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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Calendar of Events:

November 29-December 1, 2022 – Midwest Food Producers Assoc. Processing Crops Conference, Kalahari Convention Center
January 29-31, 2023 – Wisconsin Fresh Fruit and Vegetable Growers Conference, Kalahari Resort, Wisconsin Dells, WI
February 7-9, 2023 – UW-Madison Div. of Extension & WPVGA Grower Education Conference & Industry Show, Stevens Point, WI

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This week I checked on vine maturity of our variety trial under 150 units of total N vs. 300 units of total N. It was obvious that for early varieties like Agata and Colomba, vines were senescing and dying under both the low (Figure A.) and high N rates (Figure B.), and we couldn't tell the difference between the two N treatments. For late varieties like Dakota Trailblazer, flowers can still be noticed and vines were vigorously growing under both N rates, but yellower canopies were observed under the lower treatment (Figure C.). We will vine kill the early varieties later next week and harvest them in the end of August. The late varieties won't be killed until September 10th and harvested in the last week of September.

A.150 N Agata

B. 300 N Agata

C. 150 N Trailblazer

D. 300 N Trailblazer

Similarly, for snap beans and dark red kidney beans, we could see the canopy color difference but not any difference of plant growth stages between different N treatments.

Last week (7/21) at our Antigo Research Station, we applied the second spoon-feeding through the sprayer to our seed potatoes Snowden and Silverton. We had three treatments including 2, 4 and 8 gallons of UAN (32%). We saw leaves burnt under the 4 and 8 gallon treatments (Figures above), but not under the 2 gallon treatment. Overall, even with some burning symptoms, the canopy sizes under the 8 gallon treatment were the largest compared to the two lower doses. We will have the last spoon-feeding this coming week. The nitrate-N level in the groundwater that irrigated our plots is 9.6 ppm.

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Current P-Day (Early Blight) and Disease Severity Value (Late Blight) Accumulations. 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 again in 2022. 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 will come from weather stations that are placed in potato fields in each of the four locations, once available. Data from an alternative modeling source: https://agweather.cals.wisc.edu/vdifn will be used to supplement as needed. Data are available for each weather station at: https://vegpath.plantpath.wisc.edu/dsv/.

Location	Planting Date		50% Emergence Date	Disease Severity Values (DSVs) 7/29/2022	Potato Physiological Days (P-Days) 7/29/2022
Grand Marsh	**Early**	Apr 5	May 10	**45**	**601**
	Mid	Apr 20	May 15	**45**	**560**
	Late	May 12	May 25	**45**	**502**
Hancock	**Early**	Apr 7	May 12	**27**	**575**
	Mid	Apr 22	May 17	**27**	**555**
	Late	May 14	May 26	**25**	**496**
Plover	**Early**	Apr 7	May 15	**79**	**542**
	Mid	Apr 24	May 20	**79**	**508**
	Late	May 18	May 27	**78**	**473**
Antigo	**Early**	May 1	Jun 3	**28**	**423**
	Mid	May 15	June 15	**24**	**349**
	Late	June 10	June 24	**24**	278

In addition to the potato field weather stations, we have the UW Vegetable Disease and Insect Forecasting Network tool to explore P-Days and DSVs across the state (https://agweather.cals.wisc.edu/vdifn). This tool utilizes NOAA weather data (stations are not situated within potato fields). In using this tool, be sure to enter your model selections and parameters, then hit the blue submit button at the bottom of the parameter boxes.

We have reached thresholds for preventative fungicide treatment in potatoes to manage early blight in all potato plantings in Grand Marsh, Hancock, Plover, and most plantings of potatoes in Antigo areas of Wisconsin. Accumulations of P-Days were moderate to high over the past week. Potatoes should be on a preventative fungicide program with effective disease management selections to limit early blight.

All monitored Wisconsin locations accumulated between 1 and 11 DSVs this past week indicating a relatively low-risk week for promoting late blight in potato plantings in Grand Marsh, Hancock, Plover, and Antigo. However, Antigo plantings have now reached/exceeded the threshold for receiving a preventative application of fungicide for the management of late blight. A fungicide list for potato late blight in Wisconsin was provided in last week's newsletter and is available here: https://vegpath.plantpath.wisc.edu/2022/07/03/update-10-july-3-2022/

Once thresholds are met for risk of early blight and/or late blight, fungicides are recommended for optimum disease control. Fungicide details can be found in the 2022 Commercial Vegetable Production in Wisconsin Guide, Extension Document A3422, linked here: https://learningstore.extension.wisc.edu/products/commercial-vegetable-production-in-wisconsin

