

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

The main goal of this study was to evaluate selected cucumber cultivars which 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 the use of 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 transplanted and then incorporated by disking. Neptune's Harvest hydrolyzed fish emulsion fertilizer (0.094 fl oz in 6 fl oz water) was poured into each transplant hole before planting. On 12 Sep plants were side-dressed with Bio-Diversity 8-2-8 organic fertilizer at 375 lb/A and cultivated for incorporation. 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 5 times approximately weekly from 3 Sep, before symptoms were seen, through 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. 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 seen on 22 Sep, 8 days after 3 days of rain and 10 days before the first rating date. Conditions for downy mildew development were favorable because of 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. Straight Eight had significantly greater incidence and severity of downy mildew than the other cultivars. Straight Eight is an older cultivar with no genes for resistance to downy mildew. The other five cultivars evaluated were bred to have resistance for the strains of *Pseudoperonospora cubensis* that dominated the pathogen population before 2004. Calypso and Feisty have generally exhibited better suppression than other cultivars in several evaluations conducted at North Carolina State University since 2005.

| Cultivar | Downy mildew assessments ^z | | | | | |
|-------------------------|---------------------------------------|--------|-----------------------------|--------|-----------------|--|
| | Incidence | | Severity on affected leaves | | Canopy severity | |
| | 2-Oct | 9-Oct | 2-Oct | 9-Oct | 9-Oct | |
| Calypso | 37. 5 b ^y | 43.3 b | 24.4 b | 7.0 b | 3.0 b | |
| Feisty..... | 37. 5 b | 53.8 b | 32.5 b | 12.0 b | 6.1 b | |
| Jackson Classic | 35. 0 b | 46.3 b | 25.0 b | 14.3 b | 6.0 b | |
| Wainwright Classic..... | 38. 8 b | 52.5 b | 21.3 b | 12.3 b | 6.3 b | |
| Sassy | 35. 0 b | 52.5 b | 21.3 b | 16.5 b | 8.4 b | |
| Straight Eight..... | 65. 0 a | 82.5 a | 47.5 a | 65.0 a | 52.4 a | |
| P-value..... | 0.0018 | 0.0042 | 0.005 | 0.0004 | 0.0002 | |

^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 Means followed by the same letter are not statistically different from each other (Fisher's Protected LSD, P=0.05).