

**Fungicide sensitivity of cucurbit downy mildew pathogen population on Long Island, NY, determined using a seedling bioassay, 2018.**

A cucumber seedling bioassay was used to examine fungicide sensitivity in the local cucurbit downy mildew pathogen population. The cultivar Silver Slicer was selected due to its resistance to powdery mildew and susceptibility to downy mildew. Seeds were sown in a greenhouse on 28 Aug. Seedlings at the cotyledon stage were transferred individually to 4-in. pots on 5 Sep. At approximately the 3-leaf stage, the seedlings were prepared for treatment by removing the growing tip with unexpanded leaves and then sprayed to coverage with one of 11 fungicides at full and half label rates. The technical ingredient zoxamide was used rather than a formulated product because Gavel and Zing! contain another active ingredient. Applications were made with a backpack sprayer using a Twin-jet nozzle delivering 50 gal/A operated at 55 psi on 14 Sep. On the following day the seedlings were organized into six replications and placed in different areas of a previously established cucumber downy mildew fungicide efficacy field experiment with naturally occurring downy mildew. Each replication had one seedling treated with each fungicide treatment plus two control seedlings treated with water and was placed next to plots where no fungicides had been applied in the field experiment. Seedlings were left for two days for infection to occur naturally, then moved into a greenhouse until symptoms developed. On 21 and 25 Sep, seedlings were evaluated for disease severity based on percent coverage with visible symptoms on each of the three leaves and the average severity was analyzed. While in the field, the seedlings were exposed to a large population of cucumber beetles that fed on the seedlings resulted in severe damage and in some cases, caused loss of entire seedling. In order to salvage the experiment, the six replications were condensed to three and in some cases seedlings were rated for downy mildew severity on only one or two leaves. Data was analyzed with one-way ANOVA and Tukey's HSD to separate means using JMP statistical software.

Control seedlings became severely affected by downy mildew. Quadris, Revus, and Presidio were ineffective at both rates likely due to fungicide resistance, which has been previously reported. None of these fungicides had been applied in the field experiment this season therefore selection for resistance occurred elsewhere. The other eight fungicides tested were very effective at both full and half label rates. Five of these (Previcur Flex, Orondis, Ranman, Zampro, and Bravo) had been applied as components of fungicide programs tested in the field experiment where the seedling bioassay was conducted.

Treatment and rate/A	Downy mildew severity on seedlings (%) <sup>z,y</sup>	
	21 Sep	25 Sep
Control	28.7 a	59.9 a
Quadris 7.75 fl oz	32.2 a	73.4 a
Quadris 15.5 fl oz	34.7 a	63.6 a
Revus 4 fl oz	18.5 a	42.0 a
Revus 8 fl oz	21.4 a	37.3 a
Presidio 2 fl oz	26.7 a	46.2 a
Presidio 4 fl oz	16.1 a	29.8 a
Curzate 2.5 oz	0.0 b	0.1 b
Curzate 5 oz	0.1 b	0.6 b
Previcur Flex 9.6 fl oz	1.8 b	5.2 b
Previcur Flex 19.2 fl oz	0.1 b	1.0 b
Zampro 7 fl oz	1.7 b	2.1 b
Zampro 14 fl oz	0.2 b	0.5 b
Forum 6 fl oz	0.9 b	1.9 b
Forum 3 fl oz	0.5 b	0.4 b
Bravo Ultrex 0.7 lb	0.6 b	1.0 b
Bravo Ultrex 1.4 lb	0.3 b	0.4 b
Orondis Gold 4.6 fl oz	0.0 b	0.1 b
Orondis Gold 9.2 fl oz	0.0 b	0.3 b
Zoxamide 200 ppm	0.1 b	0.2 b
Zoxamide 400 ppm	0.0 b	0.0 b
Ranman 1.3 fl oz	0.0 b	0.0 b
Ranman 2.75 fl oz	0.0 b	0.0 b
<i>P-value (treatment)</i>	<0.0001	<0.0001

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

<sup>y</sup>Values were square root transformed before analysis because raw data were not distributed normally. Table contains back-transformed values.