



Vegetable Crop Update

A newsletter for commercial potato and vegetable growers prepared by the University of Wisconsin-Madison vegetable research and extension specialists

No. 21– July 9, 2015

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Late blight updates – *First report in Wood Co. on potato*

Calendar of Events

July 15 – UW-Hancock ARS Field Day, 12:30PM, Hancock, WI
July 17 – Rhinelander State Farm Field Day, Lelah Starks Elite Found. Seed Farm, Rhinelander, WI
August 19 – UW-Arlington ARS Agronomy/Soils Field Day, 8AM, Arlington, WI
August 20 – UWEX Langlade County Airport Field Day, Antigo, WI
August 25-27 – Wisconsin Farm Technology Days, Statz Bros., Inc. Farm, Sun Prairie, WI
September 1 – UW-Arlington ARS Organic Agriculture Field Day, Arlington, WI

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Late Blight Updates

In Wisconsin: Late blight has been detected in a commercial potato field in southern Wood County on July 8, 2015. We are working on the pathogen genotype and will report this information through the newsletter as soon as possible. This is the third county to confirm the disease in Wisconsin (1st was northern Adams Co. on 23 June; 2nd was western Waushara Co. on 7 July). The genotype/strain of the late blight in northern Adams County is US-23 which is sensitive to phenylamide fungicides such as mefenoxam and metalaxyl.

Across the nation: There were new detections of late blight in NJ (tomato), NY (potato, US-23), and VT (potato) this past week www.usablight.org. To date, nationally, there have been confirmations of late blight in FL (US-23), CA (US-11), NC (strain unknown), TX (not reported on [usablight.org/strain unknown](http://www.usablight.org/strain-unknown)), WA, NJ, NY (US-23), VT, and WI (US-23).

Fungicides are critical for protection of potato and tomato crops at this time with widespread late blight.

There is not one recommended fungicide program for all late blight susceptible potato (and tomato) fields in Wisconsin. Fungicide selections may vary based on type of inoculum introduction, proximity to infected fields, crop stage, late blight strain, and other diseases that may be in need of management. Please see UWEX Veg Crop Updates article on fungicide selections from June 5 at link below.

<http://www.plantpath.wisc.edu/wivegdis/pdf/2015/June%205,%202015.pdf> or a listing of 2015

WI potato late blight fungicides: below in this newsletter – I will have this posted to the Veg Path website for future access. I attached a higher resolution pdf of this doc to my email.

If you suspect/detect late blight, have the disease confirmed (free diagnostics through my lab and the UWEX Plant Disease Diagnostic Clinic) and we can genotype for further information on the nature of the pathogen.

Potato Late Blight Fungicides Registered for WI, 2015.

In-furrow and seed treatment registrations are omitted. This is not a comprehensive list. Most fungicides listed are for use in conventional production systems. List updates July 9, 2015.

