



Vegetable Crop Update

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

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Calendar of Events

September 11, 2016 – UW-West Madison ARS Organic Vegetable Field Day
January 22-24, 2017 – WIFresh Fruit & Vegetable Growers Conf. WI Dells
February 7-9, 2017 – UWEX/WPVG Grower Ed. Conf., Stevens Point, WI
March 1, 2017 – UWEX Processing Vegetable Crops Meeting, Hancock, WI

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Current P-Day (Early Blight) and Severity Value (Late Blight) Accumulations (R.V. James, UW-Plant Pathology/R.V. James Designs): A P-Day value of ≥ 300 indicates the threshold for early blight risk and triggers preventative fungicide application. A DSV of ≥ 18 indicates the threshold for late blight risk and triggers preventative fungicide application. **Red** text in table below indicates threshold has been met/surpassed. “-“ indicates that information is not available. Blitecast and P-Day values for actual potato field weather from Grand Marsh, Hancock, Plover, and Antigo are now posted at the UW Veg Path website at the tab “P-Days and Severity Values.” http://www.plantpath.wisc.edu/wivegdis/contents_pages/pday_sevval_2016.html

<i>Location</i>	Planting Date	50% Emergence	P-Day Cumulative	Disease Severity Value	Date of DSV Generation	Increase in DSV from 8/5
<i>Antigo</i>	Early 5/1	6/2	564	94	8/12	12
	Mid 5/18	6/7	529	84	8/12	12
	Late 6/3	6/21	426	69	8/12	12
<i>Grand Marsh</i>	Early 4/15	5/22	637	127	8/12	8
	Mid 5/1	5/27	600	121	8/12	8
	Late 5/15	6/3	541	110	8/12	8
<i>Hancock</i>	Early 4/18	5/24	603	109	8/12	8
	Mid 5/3	5/29	562	96	8/12	8
	Late 5/20	6/5	505	87	8/12	8
<i>Plover</i>	Early 4/20	5/25	575	128	8/12	14
	Mid 5/5	5/30	532	113	8/12	14
	Late 5/20	6/6	476	104	8/12	14

Summary: Disease Severity Values (DSVs) and Late Blight Blitecast: We now have all potatoes in WI at 50% emergence or greater and are generating forecast values for all potatoes. All growing areas have reached threshold for late blight management. Generally, conditions were low for late blight in this past week with 7 day accumulations of 8-14 Disease Severity Values, depending upon the location. Recall the maximum number of DSVs that one day can accumulate is 4. Where thresholds of 18 DSVs have been met, routine, protection of susceptible tomato and potato crops is recommended. Wisconsin commercial conventional fungicides for potato late blight control can be found at:

<http://www.plantpath.wisc.edu/wivegdis/pdf/2016/updated%20Potato%20Late%20Blight%20Fungicides%202016%20MOA.pdf>

P-Days indicating early blight risk are now at or above threshold for all potatoes in Wisconsin. Lesions are being observed in the middle and top canopies of potato crops in central and southern WI. We have not noted much brown spot in potatoes, so far, this year. Based on my early blight observations from our trials at the UW Hancock Ag Research Station, early blight is now at roughly 60% severity on 'Russet Burbank' planted during the first week of May 2016 with no early-blight-specific fungicides.

Late Blight Diagnostic Updates. **No late blight has been confirmed in WI as of 8/12/16, as far as I am aware. However, we are investigating a suspicious tomato late blight case from the St. Croix County area (more info to come in the next day or two).** No new reports of late blight were made through the national research and extension website in this past week (www.usablight.org). Earlier season's reports have come from AR, MD, CA, FL, MI, SC, VA, and WA. However, Western Manitoba, Canada (north of North Dakota) confirmed late blight in their potato production region ~3 weeks ago; and the Pert-Andover area of New Brunswick Canada has also confirmed late blight. The closest detection to WI so far has been in south central MI (US-23) on potato. US-23 has predominated cases of this disease in the US so far this year. West coast has had US-8 and US-11 as well. Disease has been confirmed on both potato and tomato. Careful monitoring for and management of volunteers and solanaceous weeds is critical – along with preventive management of the main potato crop with use of effective fungicides.

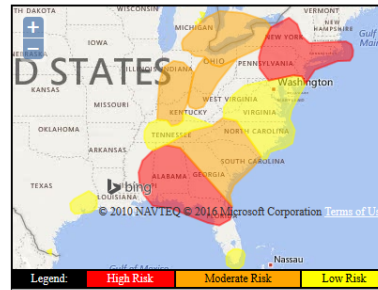
If you are suspect late blight, please submit for free diagnostic testing through the UWEX Plant Disease Diagnostic Clinic or through my laboratory directly. Dr. Brian Hudelson in the clinic offers rather quick late blight confirmations. My program can do this, similarly, for commercial producers. Further my lab will genotype the pathogen in order to better prescribe best management strategies.

