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Fungicide Efficacy Summary Tables for Management of Diseases in Field Tomatoes

Dr. Cheryl Trueman, Ridgetown Campus – University of Guelph



About these tables:

These tables were created using results from replicated processing tomato field trials at the Ridgetown Campus, University of Guelph. Please contact the author (ctrueman@uoguelph.ca) for more information on research methods and copies of full reports. The tables are for information only and do not guarantee successful results with the use of any product.

Always check the most recent version of the product label before applying any product.

Only products labelled for 'control' of the specific disease are included in each table except where noted.

Late blight:

An Ontario-specific version of fungicide ratings for late blight (<http://www.omafra.gov.on.ca/IPM/english/tomatoes/diseases-and-disorders/late-blight.html>) by Janice LeBoeuf (OMAFRA) was updated in 2017 and is posted here (<https://onvegetables.com/2017/07/26/late-blight-alert-july-28th-2017/>).

Anthraxnose (fruit rot):

Fungicide trials for anthracnose (<http://www.omafra.gov.on.ca/IPM/english/tomatoes/diseases-and-disorders/anthracnose.html>) management are completed on a regular basis at the Ridgetown Campus, University of Guelph. Only data from trials with high disease pressure were considered in developing these ratings.

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Fungicide Efficacy Summary Tables for Management of Diseases in Field Tomatoes...con't

Trade Name*	Active Ingredient(s)	FRAC Group(s)	# of Trials	Rating**
Various	Mancozeb	M3	1	+++
Various	Chlorothalonil	M5	5	+++
Inspire	Difenoconazole	3	3	+
Bravo Top	Difenoconazole + chlorothalonil	3 + M5	3	+++
Lance / Cantus	Boscalid	7	3	0
Aprovia	Benzovindiflupyr	7	2	+++
Sercadis	Fluxapyroxad	7	2	++
Fontelis	Penthiopyrad	7	3	+++
Reason	Fenamidone	11	1	0
Cabrio	Pyraclostrobin	11	3	+++
Quadris	Azoxystrobin	11	4	+++
Quadris Top	Azoxystrobin + difenoconazole	11 + 3	3	+++

* Not all products may be registered for this crop-disease combination. Always check product labels before use.

**0 (no effect) no difference from control plots that receive no fungicide; + (poor) inconsistent control and/or some effect at reducing; ++ (OK to good) consistent control, does not perform as well as +++ products in all years; +++ (very good) consistent control, consistently one of the best fungicides in the trial.

Early blight:

Early blight(<http://www.omafr.gov.on.ca/IPM/english/tomatoes/diseases-and-disorders/early-blight.html>) disease pressure is inconsistent at the Ridgetown Campus, University of Guelph. Ratings represent results of only two efficacy trials when disease pressure was high and significant levels of late blight were absent.

Trade Name*	Active Ingredient(s)	FRAC Group(s)	# of Trials	Rating**
Cueva	Copper octonate	M1	1	0
Various	Mancozeb	M3	1	+
Various	Chlorothalonil	M5	2	++ to +++
Inspire	Difenoconazole	3	1	++
Lance / Cantus	Boscalid	7	1	+++
Sercadis	Fluxapyroxad	7	1	+
Fontelis	Penthiopyrad	7	2	++
Aprovia TOP	Benzovindiflupyr + difenoconazole	7 + 3	1	+++
Scala	Pyrimethanil	9	1	++
Reason	Fenamidone	11	1	++
Cabrio	Pyraclostrobin	11	1	++
Quadris	Azoxystrobin	11	2	+++
Quadris Top	Azoxystrobin + difenoconazole	11 + 3	1	+++
Tanos	Famoxadone + cymoxanil	11 + 27	1	+++
Phostrol	Mono- and di-potassium salts of phosphorous acid	33	1	0
Phostrol + Cueva	Mono- and di-potassium salts of phosphorous acid + copper octonate	33 + M1	1	0
Phostrol + Bravo ZN	Mono- and di-potassium salts of phosphorous acid + copper octonate	33 + M5	1	+++

*Not all products may be registered for this crop-disease combination. Always check product labels before use.

**0 (no effect) no difference from control plots that receive no fungicide; + (poor) inconsistent control and/or some effect at reducing; ++ (OK to good) consistent control, does not perform as well as +++ products in all years; +++ (very good) consistent control, consistently one of the best fungicides in the trial.

