

Efficacy of fungicides for managing downy mildew organically in cucumber, 2016.

A field experiment was conducted at the Long Island Horticultural Research and Extension Center (LIHREC) in Riverhead, NY, on Haven loam soil. Fertilizer (N-P-K, 10-10-10) at 1000 lb/A (100 lb/A of nitrogen) was broadcast over the bed area and incorporated on 20 Jun. Beds were formed with drip tape and covered with black plastic mulch on 20 Jun. Seeds were sown on 5 Jul in the greenhouse. Seedlings were transplanted by hand into the holes in the beds on 1 Aug. During the season, water was provided as needed via drip irrigation. For initial weed control Strategy 3 pt/A, Sandea 0.5 oz/A, and Roundup PowerMax 22 oz/A were applied on 27 Jun by tractor-sprayer between the rows. Weeds were also managed by hand weeding and covering soil next to mulched rows with landscape cloth. Plots were single 18-ft rows with 9 plants at 24-in. spacing. Rows were 4 ft apart. The plots were 6 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. Fungicides were applied weekly for 7 weeks beginning on 8 Aug with a backpack CO₂-pressurized sprayer equipped with a single-nozzle boom and a TJ60-4004EVS nozzle delivering 50 gal/A operated at 55 psi and 2.4 mph. Downy mildew severity was assessed on 29 Aug, and 7, 14, and 26 Sep by estimating incidence of symptomatic leaves in each plot and rating severity on nine representative affected leaves. Incidence and average severity for symptomatic leaves were used to estimate canopy severity. Fruit was removed from plants to maintain plant growth; yield was not assessed. Area Under Disease Progress Curve (AUDPC) values were calculated from 29 Aug through 26 Sep. Average monthly high and low temperatures (°F) were 86/70 in Jul, 86/71 in Aug, and 77/61 in Sep. Rainfall (in.) was 2.93, 2.19, and 3.23 for these months, respectively.

Downy mildew developed naturally in this experiment, and progressed in severity steadily after disease onset. Only one treatment, Nordox, controlled downy mildew significantly compared to the untreated plots based on AUDPC values. The Milagrum Plus and Forticept Agro treatments showed some activity early in the season, with both providing control on 7 Sep, but failed to hold up when disease pressure increased as the growing season continued. It should also be noted that even the Nordox treatment failed to control downy mildew later in the season, and with the entire season taken into account, only provided 29% control relative to the untreated plots. This level of effectiveness would not be acceptable in commercial settings. No phytotoxicity was observed.

Treatment and Rate/A (application dates) ^x	Canopy severity (% symptomatic tissue in plot) ^{y,z}				
	29 Aug	7 Sep	14 Sep	26 Sep	AUDPC
Untreated control	0.61 a	10.7 a	13.9 a	53.3 a	540.2 a
Milagrum Plus 60 oz (1-7)	0.13 b	6.2 bc	17.2 a	46.8 a	493.9 ab
Double Nickel 55 LC 3 qt (1,2)					
Forticept Agro 0.66 %v/v (3-7)	0.29 ab	6.8 b	10.9 a	57.0 a	500.6 ab
Nordox 75WG 1.25 lb (1-7)	0.01 b	2.6 c	8.0 a	47.7 a	383.1 b
<i>P</i> -value (treatment)	0.004	0.001	0.214	0.154	0.043

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

^y Some data was square root transformed before analysis. Table contains de-transformed means.

^x Rate of formulated product/A. Application dates were 1=5 Aug, 2=12 Aug, 3=19 Aug, 4=26 Aug, 5=2 Sep, 6=9 Sep, and 7=16 Sep.