Cucurbit Downy Mildew Updates (<http://cdm.ipmpipe.org/>). In the past week there were 11 states reporting new confirmations of cucurbit downy mildew: AL, KY, MI, NC, NY, OH, PA, SC, TX, VA, and VT (counties colored red in map below from 8/12/16). Previous confirmations were made in AL, DE, FL, GA, KY, MD, MI, NC, NJ, NY, OH, ON Canada, PA, SC, and TX (counties colored green in map below from 8/12/16). The closest finds to WI at this time are in south central MI. There is no risk of movement of the pathogen to Wisconsin production regions in the upcoming forecast for cucurbit downy mildew movement over the next several days (see below from <http://cdm.ipmpipe.org/current-forecast>). Growers should be on watch for earliest

symptoms of downy mildew for rapid response with effective fungicides (link below to treatment information). <http://www.plantpath.wisc.edu/wivegdis/pdf/2016/July%2013,%202016.pdf>



Risk prediction map for Day 2: Thursday, August 11



HIGH Risk for cucurbits in northern FL, the FL panhandle, southwest GA, AL, eastern MS, central and eastern PA, central and southeast NY, Long Island, CT, RI, and southern MA.
Moderate Risk for southeast MI, southern ON, western NY, northwest PA, OH, central and southern IN, KY except the southeast, southeast TN, western and southern NC, SC, and northern and eastern GA.
Low risk for cucurbits in far southeast TX, southern FL, TN except the southeast, east-central and eastern NC, eastern WV, VA, MD, DE, and southern NJ. Minimal Risk to cucurbits elsewhere.

Forecaster: TK at NCSU for the Cucurbit ipmPIPE - 2016

UW-Madison/Extension Plant Disease Diagnostic Clinic (PDDC) Update

Brian Hudelson, Sean Toporek, Jake Kurczewski and Ann Joy

The PDDC receives samples of many plant and soil samples from around the state. The following diseases/disorders have been identified at the PDDC from August 6, 2016 through August 12, 2016.

PLANT/SAMPLE TYPE	DISEASE/DISORDER	PATHOGEN	COUNTY
VEGETABLE CROPS			
Cabbage	Alternaria Leaf Spot	<i>Alternaria brassicicola</i>	Crawford
Cauliflower	Alternaria Leaf Spot	<i>Alternaria brassicicola</i>	Lafayette
Eggplant	Verticillium Wilt	<i>Verticillium sp.</i>	Dane
Garlic	<i>Embellisia</i> Skin Blotch	<i>Embellisia alli</i>	Crawford
Kale	Alternaria Leaf Spot	<i>Alternaria brassicicola</i>	Crawford
Lettuce	Anthracoze	<i>Microdochium panattonianum</i>	Lafayette
Onion	Sour Skin	<i>Burkholderia cepacia</i>	Fillmore (MN)
Pepper	Aerial Pythium	<i>Pythium sp.</i>	Rock
	Sunscald	None	Crawford
Tomato	Bacterial Speck	<i>Pseudomonas syringae pv. tomato</i>	Crawford
	Blossom End Rot	None	Sheboygan
	Cucumber Mosaic	<i>Cucumber mosaic virus</i>	Dane
	Root Rot	<i>Rhizoctonia sp.</i> , <i>Fusarium sp.</i>	Green Lake
	Septoria Leaf Spot	<i>Septoria lycopersici</i>	Sheboygan
	Tobacco Mosaic	<i>Tobacco mosaic virus</i>	Dane
	Tomato Spotted Wilt	<i>Tomato spotted wilt virus</i>	Dane
Zucchini	Bacterial Leaf Spot	<i>Xanthomonas camoestris pv. cucurbitae</i>	Lafayette
SPECIALTY CROPS			
Hop	Downy Mildew	<i>Pseudoperonospora humuli</i>	Dane

For additional information on plant diseases and their control, visit the PDDC website at pddc.wisc.edu.

Powdery mildew confirmed on hop cones in Portage County Wisconsin on 8/11/2016. (written with information and photo by Michelle Marks, Graduate Research Assistant with UW-Plant Pathology). While there have been previous suspicions of powdery mildew on hops from WI in past recent years, yesterday marked the first day on which a sample came through our lab for diagnostic confirmation and was positive. Symptoms included browning of cones accompanied by white fuzzy pathogen sporulation, typical for powdery mildew. We confirmed the disease, caused by the fungus *Podosphaera macularis* based on pathogen morphological features. While hops are now being harvested in many WI areas, it is still important to be on the look out for symptoms of this disease as management responses with fungicides can differ between downy mildew and powdery mildew targets. If you are choosing fungicides with very specific activity against downy mildew, you may not be providing protection against powdery mildew.



Further information on hop powdery mildew disease cycle can be found at the UWEX link below.

<http://learningstore.uwex.edu/Assets/pdfs/A4053-02.pdf>

Fungicides for powdery mildew control in hops for Wisconsin are listed in the table below.