Fungicide Efficacy Summary Tables for Management of Diseases in Field Tomatoes...con't

Septoria leaf spot:

Septoria leaf spot(<http://www.omafra.gov.on.ca/IPM/english/tomatoes/diseases-and-disorders/septoria-leaf-spot.html>) pressure is inconsistent at the Ridgetown Campus, University of Guelph. Ratings represent results of only two efficacy trial when disease pressure was high and significant levels of late blight were absent.

Trade Name*	Active Ingredient(s)	FRAC Group(s)	# of Trials	Rating**
Cueva	Copper octanoate	M1	1	0
Various	Mancozeb	M3	1	+
Various	Chlorothalonil	M5	2	++ to +++
Bravo Top	Chlorothalonil + difenoconazole	M5 + 3	1	+++
Aprovia	Benzovindiflupyr	7	1	+++
Sercadis	Fluxapyroxad	7	2	++ to +++
Fontelis	Penthiopyrad	7	2	+++
Aprovia TOP	Benzovindiflupyr + difenoconazole	7 + 3	1	+++
Quadris	Azoxystrobin	11	2	+++
Quadris Top	Azoxystrobin + difenoconazole	11 + 3	1	+++
Tanos	Famoxadone + cymoxanil	11 + 27	1	+++
Phostrol	Mono- and di-potassium salts of phosphorous acid	33	1	0
Phostrol + Cueva	Mono- and di-potassium salts of phosphorous acid + copper octanoate	33 + M1	1	0
Phostrol + Bravo ZN	Mono- and di-potassium salts of phosphorous acid + copper octanoate	33 + M5	1	+++

** Not all products may be registered for this crop-disease combination. Always check product labels before use.

**0 (no effect) no difference from control plots that receive no fungicide; + (poor) inconsistent control and/or some effect at reducing; ++ (OK to good) consistent control, does not perform as well as +++ products in all years; +++ (very good) consistent control, consistently one of the best fungicides in the trial.

Interested in a product not on the list?

If you didn't find the product information you were looking for, check out the fungicide efficacy ratings from other locations: Wisconsin (late blight), New York (late blight)([http://vegetablemdonline.ppath.cornell.edu/NewsArticles/2014%20PotatoFungicide emphasis on late%20blight.pdf](http://vegetablemdonline.ppath.cornell.edu/NewsArticles/2014%20PotatoFungicide%20emphasis%20on%20late%20blight.pdf)), New York (late blight, early blight)(<http://vegetablemdonline.ppath.cornell.edu/NewsArticles/2014-Potato-Efficacy-Rating-NY.pdf>).

Keep in mind that the efficacy ratings linked above are US sources and not all of the products are registered in Canada, or registered on late blight of field tomato. For information on registered tomato fungicides for Ontario, see OMAFRA's Vegetable Crop Protection Guide(<http://www.omafra.gov.on.ca/english/crops/vegpubs/vegpubs.htm>). Always read and understand the label before using any crop protection product

Chlorothalonil (Bravo/Echo) Use Changes for Vegetable Growers

Dennis Van Dyk, Vegetable Crop Specialist, OMAFRA



This past year PMRA released the final decision on the re-evaluation of chlorothalonil products such as Bravo and Echo. Below is a summary table for the final use changes from the PMRA decision. Label changes will take effect as soon as amended labels are published by the PMRA and no later than May 10, 2020.

A printable and accessible version is also available.

Legend	
New additional to label	Increase in REI ¹ (compared to 48 hours) ²
Reduction in the number of applications permitted	Decrease in REI (compared to 48 hours)
¹ REI: Restricted entry interval.	
² Previous 48 hour REI for vegetable crops was derived from registrant technical information	

