Vegetable Crop Update

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

Extension UNIVERSITY OF WISCONSIN-MADISON

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In This Issue:

- Nitrates in Well Water at UW Hancock ARS, Potato Production Updates
- Disease Forecasting Updates for Potato Late Blight in Potato & Tomato, Cucurbit Downy Mildew Updates, Onion Downy Mildew

Calendar of Events:

November 30-December 2, 2021 – Midwest Food Producers Assoc. Processing Crops Conference, Kalahari Convention Center
February 8-10, 2022 – UW-Madison Div. of Extension & WPVGA Grower Education Conference, Holiday Inn, Stevens Point, WI

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This week we got the water testing results for nitrate-N levels in the groundwater from wells at the UW Hancock Research Station:

Well sources	7/1/21	7/29/21
	- Nitrate-N (ppm) -	
E Well	9.5	9.2
K Well	23.6	23.8
R Well	NA	18.7
S Well	15.3	15.3
C West Well	9.3	10.8
C East Well	8.5	7.8

We can tell from the results that nitrate-N levels stayed consistent between the two sampling dates, which was early and late July. The K well had the highest nitrate-N levels at about 24 ppm, and this number was similar to what we got last year. The R well was the second highest, at 15.3 ppm. All the other wells had nitrate-N levels around or below 10 ppm.

It should be known that 1ppm of nitrate-N in 1'' of irrigation water equals to 0.23 lb N / acre. So far we have applied 14'' of irrigation water to the full-season potato plots in the K field at HARS, so we totally received 0.23 × 24 ppm of nitrate-N × 14'' of irrigation water ≈ 77 lb N / acre on top of what's applied through fertilizer (300 lb N / acre). So far all potato plants (including RB) on our research plots at HARS have naturally senesced. This week (118 days after planting / 90 days after emergence) my team again did the digging for Russet Burbank and Soraya potatoes that were under four different nitrogen treatments. The four N treatments are listed below:

Treatment ID	Planting	Emergence (hilling)	Tuber Initiation	Side-dressing		Seasonal Total
	4/22	5/17	6/8	7/3	7/17	
	------ lb N acre^{-1} ------					
1	40	-	-	-	-	40
2	40	70	40	50	-	200 early
3	40	70	40	-	50	200 late
4	40	70	40	50	50	250

Tuber bulking data for Russet Burbank:

Trt ID	N Rate (lb/acre)	Tuber Set Per Plant	Max Tuber Weight (oz)	Average Tuber Weight (oz)	Tuber Yield (cwt/ac)	Specific Gravity
1	40	13	10	3	340	1.074
2	200 Early	13	10	4	387	1.075
3	200 Late	13	14	4	427	1.075
4	250	13	15	4	415	1.072

Tuber bulking data for Soraya:

Trt ID	N Rate (lb/acre)	Tuber Set Per Plant	Max Tuber Weight (oz)	Average Tuber Weight (oz)	Tuber Yield (cwt/ac)	Specific Gravity
1	40	15	9	3	420	1.052
2	200 Early	16	16	4	559	1.056
3	200 Late	15	10	4	484	1.054
4	250	15	12	4	449	1.053

We will have a final digging in the week of August 30th before vine kill on September 10th.

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Potato Disease Modelling and Management of Early Blight and Late Blight: Current P-Day (Early Blight) and Disease Severity Value (Late Blight) Accumulations. Many thanks to Ben Bradford, UW-Madison Entomology; Stephen Jordan, UW-Madison Plant Pathology; and our grower collaborator weather station hosts for supporting this disease management effort. A Potato Physiological Day or P-Day value of ≥300 indicates the threshold for early blight risk and triggers preventative fungicide application. A Disease Severity Value or DSV of ≥18 indicates the threshold for late blight risk and triggers preventative fungicide application. Red text in table indicates threshold has been met or surpassed. Weather data used in these calculations comes from weather stations that are placed in potato fields in each of the four locations (substitute data from https://agweather.cals.wisc.edu/vdifn as needed). Data are available in graphical and raw formats for each weather station at: https://vegpath.plantpath.wisc.edu/dsv/

Location	Planting Date		50% Emergence Date	Disease Severity Values (DSVs) 8/21	Potato Physiological Days (P-Days) 8/21
Grand Marsh	**Early**	April 2	May 10	**97**	**731**
	Mid	April 10	May 15	**97**	**717**
	Late	May 1	May 23	**91**	**651**
Hancock	**Early**	April 5	May 12	**45**	**737**
	Mid	April 15	May 15	**45**	**728**
	Late	May 5	May 23	**41**	**666**
Plover	**Early**	April 7	May 12	**84**	**696**
	Mid	April 20	May 20	**81**	**652**
	Late	May 7	May 30	**76**	**590**
Antigo	**Early**	April 26	May 28	**44**	**682**
	Mid	May 10	June 5	**44**	**644**
	Late	May 20	June 13	**44**	**575**

All potato fields of Wisconsin have reached/surpasesed the threshold for Disease Severity Values (18) and should continue to be preventatively treated for late blight management. Accumulations over the past week ranged from 1-9 DSVs, indicating low - moderate risk from disease-promoting weather. No new reports of late blight from WI over the past week. To date, there were two confirmed findings of US-23 potato late blight both in Portage County WI (Jul 28 and Aug 9).

