severity. Marketable fruit and culls were harvested on 2 and 13 Oct. Average monthly high and low temperatures (°F) were 79/63 in Aug, 75/61 in Sep, and 63/47 in Oct. Rainfall (in.) was 3.76, 8.34, and 3.18 for Aug, Sep, and Oct, respectively. Drip irrigation was used as needed to supplement rainfall.

Downy mildew symptoms were first observed on 22 Sep, 7 days after 3 days of rain. Favorable conditions for downy mildew development were provided by rain and long, heavy dew periods that are common during late summer to fall where the experiment was conducted. Rain fell over 4 days starting with 3 in. on 27 Sep. Temperatures were unusually cool during fall 2008, thus few fruit developed and the experiment was terminated due to poor plant growth. No significant differences were detected among the cultivars in downy mildew incidence or severity. Dasher II, Poinsett 76, and Stonewall were less severely affected by downy mildew than Marketmore 76 in several evaluations conducted at North Carolina State University since 2005. General Lee is a cultivar commonly grown on Long Island. Significant differences were detected in an adjacent experiment with pickling-type cucumber cultivars that included an old cultivar with no genes for resistance to downy mildew. All slicer-type cucumber cultivars evaluated were bred to have resistance to strains of *Pseudoperonospora cubensis* that dominated the pathogen population before 2004.

| Cultivar | Downy mildew assessments ^z | | | | |
|----------------------|---------------------------------------|-------|-----------------------------|--------|---------------------|
| | Incidence | | Severity on affected leaves | | Canopy severity |
| | 2-Oct | 9-Oct | 2-Oct | 9-Oct | 9-Oct |
| Dasher II | 30.0 | 34.3 | 23.8 | 9.8 | 3.3 bc ^y |
| Poinsett 76 | 30.0 | 38.3 | 20.0 | 8.8 | 3.3 bc |
| Stonewall | 35.0 | 51.3 | 32.5 | 12.5 | 6.3 ab |
| HMX 7421 | 28.8 | 36.3 | 16.3 | 5.0 | 1.8 c |
| HMX 4453 | 36.3 | 48.8 | 30.0 | 15.0 | 8.4 a |
| General Lee | 32.5 | 45.0 | 23.8 | 10.5 | 4.8 abc |
| Marketmore 76 | 40.0 | 46.3 | 25.6 | 8.5 | 3.8 bc |
| <i>P</i> -value..... | 0.2032 | 0.13 | 0.1626 | 0.1416 | 0.072 |

^z Percent leaf tissue with symptoms of downy mildew was estimated and severity was assessed for the affected leaves. Canopy severity was calculated from these values.

^y Mean separation letters are included although values are not statistically different from each other (Fisher's Protected LSD, *P*=0.05).