Disease	Active ingredient	Rate/commercial product	Pre-harvest interval (days)	Mode of action (Fungicide Resistance Action Committee #)	Comments
Powdery mildew (<i>Podosphaera macularis</i> and <i>humili</i>)	trifloxystrobin	1.0 oz with every 15-30 gal spray volume Flint	14	Surface-systemic or translaminar (11)	Apply preventatively for best results. Apply on a 10 to 14 day interval. Follow resistance management guidelines.
	tebuconazole	4.0-8.0 fl oz Monsoon, ONSET 3.6L, Orius 3.6F, Tebustar 3.6L, Tebuzol 3.6F, Toledo 3.6F	14	Systemic (3)	Apply at 10 to 14 day intervals. Follow resistance management guidelines.

	pyraclostrobin and boscalid	14.0 oz/100 gal spray volume Pristine	14	Systemic, protectant, curative (11,7)	Use preventatively and apply at 14-21 day intervals as needed. Follow resistance management guidelines.
	metrafenone	15.4 fl oz Vivando	3	Systemic, protectant (U8)	Do not apply more than 2 applications of Vivando per year. Do not mix with horticultural oils.
	myclobutanil	2.0-10.0 oz Rally	14	Systemic, protectant, curative (3)	Emergence to training label rate is 2-4 oz/training to wire is 4-6 oz/wire to 14-day prior to harvest is 6-10 oz. Follow resistance management guidelines. (Old product name was Nova)
	quinoxyfen	4.0-8.2 fl oz Quintec	21	Protectant (13)	Follow resistance management guidelines, including 'do not apply more than 4X per season.' Minimum spray interval is 7 days.
	triflumizole	12.0 fl oz Procure 480SC	7	Protectant, systemic, curative (3)	Use prior to or at disease onset for best results and reapply on a 14 day schedule.
	potassium bicarbonate	2.5-5.0 lb/100 gal spray volume Armicarb 100 2.5-5.0 lb Kaligreen	0	Protectant (NC)	Do not exceed mix rate of 5.0 lb/100 gal of water. Do not store unused portion of spray for more than 12 hours prior to use. Apply when weather conditions favor disease and repeat on a 7-10 day basis.
	sodium bicarbonate	4.0 oz/10 gal water spray volume Milstop	0	Protectant (NC)	Begin application when weather favors disease and apply at 1 to 2 week intervals. Tighten intervals when disease pressure heightens.
	copper octanoate	0.5-2.0 gal Cueva in 100 gal water	14	Protectant (M1)	Apply soon after training vines.
	mono and dipotassium salts of phosphorous acid	1-3 qt/100 gal water Phosphite 1.0-3.0 qt in 20 gal of water Rampart	0	Protectant, induces plant resistance and therefore is sometimes referred to as systemic (33)	Apply at 2 to 3 week intervals. Do not apply at an interval less than 3 days.

	sulfur	4.0-6.0 lb Thiolux	See labels	Protectant (M2)	Do not apply after flowering and verify with processor before use. Do not use within 2 weeks of oil spray. Sulfur is fungitoxic in its vapor phase and, therefore, is effective only when air temps promote volatilization. Sulfur volatilizes above 65°F, phytotoxic above 95°F. Use above 85°F is not recommended. See label for rates and reentry intervals. Kumulus and Microthiol Disperss are labeled for spider mite control.
	Extract of <i>Reynoutria sachalinensis</i>	1.0-4.0 qt Regalia	0	Upregulates resistance within the plant (P5)	Use preventatively and apply at 7 day intervals as needed. Emergence to wire-touch 1.0-2.0 qt recommended/wire-touch through harvest 2.0-4.0 qt. OMRI approved. Some contact fungicidal activity.
	<i>Bacillus subtilis</i> QST 713 strain	4.0-6.0 qt/100 gal spray volume of Serenade ASO	0	Protectant (44)	Use when conditions favor disease and apply at 7 day intervals as needed. OMRI approved.
	<i>Bacillus subtilis</i> QST 713 strain	2.0-3.0 lb/100 gal spray volume of Serenade MAX	0	Protectant (44)	Use when conditions favor disease and apply at 7 day intervals as needed. OMRI approved.
	<i>Bacillus pumilis</i> QST 2808	2.0-4.0 qt/100 gal spray volume of Sonata	0	Protectant (44)	Use when conditions favor disease and apply at 7-14 day intervals as needed. OMRI approved.
	neem oil	0.5%-1.0% in 25-100 gal water spray volume of Trilogy	0	Protectant (NC)	Use when conditions favor disease and apply at a 7-14 day interval as needed. OMRI approved. Also a miticide/insecticide.

OMRI-approved products are typically acceptable by organic certifiers. Several copper formulations may be approved for organic use, but this status can change. Check with your organic certifying agency prior to selection of fungicides for the production season.

*FRAC code numbers are used to classify fungicides by their chemical structures and modes of action. This information is useful because the codes can be used to consider appropriate fungicide alternation strategies to manage fungicide resistance.