Outside of Wisconsin, tomato late blight was confirmed in Haywood County North Carolina on Aug 16 on tomato (strain typing in process); on tomato in Ontario (Haldimand-Norfolk) Canada (no sample submitted for strain determination on Aug 10); on potato in Aroostook County Maine (US-23 on Aug 9); and on tomato in northeastern Georgia (US-23 on Jul 28) (usablight.org). US-23 is typically sensitive to the fungicides in the phenylamide group (including mefenoxam and metalaxyl). For more information on this disease: https://vegpath.plantpath.wisc.edu/resources/potato-late-blight/

To help in selection of fungicides for managing late blight in potato in Wisconsin, I have updated a table which includes modes of action and resistance risk management groups. https://vegpath.plantpath.wisc.edu/wp-content/uploads/sites/210/2021/07/2021-Potato-Late-Blight-Fungicides.pdf

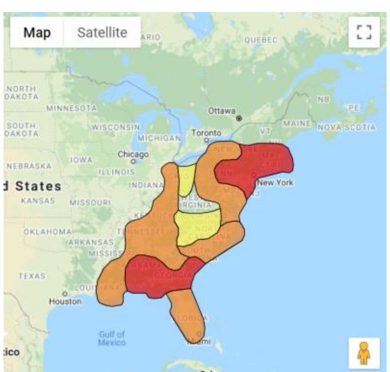
The **early blight** P-Day threshold of 300 has been exceeded in all potato plantings of Wisconsin. A listing of details of currently registered fungicides for early blight management can be found in our 2021 Wisconsin Vegetable Production guide: https://cdn.shopify.com/s/files/1/0145/8808/4272/files/A3422-2021.pdf

Cucurbit Downy Mildew Update: Over the past week, cucurbit downy mildew was confirmed in the following locations: PA (cucumber, summer squash), NY (cucumber), OH (cucumber), and MS (pumpkin), TN (cucumber). There have been no samples of cucurbit downy mildew through our UW Plant Disease Diagnostic Clinic, or my Vegetable Pathology Lab so far this season. No downy mildew has been observed in our sentinel plots in WI.

This season, so far, the disease has been documented in AL, CT, DE, FL, GA, IN, KY, LA, MA, MD, MI, MS, NC, NH, NJ, NY, OH, Ontario Canada, PA, RI, SC, TN, VA, and WV. There is no predicted movement of the pathogen into Wisconsin at this time– as reflected in the recent forecast (for Sunday August 22 , 2021) depicted below from https:// cdm.ipmpipe.org/

Please contact me or the UW Plant Pathology Diagnostic Clinic for confirmed diagnoses of cucurbit downy mildew. https://pddc.wisc.edu/

Due to the presence of unique pathogen types (Clade 1 and 2 types with unique host ranges among cucurbits), our improved understanding of the cucurbit downy mildew type that may be in our region can aid in recommending the most appropriate prevention of crop disease and resulting loss.



HIGH Risk for cucurbits in southern SC, southern GA, central and southern AL, the FL panhandle, NJ, central and eastern PA, eastern and southeast NY, Long Island, southern New England, southern VT, and southern NH . Moderate Risk in central and western NY, western PA, northern WV, DE, MD, northern and eastern VA, eastern NC, central and eastern SC, western OH, central and eastern KY, TN, central and northern GA, northern AL, central and southern MS, southeast LA, and the FL peninsula. Low Risk to cucurbits in western SC, central NC, south-central and southwest VA, and eastern OH. Minimal risk elsewhere.

Onion downy mildew: was confirmed on commercial onion leaves from Marquette County WI this past week. Onion downy mildew can be very problematic in onion fields. This foliar disease is caused by a fungus-like pathogen called *Peronospora destructor*. Infection is favored by temperatures less than 72°F and high humidity and leaf wetness. The pathogen can overwinter in volunteer onion, culls, and wild Allium weed species if the pathogen was present in your location in previous years. Symptoms include pale or white elongated patches on leaves that start off small and can elongate and produce a purple-gray sporulation which appears "downy." Leaves can bend over and eventually die due to severe downy mildew infection. Please refer to picture below. This disease can impact bulb size, quality, and storability.

Management recommendations include practicing a 3+ year rotation to non-hosts such as small grains and corn, eliminating culls and volunteers, avoiding dense planting, avoiding excess N and overhead irrigation, and orienting rows parallel to prevailing wind to avoid prolonged leaf wetness.

Effective fungicides for onion downy mildew control include: ametoctradin+dimethomorph (Zampro) azoxystrobin (Quadris, Amistar, others) azoxystrobin + propiconazole (Quilt Excel) copper hydroxide (Kocide, Champ, others) cymoxanil + chlorothalonil (Ariston) cymoxanil + famoxadone (Tanos) dimethomorph (Forum) fenamidone (Reason) fluazinam (Omega) fosetyl-aluminum (Aliette) mancozeb (Dithane, Manzate, others) mandipropamid (Revus) mefenoxam (Ridomil Gold) oxathiapiprolin+chlorothalonil (Orondis Opti) oxathiapiprolin+mandipropamid (Orondis Ultra) pyraclostrobin (Cabrio) pyraclostrobin & boscalid (Pristine) zoxamide+chlorothalonil (Zing!) zoxamide+mancozeb (Gavel)

Although labeled for onion downy mildew, coppers and chlorothalonil are not very effective for downy mildew control, and coppers can be phytotoxic to onions. Please see the 2021 Wisconsin Vegetable Production Guide A3422 for further details on application rates and specifications. If you suspect you have Downy mildew in your onions, please get a sample and contact your county agent, our disease diagnostic clinic, or myself for confirmation. The 2021 A3422 Commercial Vegetable Production in Wisconsin guide is available for purchase through the UW Extension Learning Store website or accessible by free pdf here: https://cdn.shopify.com/s/files/1/0145/8808/4272/files/A3422-2021.pdf

Above: Onion downy mildew in the field, left, and close up showing pathogen growth with fuzzy, gray spore masses. Photo credits to Dr. Mary K. Hausbeck, Michigan State University.