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Trade Name (rate/A)	Active Ingredient(s)	PHI	REI	FRAC #	Activity of fungicide	Comments
<u>Agri Tin, Super Tin 4L, Super Tin 80WP</u> (4-6 fl oz)	triphenyltin hydroxide	7 days	48 hours	30	protectant kills spores on contact	Restricted use pesticide. 3 fl oz rate can be used if material is tank-mixed with another fungicide. A good addition to treatment mix to limit sporulation in dense canopies.
<u>Alude</u> (1.25 qt in 90 gal water) <u>Confine Extra</u> (3-5 qt in 20 gal water/acre)	mono and dipotassium salts of phosphorous acid	0 days	4 hours	33	upregulates resistance/disease protection in plant	Foliar application
<u>Ariston</u> (2.0 pt)	chlorothalonil+ cymoxanil	14 day	12 hours	M5+27	protectant + locally systemic	Newly registered fungicide. Additional chlorothalonil may be tank-mixed with this formulation to enhance % active ingredient applied, but be sure to include the Ariston component in overall season total. Cymoxanil is same active ingredient in Curzate which is a good curative.
<u>Elixir</u> (1.2-2.0 lb)	mancozeb+ chlorothalonil	7 days	24 hours	M3+ M5	protectant	Newly registered fungicide for potato only. Use higher rate as vines increase in size.
<u>Fosphite, Rampart</u> (1-4 qt in at least 20 gal water/A)	potassium phosphite	0 days	4 hours	33	upregulates resistance/disease protection in plant	Foliar post-emergence spray and post harvest spray for control in storage.
<u>Fungi-Phite</u> (Foliar: 2 qt/A Seed trt: 15% volume to volume-2 ton in 1 gal solution) <u>Badge SC</u> (1-3 pt at 7-10 day interval)	potassium phosphite copper hydroxide, copper oxychloride	0 days	4 hours 24 hours	33 M1	upregulates resistance/disease protection in plant protectant	Seed piece spray and foliar post-emergence spray. Tank-mix with another effective fungicide is recommended and use high label rate for late blight control. Protectant activity only.
<u>Bravo Ultrex</u> (.7 then .9 to 1.36 lb) <u>Bravo WeatherStik, Echo 720, Equus 720 SST, Initiate 720, Chlorothalonil 720 SC, Chloronil 720</u> (.75 then 1-1.5 pt) <u>Bravo Zn, Equus 500 Zn</u> (1 1/8 then 1 1/5 to 2 1/4 pt)	chlorothalonil	7 days	12 hours	M5	protectant	11.25 lb a.i./acre maximum on standard label. However, WI has a special 24(c) registration for long season potatoes extending the max a.i. from 11.25 to 16 lb a.i./acre with Bravo (Syngenta) formulations.

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Trade Name (rate/A)	Active Ingredient(s)	PHI	REI	FRAC #	Activity of Fungicide	Comments
<u>Echo Zn</u> (1 to 2.125 pt) <u>Equus DF</u> (.7 then .9 to 1.36 lb) Echo 90DF (5/8 then 7/8 to 1.25 lb)	chlorothalonil	7 days	12 hours	M5	protectant	11.25 lb a.i./acre maximum on standard label. However, WI has a special 24(c) registration for long season potatoes extending the max a.i. from 11.25 to 16 lb a.i./acre with Bravo (Syngenta) formulations.
<u>Cabrio Plus</u> (2.9 lb)	pyraclostrobin+ metiram	3 days	24 hours	11+M3	locally systemic + protectant	17.4 lb/acre maximum per season. Do not apply more than 2 sequential applications.
<u>Champ WG</u> (1 to 1.5 lb 3 to 4 lb in severe areas) <u>Champ Formula 2</u> Flowable (2/3 to 2 2/3 pt) <u>Champ DP Dry</u> <u>Prill</u> (2/3 to 1 lb 2 to 2 2/3 lb when disease is severe)	copper hydroxide	0 days	24 hours	M1	protectant	Use high label rates for foliar late blight protection.
<u>Kentan DF</u> (1-2.5 lb 4 lb when severe)	copper hydroxide	0 days	24 hours	M1		Use high label rates for foliar late blight protection.
<u>Kocide 2000</u> , <u>Kocide 3000</u> (.73- 3 lb .5-1.75 lb)						
<u>Nu-Cop 3L</u> (2/3 to 2 pt 2 to 4 pt if severe)						
<u>Nu-Cop 50DF</u> (1-1.5 lb 3-4 lb if severe)						
<u>C-O-C-5 WDG</u> (1.5- 4 lb)	copper oxychloride, basic copper sulfate	0 days	24 hours	M1	protectant	Use high label rates for foliar late blight protection.
<u>Cuprofix-Ultra 40</u> <u>Dispers</u> (0.75-3.0 lb)						
<u>Mastercop</u> (0.5-1.5 pt)	copper sulfate pentahydrate	0 days	24 hours	M1	protectant	Use high label rates for foliar late blight protection.