Crop	Max Application Rate (kg a.i./ha)	Max Number of Applications	Retreatment Interval (days)	Activity	REI (days)
Asparagus	1.2 (dry flowable) 1.7 (solution)	3	14	Scouting	4
				All other activities	0.5
Cabbage	2.4	2	7	Scouting, thinning	2
				Hand weeding	1
				All other activities	0.5
Carrot	1.6	7	7	Hand harvesting	22
				Scouting	7
				All other activities	0.5
Celery, field	2	2	3	All activities	0.5
Celery seedbeds (greenhouse)	1.4	1	N/A	All activities	0.5
Cole crops: Broccoli, Brussels sprouts, cauliflower	2.4	1	N/A	Topping (Brussels sprouts)	5
				Scouting	5
				All other activities	0.5
Corn, sweet	1.6	2	10	Hand harvesting	18
				Mechanical harvesting	14
				Scouting	1
				All other activities	0.5
Cucurbit veg (Cantaloupe, muskmelon, honeydew, squash, pumpkin, watermelon, cucumber)	2.4	2	7	All activities	0.5
Onion (dry bulb)	2.4	2	7	Hand weeding	6
				Scouting	1
				All other activities	0.5
Onion (green bunching)	2.4	2	7	Hand weeding	6
				Scouting	1
				All other activities	0.5
Parsnip	1.4	7	7	Hand harvesting	21
				Scouting	5
				All other activities	0.5
Pea, dry	1.5	2	10	Scouting	1
				All other activities	0.5
Potato (seed)	1.2	3	7	Handset irrigation	23
				Roguing	19
				Scouting	3
				All other activities	0.5
Potato (table)	1.2	3	7	Handset irrigation	23
				Scouting	3
				All other activities	0.5
Tomato (not grown for processing)	2.4 and 1.2	2 (total)	14 (for applications at 2.4 kg a.i./ha) 8 (for applications at 1.2 kg a.i./ha)	All activities	0.5
Tomato (grown for processing)	2.4 and 1.2	9 (2 applications at 2.4 kg a.i./ha and 7 applications at 1.2 kg a.i./ha)	14 (for applications at 2.4 kg a.i./ha) 8 (for applications at 1.2 kg a.i./ha)	Scouting	7
				All other activities	0.5

Be Aware and Prepare: New Potential Pest Threat to Tomatoes and Peppers

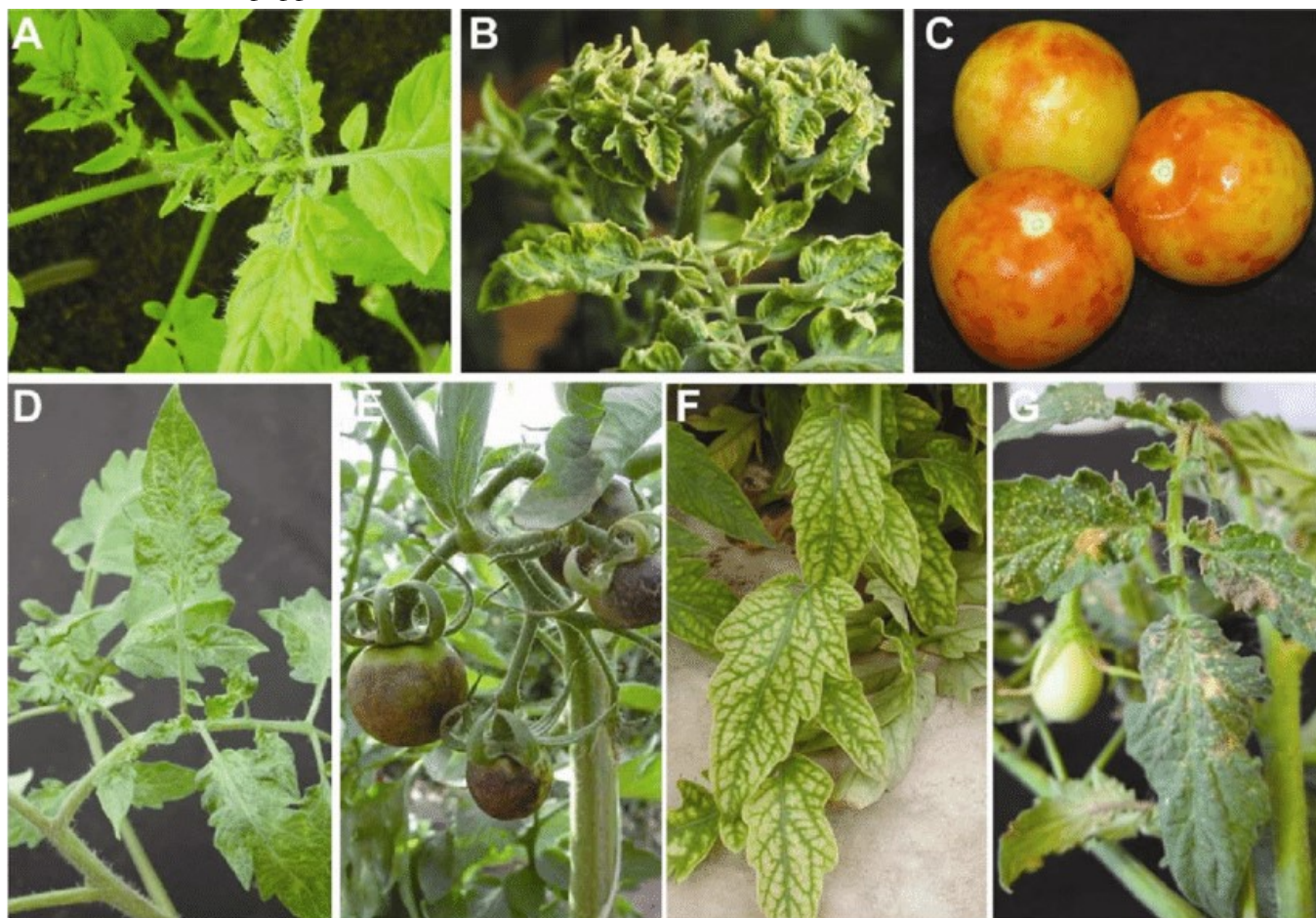
Amanda Tracey, Vegetable Crop Specialist, OMAFRA