According to usablight.org there have not been recent diagnoses of late blight in tomato or potato crops in the US. For this year, there were just 2 reports entered back in March in southern Florida (US-23 clonal lineage/strain type). **However, there were two reports of tomato late blight in Ottawa and Prince Edward Counties in eastern Ontario Canada over the past week.**

Cucurbit Downy Mildew: During this past week, downy mildew was confirmed on cucumber in two counties in Michigan (Allegan and Muskegon) and the spores of the pathogen were collected in air sampling traps in numerous other counties. This suggested a large potential dispersal of cucurbit downy mildew pathogen across the state of Michigan in the last week of July. Over the past week other reports came from NY, NJ, PA, MD, and VA. Previously in this growing season, the disease was confirmed in: AL, CT, DE, FL, GA, MA, MD, NC, NH, NJ, NY, OH, PA, SC, and VA. No findings of cucurbit downy mildew in our Wisconsin-based sentinel plots in Dane County.

Counties highlighted in red have had a positive cucurbit downy mildew report during the past 7 days. Green counties indicate a former report of the disease greater than 7 days ago. From: https://cdm.ipmpipe.org/

As a reminder, the pathogen is now known to have two 'strains' for clade types. **The type (Clade 2)** which infects cucumber, can also infect melon. Due to fungicide resistance within the downy mildew

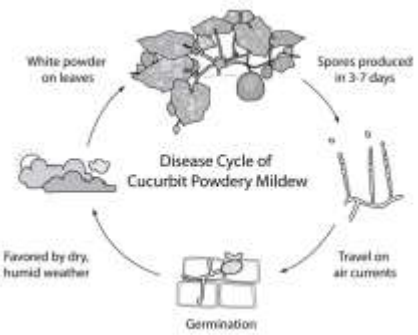
pathogen population, especially in Clade 2, selection of fungicides is important. Management of cucurbit downy mildew requires preventative fungicide applications as commercial cultivars are generally susceptible to current strains (Clades) of the pathogen. Management information can be sourced here: https://vegpath.plantpath.wisc.edu/2022/07/03/update-10-july-3-2022/

It is very important cucumber growers use proven downy mildew fungicides (shown below in alphabetical order). These fungicides were effective in Dr. Mary Hausbeck's Michigan State Univ. Plant Pathology 2021 research field plots and include:

- Elumin + chlorothalonil or mancozeb
- Omega (Orbus) + chlorothalonil or mancozeb
- *Orondis Opti (chlorothalonil is part of the premix)
- Previcur Flex + chlorothalonil or mancozeb
- *Ranman + chlorothalonil or mancozeb
- Zampro + chlorothalonil or mancozeb

A full article with pictures can be found here: https://www.canr.msu.edu/news/downy-mildew-detected-on-cukes-in-muskegon-and-allegan?utm_source=cc&utm_medium=email&utm_campaign=extensiondigests

Cucurbit Powdery Mildew: Cucurbits have been showing signs of powdery mildew in central Wisconsin over the past week. This disease is typically caused by the fungal pathogen *Podosphaera xanthii* and we see it appear on most susceptible cucurbits first in mid to late July of most years. While some cucurbits can tolerate powdery mildew infection, if the disease onsets early and on a highly susceptible variety, control may be necessary. There are several fungicides with effective control of powdery mildew (list provided below from the A3422 Commercial production guide for vegetables in Wisconsin). However, cucurbit powdery mildew pathogen populations in Wisconsin have resistance to the strobilurin fungicides which include azoxystrobin, pyraclostrobin, and trifloxystrobin. In our past field trials, Quintec (quinoxyfen) was most effective in alternation and tank-mixed with chlorothalonil. For multi-pick cucurbits, it's important to have a look at the allowable days to harvest. The images below show typical powdery mildew signs (talcum-like white spore production on foliage) and the disease cycle of powdery mildew on cucurbits.