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<u>Cueva</u> (2 gal in 50-100 gal water/acre)	copper octanoate	0 days	24 hours	M1	protectant	Use high label rates for foliar late blight protection.
<u>Curzate 60DF</u> (3.2 oz foliar)	cymoxanil	14 days	12 hours	27	locally systemic	Locally-systemic fungicide. Must be tank-mixed with a protectant fungicide. Rainfast within 2 hours. Excellent curative activity.
<u>Dithane F45 Rainshield</u> (.4 to 1.6 qt)	mancozeb	24 hours	3 days	M3	protectant	Max rate per acre/season is 11.2 lb a.i. Plant as soon as possible after seed treatment. Late season, post vine kill, treatments can limit spore survival and protect against tuber blight.
<u>Dithane M45</u> (.5 to 2 lb)						
<u>Koverall, Roper DF Rainshield</u> (1-2.0 lb)						
<u>Evito 480SC, Aftershock</u> (3.8 fl oz)	fluoxastrobin	7 days	12 hours	11	locally systemic	Follow label for resistance management.
<u>Forum</u> (Foliar and tuber control: 6 oz)	dimethomorph	4 days	12 hours	40	systemic	May be tank-mixed with another effective fungicide for enhanced management. Addition of an adjuvant may enhance management. Can be applied after vine kill. Good antisporeulant
<u>Gavel 75DF</u> (1.5 to 2 lb)	zoxamide+ mancozeb	3 days	48 hours	22+M3	protectant	Do not make >6 applications/crop. Contact fungicide. Excellent in limiting leaf blight.
<u>Gem 500SC</u> (3.8 fl oz)	trifloxystrobin	7 days	12 hours	11	locally systemic	Follow label for resistance management.
<u>Headline</u> (6 to 12 fl oz)	pyraclostrobin	3 days	12 hours	11	locally systemic	Follow label for resistance management.
<u>ManKocide</u> (1.5 to 2 then 4-5 lb)	mancozeb+ copper hydroxide	3 days	24 hours	M3+ M1	protectant	Not labeled as a seed trt for potatoes.
<u>Omega 500F</u> (5.5 fl oz)	fluazinam	14 days	48 hours	29	protectant	REI is 4 days for high exposure activities. New special local need label 24c in April 2011.
<u>Omega Top MP</u> (5.5 fl oz) – individual label for Omega sold in co-pack with Top MP (difenoconazole)	fluazinam	14 days	48 hours	29	protectant + locally systemic	Can be applied aerially. REI is 4 days for high exposure activities.
<u>Oxidate</u> (40 to 120 fl oz to 100 gal water, 30- 100 gal solution per acre)	hydrogen dioxide	0 days	1 hour	NC	kills spores on contact no residual protectant activity after treatment	Foliar spray for late blight. Frequent applications (5-day intervals) can limit sporulation. This fungicide should be considered an additive to an organic fungicide program, but should be alternated by a copper or other effective protectant fungicide program for organic systems.

