

# Vine Crop Update 2015

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Cucurbit downy mildew, caused by the water-mold pathogen *Pseudoperonospora cubensis*, continues to be a serious problem for cucurbit growers in New York. While all cucurbits are susceptible, cucumbers are highly susceptible and have been extremely hard hit by downy mildew in recent years. During the 2015 season, we looked at fungicide sensitivity for conventional control products and efficacy in organically approved control products.

For the fungicide sensitivity study, we grew susceptible cucumber plants in small pots in the greenhouse. Treatments (11 fungicides + water control) were applied to plants and they were placed in the field between rows of cucumbers with cucurbit downy mildew symptoms (four reps per treatment). The potted plants were left in the field for 48 hours, then brought into the greenhouse and rated for disease severity after five days. The results can be seen in Table 1.

Table 1. Results of fungicide sensitivity assay. Four fungicides had significantly more disease than the other seven, and two of the fungicides were not significantly different from plants treated with water.

Product	Rate	Active Ingredient	FRAC code	Mean % Disease	
water	na	na		65	a
Previcur Flex 6SL	1.2 pt/A	Propamocarb	28	58.8	a
Revus 2.08SC	8 fl oz/ A	Mandipropamid	40	55	ab
Quadris 2.08F	15.5 fl oz/A	Azoxystrobin	11	47.5	bc
Tanos 50DF	8 oz/A	Famoxadone + Cymoxanil 25%	11 27	42.5	c
Presidio 4SC	4 fl oz/A	Fluopicolide	43	12.5	d
Gavel 75DF	2lb/A	Mancozeb + Zoxamide	M3 22	10.5	de
Bravo Weatherstik	2pt/A	Chlorothalonil	M5	6.3	def
Manzate ProStik 75DG	2lb/A	Mancozeb	M3	6.3	def
Omega 500F	1.5pt/A	Fluazinam	29	2.1	ef
Curzate 60DF	5oz/A	Cymoxanil 60%	27	1.5	ef
Ranman 400SC	2.75 fl oz/A	Cyazofamid	21	0.1	f

The second experiment focused on control products approved for control of cucurbit downy mildew in organic production. A total of eight treatments plus and untreated control were used in this experiment with four replicates of each treatment in a randomized complete block design. Plants (the cucurbit downy mildew susceptible cultivar Diva) were grown in a field that has been managed using practices allowed for organic production since 2008. The treatments included plant activators and products that

act directly on the pathogen. The results can be seen in Table 2. It was interesting to see that Zonix was somewhat effective against downy mildew, as this product (a rhamnolipid biosurfactant) acts by disrupting the cell membrane of the zoospores (swimming spores) of downy mildew and has a very different mode of action from other products tested. While all products were better than the untreated control, all plots were heavily diseased by the final rating.

Table 2. Results of product efficacy study. All treatments had statistically better disease control than the non-treated control. When looking at the final disease rating, two of the treatments (Zonix and Nordox) had better disease control than Actinovate.

Treatment	Active ingredient	Mean AUDPC (amount of disease over time)	Final rating % disease
Champ 30 WG	Copper hydroxide	319.3 b	50.0 bc
Cueva FL	Copper octanoate	232.4 b	47.5 bc
Double Nickel	<i>Bacillus amyloliquefaciens</i>	306.0 b	50.0 bc
Nordox 75 WG	Cuprous oxide	229.3 b	45.0 c
Zonix	Rhamnolipid biosurfactant	257.3 b	43.8 c
Actinovate AG	<i>Streptomyces lydicus</i>	301.3 b	57.5 b
Regalia	<i>Reynoutria sachalinensis</i> extract	257.5 b	51.3 bc
Regalia + Actinovate		236.0 b	48.8 bc
Non-treated control		483.8 a	77.5 a