

**Project Title:** Cucumber Downy Mildew Fungicide Evaluation Trial 2018

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**Objective:** Downy mildew, an aggressive plant pathogen, can develop at any time during the cucumber season and have devastating consequences for cucumber growers. It is a very destructive disease and progresses rapidly under favorable weather conditions. In 2006, downy mildew appeared early in Ontario causing extensive crop defoliation and yield losses. The severity of the disease resulted in some growers only meeting about 70% of the contracted tonnage. From 2007 to 2009, with the availability of more fungicides through emergency registrations, the severity of the disease was reduced and crop yields were maintained. In 2015 downy mildew showed up early in mid-June and infection on many crops was severe by the end of the month. Disease pressure was high, but was kept in check with regular, weekly spray applications. In 2016, disease pressure was low due to dry and hot conditions, however downy mildew was still present. Over the past few years, we have seen disease resistance to some fungicides that were effective in the past in controlling downy mildew in cucumbers. Testing of current registered products is necessary for making informed recommendations on spray programs that will continue to be effective in controlling downy mildew. Also, evaluating new products is important for the registration of new effective fungicides to control downy mildew, which is a great benefit to the Ontario processing cucumber industry.

**Methodology:** One trial was conducted at the Simcoe Research Station, University of Guelph in 2018. Cucumber cultivar 'Vlaspik' was seeded using a precision seeder on June 21 in rows 28 inches apart with in-row plant spacing of 4" to give a plant population of 56,000 plants/per acre. The crops were grown according to accepted commercial practices used in Ontario. The trial was setup as a randomized complete block design with 4 replications per treatment. Treatments were applied using a hand-held CO<sub>2</sub> backpack sprayer with air induction, low drift (AI TeeJet 110015-VS) nozzles at a pressure of 40 psi and water volume of 200 L/ha. There were a total of 10 treatments evaluated, including an untreated control (Table 1). Treatments were applied to plots on July 12, 18, 26 and August 2.

Downy mildew visual ratings were made at weekly intervals starting on July 13<sup>th</sup>, however the disease never developed on any of the plots, not even a couple weeks after harvest was complete. Mature fruit were harvested by hand on August 8<sup>th</sup>, targeting a crop that was at approximately 10% grade 4 (2" in diameter). Yields were measured as graded fruit #'s and weights. Plot yields were converted to tons/acre for reporting purposes. Oversize fruit (>2 1/8 " in diameter) were not included in the yield data.

**Results:** In 2017, downy mildew infection was considerably more severe than in 2018. Downy mildew did not appear at the location of the trials until the end of August, weeks after harvest was complete. Consequently there were no downy mildew control ratings during the season on this trial. Final yield results reflect the absence of downy mildew. There were no significant differences between treatments. The treatments did not have a negative effect on yield in the absence of disease, which is expected.

Table 1: Treatment list description for cucumber downy mildew fungicide evaluations, Simcoe, ON, 2018.

<b>Product Name</b>	<b>Active Ingredient(s)</b>	<b>Registration Notes</b>
Bravo ZN	chlorothalonil	Registered in Canada for use on cucumbers
Torrent + Sylgard	cyazofamid silicone surfactant	Registered in Canada for use on cucumbers
Tattoo C	propamocarb/chlorothalonil	Registered in Canada for use on cucumbers
Zampro + Sylgard	ametoctradin/dimethomorph silicone surfactant	Registered in Canada for use on cucumbers
Orondis Ultra	mandipropamid/oxthiapiprolin	Registered in Canada as a copack of Orondis Ultra A and Orondis Ultra B for use on cucumbers
Allegro	fluazinam	Registered in Canada on beans, brassica crops, carrots & potatoes. Registered in U.S. on cucumbers
Zing!	zoxamide/chlorothalonil	Registered in U.S. on cucumbers
Gavel	zoxamide/mancozeb	Registered in Canada on potatoes and in the U.S. on cucumbers
Torrent alt. Diplomat	cyazofamid polyoxin d zinc salt	Applied every other application alternated with Diplomat Non-conventional product registered in Canada on fruits and vegetables

**Table 2:** Incidence of cucumber leaves with downy mildew symptoms and yield of cucumbers harvested from plots sprayed with different fungicides, Simcoe, ON, 2018.

Product**	Rate per Acre	% Downy Mildew Infection*				Yield t/acre
		Jul-17	Jul-25	Aug-1	Aug 7	
Bravo ZN	1.9 L	0	0	0	0	12.4 a
Torrent + Sylgard	81 mL 0.1 % v/v	0	0	0	0	16.5 a
Tattoo C	1.1 L	0	0	0	0	14.5 a
Zampro + Sylgard	0.4 L 0.1 % v/v	0	0	0	0	14.3 a
Orondis Ultra A	162 mL	0	0	0	0	12.0 a
Orondis Ultra B	35 mL	0	0	0	0	12.0 a
Allegro	1.0 L	0	0	0	0	14.1 a
Zing!	1.1 L	0	0	0	0	12.7 a
Gavel	0.9 kg	0	0	0	0	14.2 a
Torrent alt. Diplomat	81 mL 0.4 L	0	0	0	0	12.3 a
Untreated Control		0	0	0	0	14.8 a

Planting Date : June 21  
Plant Population : 56,000 plants/Ac

Date of First Application : July 12  
Harvest Date : August 8

\* Based on overall leaf canopy damage

\*\* First application was applied at the 1-2-leaf stage, subsequent applications were made on a 7-day spray interval, 4 applications total.

Means followed by the same letter do not significantly differ (P=0.05, Tukey's HSD)