Disease control in pumpkin and squash *(continued)*

Disease	Active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Powdery mildew	azoxystrobin	11.0–15.5 fl oz Aframe, AzoxyStar, Equation, Quadris Flowable, Satori	1	Equation, Quadris, Cabrio, and Flint belong to the Group 11 (strobilurin) category of fungicides. Quadris Opti contains a combination of Groups 11 and M5 fungicides. Do not exceed 1 application of any of these products before alternating with a fungicide having a different mode of action. Do not exceed 4 applications of strobilurin fungicides per year. Do not exceed 64.0 oz/a Cabrio, 8.0 oz/a Flint, 1.92 qt/a Quadris or Equation, or 2 gal/a Quadris Opti per season. Do not tank mix Cabrio, Flint, Quadris, Equation, or Quadris Opti with additives or adjuvants.
	azoxystrobin + chlorothalonil	3.2 pt Quadris Opti	1	
	pyraclostrobin	12.0–16.0 oz Cabrio EG	0	
	trifloxystrobin	1.5–2.0 oz Flint	0	
	boscalid + pyraclostrobin	12.5–18.5 oz Pristine WDG	0	Pristine belongs to Group 7 and Group 11 (strobilurin) fungicide categories. Do not exceed 2 sequential applications before alternating to a labeled fungicide with a different mode of action. Do not exceed 4 applications of Pristine or other Group 7 or 11 fungicides per season. Limit of 74.0 oz/a per season.
	clarified hydrophobic extract of neem oil	0.5–1.0% Trilogy in 25–100 gal water *or* 2.0 pt in at least 5 gal water	0	Do not apply more than 2 gal of Trilogy/a. OMRI-approved.
	cyflufenamid	3.4 oz Torino	0	Do not make more than 2 applications per year. Do not apply more than once every 7 days. Do not exceed total of 6.8 oz/a product per year.
	cyprodinil + fludioxonil	11.0–14.0 oz Switch 62.5WG	1	Do not apply more than 56.0 oz/a Switch per season. After 2 applications, alternate with a fungicide with a different mode of action for 2 applications.
	difenoconazole + benzovindiflupyr	10.5–13.5 fl oz Aprovia Top	0	Do not apply to greenhouse peppers. Do not apply more than 53.6 oz per year.
	fluopyram	6.5–6.84 fl oz Velum Prime	0	Also labeled for nematode suppression. Do not apply more than 13.7 fl oz of Velum Prime per acre per year. Fluopyram usage should be considered as total of soil and foliar applications (no more than 0.446 lb fluopyram).
	fluopyram + tebuconazole	6.0–17.0 fl oz Luna Experience	7	A mild yellowing on leaf margins is sometimes noted following application.
	fluopyram + trifloxystrobin	4.0–7.6 fl oz Luna Sensation	0	Do not apply more than 27.1 fl oz/a per season.
	flutriafol	10.0–14.0 fl oz Topguard	0	Follow resistance management guidelines.
	kresoxim-methyl	3.2–4.8 oz Sovran	0	Do not exceed 19.2 oz/a per season. Consult label for comments on adjuvant usage.
	metrafenone	15.4 fl oz Vivando	0	Make no more than 3 applications per year.
	myclobutanil	2.5–5.0 oz Rally 40WSP	0	Do not exceed 1.5 lb/a product (0.6 lb ai/a) per year. Observe a 30-day plantback interval between the last application and planting new crops. (Formerly Nova.) Resistance has been noted in WI.
	neem oil	0.5–1.0% Trilogy in 25–100 gal water	0	Has fungicide and miticide benefits. Organic (OMRI) approved.

Powdery mildew *(cont.)*	penthiopyrad	12.0–16.0 fl oz Fontelis	1	For disease control in greenhouse cucurbits, use at a rate range of 0.375–0.5 fl oz per gallon of spray per 1,360 sq ft. These rates equal field rates of 12.0–16.0 fl oz/a. Make no more than 2 sequential applications before switching to a fungicide with a different mode of action. Do not apply more than 67.0 fl oz/a per year.
	potassium bicarbonate	2.5–5.0 lb Kaligreen	1	Use higher rates when disease pressure is high. Apply at first sign of disease for best results.
	quinoxyfen	4.0–6.0 fl oz Quintec	3	Do not apply more than 32.0 fl oz Quintec per calendar year. Under certain environmental conditions, Quintec may cause leaf spotting or chlorosis. If symptoms occur after applying Quintec, discontinue use.
	sulfur	various, depending on product and formulation	0	Do not apply to sensitive crops. Do not apply during hot weather. Do not use within 2 weeks of an oil treatment. Consult with processor prior to use.
	tebuconazole	4.0–6.0 fl oz Folicur 3.6 F, Monsoon, Onset 3.6L, Orius 3.6F, Tebusha 3.6FL, TebuStar 3.6L, Tebuzol 3.6F, Toledo	7	Do not exceed 24.0 fl oz/a per season.
	thiophanate methyl	0.5 lb Topsin M 70W, Topsin M WSB 10.0 fl oz Topsin 4.5FL 0.2–0.4 lb Thiophanate methyl WDG	0 0	Apply when disease first appears and repeat if needed every 7–14 days.
	triflumizole	4.0–8.0 oz Procure 50WS 4.0–8.0 fl oz Procure 480 SC	0	Do not exceed 40.0 oz/a of Procure 50WS or 40.0 fl oz/a of Procure 480 SC per season. See product label for plantback restrictions for leafy vegetables (30 days), root vegetables (60 days), and all other crops (1 yr).