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

M.R. Uebbing and M.K. Hausbeck
Michigan State University
Department of Plant, Soil, and Microbial Sciences
East Lansing, MI 48824

Evaluating pickling cucumber cultivars for resistance to downy mildew under natural infection conditions, 2022.

The trial was established at the Michigan State University Plant Pathology Farm in Lansing, MI, in a field of Capac loam soil previously planted to cucumber. The field was plowed on 20 May and disced on 1 Jun. Preplant fertilizer (220 lb/A urea and 180 lb/A of potash) was applied and incorporated on 1 Jun. On 9 Jul, raised beds were formed in the field with black plastic mulch 8 ft apart with drip tape (0.65 gpm/100 ft) for irrigation and in-season fertilization. Biweekly mechanical cultivation and hand weeding were used for weed control. Planting occurred on 26 Jul from seed. The cultivars used for this experiment were 'Straight-Eight', 'Liszt', 'WI7088D', 'WI7821', 'WI7822', 'Gy14DH', 'Chaperon', 'Peacemaker', and 'Citadel'. Cultivars were arranged in a randomized complete block design with four replications. Each replicate was 20 ft with a 5-ft buffer between each plot in a row. Each week during the growing season the trial was fertilized with urea ammonium nitrate (28% N) liquid fertilizer at 1.0 gal/A through the drip tape. Quadris F (15.5 fl oz/A) and Torino SC (3.4 fl oz/A) were sprayed on 26 Aug to control the incidence of Alternaria leaf spot, Alternaria leaf blight, and powdery mildew; Admire Pro (10.5 fl oz/A) was applied through the drip lines on 10 Aug for insect control. The plots were rated for disease severity on 24, 29 Aug and 5 Sep by estimating the percentage of foliage with downy mildew symptoms and area under the disease progress curve (AUDPC) was calculated at the end of the season. Data were analyzed with SAS statistical software, version 9.4, using the PROC GLIMMIX procedure for a one-way ANOVA, with mean separation performed using Tukey's honestly significant difference test (P=0.05).

On 24 Aug, disease severity in the susceptible check ('Straight-Eight') was 26.3% and increased significantly on 29 Aug (86.3%). On 29 Aug, 'Straight-Eight' was not different from 'Liszt', 'Gy14DH', and 'WI7822' but had more disease than all other cultivars. On 5 Sep, all cultivars had significantly less disease than 'Straight-Eight' except 'Liszt' and 'WI7822'; 'WI7088D' had significantly less disease (4.8%) than all other cultivars except 'Chaperon' and 'Peacemaker'. According to the area under the disease progress curve (AUDPC), 'WI7088D' was not different from 'Chaperon', 'Citadel', or 'Peacemaker'. Overall this study shows that multiple cultivars evaluated ('WI7088D', 'Chaperon', 'Peacemaker', and 'Citadel') show moderate levels of resistance to the downy mildew disease under natural infection conditions with high pathogen pressure in Michigan.

Cultivar	Foliar infection (%)[z]			
	24 Aug	29 Aug	5 Sep	AUDPC
Straight-Eight	26.3	86.3 a[y]	88.8 a	893.8 a
WI7088D	13.8	8.0 d	4.8 e	99.0 d
Peacemaker	10.0	27.5 cd	23.8 de	273.1 cd
Chaperon	13.8	26.3 cd	26.3 de	283.8 cd
Citadel	12.5	31.3 cd	28.8 d	319.4 cd
WI7821	13.8	48.8 bc	46.3 cd	488.8 bc
WI7822	13.8	60.0 a-c	73.8 ab	652.5 ab
Gy14DH	17.5	67.5 ab	65.0 bc	676.3 ab
Liszt	17.5	70.0 ab	66.3 a-c	695.6 ab
P-value	0.0701	<0.0001	<0.0001	<0.0001

[z]Based on visual estimation of foliage diseased (%).
[y]Column means with the same letter are not significantly different according to Tukey's honestly significant difference test (P=0.05) using ANOVA, SAS.