There's buzz around the world about a new virus that has emerged in several countries. Lucky for us, it is NOT yet found in Canada. So we have an opportunity to beef up our biosecurity and be on the lookout for this nasty virus. Here's some information that can help your preparedness.

The culprit: Tomato brown rugose fruit virus (ToBRFV)

Locations: Germany, Israel, Italy, Jordan, Mexico, USA (California)

Hosts: Tomato and pepper are the main hosts



Symptoms of emerging viruses in tomato plants. A, Necrotic spots at the leaflet base induced by Tomato torrado virus; B, leaf deformation, yellowing, and stunting induced by Tomato yellow leaf curl virus; C, fruit marbling induced by Pepino mosaic virus; D, chlorotic rings and line patterns on leaves induced by Pelargonium zonate spot virus; E, fruit necrosis induced by Tomato marchitez virus; F, intervenal leaf chlorosis induced by Tomato chlorosis virus; G, necrotic leaf spots induced by Tomato necrotic spot virus. Pictures E and G are kindly provided by P. Maris (De Ruiter Seeds, Bergschenhoek, The Netherlands) and R. Gilbertson (University of California, U.S.A.), respectively.

Symptoms: As with many viruses, symptoms can vary, but include the following:

- Chlorosis, mosaic and mottling and occasionally narrowing of leaves
- Necrotic spots on peduncles, calyces and petioles
- Yellow or brown spots on fruit
- Deformed or irregular fruit
- Green stripes (on pepper fruit)

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Management: This type of virus is very stable and survives for long periods of time on surfaces. Practice strict sanitation and disinfection of workers clothing, equipment, tools, etc. Conduct thorough and frequent scouting of your crop to identify early infections.

Key message: BIOSECURITY is your main defense as prevention is key.

Here are some additional resources for more information:

- **EPPO Alert**(https://www.eppo.int/ACTIVITIES/plant_quarantine/alert_list_viruses/tomato_brown_rugose_fruit_virus)
- **California Pest Rating** (<https://blogs.cdfa.ca.gov/Section3162/?p=5843>)
- **CFIA's Farm-Level Biosecurity Guide**(<http://www.inspection.gc.ca/plants/plant-pests-invasive-species/biosecurity/guide/eng/1323477130171/1323477259986>)

This virus does appear to be more damaging in protected agriculture systems than in field production. Other hosts include tobacco, petunias, some related weed species and potentially eggplants.

If you see symptoms similar to what is listed above or suspect a viral infection in your crop, contact Amanda Tracey at amanda.tracey@ontario.ca.

Original post by Cara McCreary, Greenhouse Vegetable IPM Specialist can be found at ONgreenhousevegetables (<https://medium.com/ongreenhousevegetables/disease-alert-be-aware-and-prepare-5f74e17182dc>).

Figure Reference:

Hanssen, Inge & Lapidot, Moshe & Thomma, Bart. (2010). Emerging Viral Diseases of Tomato Crops. *Molecular plant-microbe interactions* : MPMI. 23. 539-48. 10.1094/MPMI-23-5-0539.