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Trade Name (rate/A)	Active Ingredient(s)	PHI	REI	FRAC #	Activity of fungicide	Comments
Penncozeb 80WP, Penncozeb 75DF (.5 to 2 lb) Penncozeb 4FL, Manzate flowable (.4 to 1.6 qt) Manzate Pro-Stick (1 to 2 lb, seed trt: 1.25 lb/50 gal water)	mancozeb	3 days	24 hours	M3	protectant	Do not exceed 11.2 lb a.i./acre/year. Late season, post vine kill, applications can limit spore viability in soil around tubers and limit tuber infection. Late season, post vine kill, application may limit spore survival and control tuber blight.
Phostrol (2.5 to 10 pt) (Post harvest trt: 1 gal/ton in .5 gal water)	mono- and di- basic sodium, potassium, and ammonium phosphites	0 days	4 hours	33	upregulates resistance or plant defense	Can be applied as a foliar for late blight, pink rot, and Pythium leak. Can be applied post-harvest for storage disease control. Not the best protectant for late blight, but excellent if applied multiple times to foliage for upregulation of late blight and pink rot resistance in the tubers (start at dime sized tubers and apply every 2 weeks for total of at least 3 sprays).
Polyram 80DF (1.5 to 2 lb in 15 gal water/acre minimum)	metiram	3 days	24 hours	M3	protectant	Metiram is an EBDC, like mancozeb (M3). Total amount of a.i. per year/acre must include all EBDCs.
Previcur Flex (.7 to 1.2 pt)	propamocarb hydrochloride	14 days	12 hours	F	systemic antisporeulant	Apply in a tank-mix with effective protectant. Can be applied as a broadcast or banded application over the row, post-emergence. Excellent at killing spores if used on a field with new and sporulating late blight lesions. Good curative activity.
Priaxor (4-8 fl oz)	fluxapyroxad+ pyraclostrobin	7 days	12 hours	7+11	protectant + locally systemic	Cannot apply more than 3 applications/season. Follow label for resistance management. Xemium and Headline pre-mix.
Quadris, Satori (6 to 15.5 fl oz)	azoxystrobin	14 days	4 hours	11	locally systemic	Alternate away from Group 11 fungicides to manage resistance.
Quadris Opti (1.6 pt)	azoxystrobin+ chlorothalonil	14 days	12 hours	11+M5	locally systemic + protectant	Alternate away from Group 11 fungicides to manage resistance.
Ranman (1.4 to 2.75 fl oz)	cyazofamid	7 days	12 hours	21	protectant	Follow label for resistance management.
Reason (5.5 to 8.2 fl oz)	fenamidone	14 days	12 hours	11	locally systemic	Follow label for resistance management. Has a foliar and seed trt label for late blight control.
Revus (5.5 to 8 fl oz)	mandipropamid	14 days	4 hours	40	locally systemic	Addition of an adjuvant is recommended.
Revus Top (5.5 to 7 fl oz)	mandipropamid+ difenoconazole	14 days	12 hours	40+3	locally systemic + contact	Addition of an adjuvant is recommended.
Tanos (8 to 10 oz)	cymoxanil + famoxadone	14 days	12 hours	27+11	locally systemic + contact	Must be tank-mixed with an effective protectant fungicide. Good protectant for limiting leaf blight. Excellent curative.

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<u>Ridomil Gold SL</u> (1 to 2 pt)	mefenoxam	14 days	48 hours	4	systemic	Do not apply beyond the at-planting stage. Excellent two-way systemic activity when pathogen strain is sensitive (ie: US-23).
<u>Ridomil Gold Bravo SC</u> (2.5 pt)	mefenoxam+ chlorothalonil	14 days	48 hours	4+M5	systemic + protectant	Follow label for resistance management. Excellent two-way systemic activity when pathogen strain is sensitive (ie: US-23).
<u>Ridomil Gold Copper</u> (2 lb)	mefenoxam+ copper hydroxide	14 days	48 hours	4+M1	systemic + protectant	Tank-mix with an effective protectant. Excellent two-way systemic activity when pathogen strain is sensitive (ie: US-23).
<u>Ridomil Gold M2 WG</u> (2.5 lb)	mefenoxam+ mancozeb	3 days	48 hours	4+M3	systemic + protectant	Follow label for resistance management. Excellent two-way systemic disease management if late blight strain is sensitive (ie: US-23)
<u>Zampro</u> (11-14 fl oz)	ametoctradin+ dimethomorph	4 days	12 hours	45+40	systemic + protectant	Do not make more than 2 sequential applications. Follow label for resistance management. Ametoctradin is new a.i.; dimethomorph is Forum (formerly Acrobat). Highly effective late blight treatment in several states in research trials (high rate gave significantly better control). Controls tuber blight. Has curative activity.
<u>Zing!</u> (32-34 fl oz)	zoxamide+ chlorothalonil	7 days	12 hours	22+M5	protectant	Do not make more than 2 sequential applications before alternating with another fungicide of a different mode of action. Do not make >8 applications or apply >1.52 lb of zoxamide and 8.88 lb of chlorothalonil per season per acre. Excellent protectant with good rainfastness. No curative activity or antisporeulant.