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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- Disease Forecasting Updates for Potato
- Cucurbit Downy Mildew Updates
- Potato Virus Y and Western Bean Cutworm Updates

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 (90 days after planting / 62 days after emergence) my team dug our Russet Burbank and Soraya potatoes under four different nitrogen treatments and found interesting tuber bulking results. 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)	Total Yield (cwt/acre)
1	40	16	43	2	331
2	200 early	17	12	1	204
3	200 late	16	7	2	287
4	250	14	10	2	193

RB under 40 N

RB under 250 N

We noted that Russet Burbank plants under the control treatment (only 40 units of N at planting) progressed much faster than those under higher N rates (by at least 2 weeks), plus the canopy color was much yellower under the control. Plants under 40 N all finished flowering, whereas those under 250 N still had fully blooming flowers. Tuber set and average tuber weight were not different between the different N rates, but maximum tuber weight under the control was a lot higher than those under higher N rates. Therefore, total yield under the control was the highest among the four N rates.

The three higher N rates (treatment ID 2, 3, 4) were designed to evaluate effects of N fertilizer applied during early July vs. mid-to-late July. We have seen that total yield under the 200 N with side-dressing at mid-to-late July was the highest on the day of sampling. We will make growth curves of plants under the four N rates in order to compare tuber development patterns.

Tuber bulking data for Soraya:

Trt ID	N rate (lb/acre)	Tuber set per plant	Max tuber weight (oz)	Average tuber weight (oz)	Total Yield (cwt/acre)
1	40	14	18	2	449
2	200 early	17	27	2	594
3	200 late	19	13	2	549
4	250	17	9	2	604

It is very interesting to notice that tuber bulking response of Soraya, a European full-season yellow variety featured by high N use efficiency, is completely different from Russet Burbank. As they showed greatly higher total yield (almost doubled) than RB on the day of sampling, with tuber set per plant and average tuber weight similar to RB. The maximum tuber weight of Soraya was higher than that of RB. Also in the case of Soraya, yield under the control treatment was apparently lower than that under the higher N rates. All Soraya plants under all N rates have completed flowering.

These two pictures showed average tuber weight range of Soraya (left) and Russet Burbank (right).

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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) 7/24	Potato Physiological Days (P-Days) 7/24
Grand Marsh	**Early**	April 2	May 10	**60**	**534**
	Mid	April 10	May 15	**60**	**524**
	Late	May 1	May 23	**54**	**462**
Hancock	**Early**	April 5	May 12	**30**	**539**
	Mid	April 15	May 15	**30**	**530**
	Late	May 5	May 23	**24**	**468**
Plover	**Early**	April 7	May 12	**58**	**508**
	Mid	April 20	May 20	**55**	**465**
	Late	May 7	May 30	**50**	**403**
Antigo	**Early**	April 26	May 28	**21**	**444**
	Mid	May 10	June 5	**21**	**406**
	Late	May 20	June 13	**21**	**337**

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. **Late blight** hasn't appeared in the US this season (usablight.org), however, when environmental conditions are favorable the pathogen can become active and quickly cause crop destruction. 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

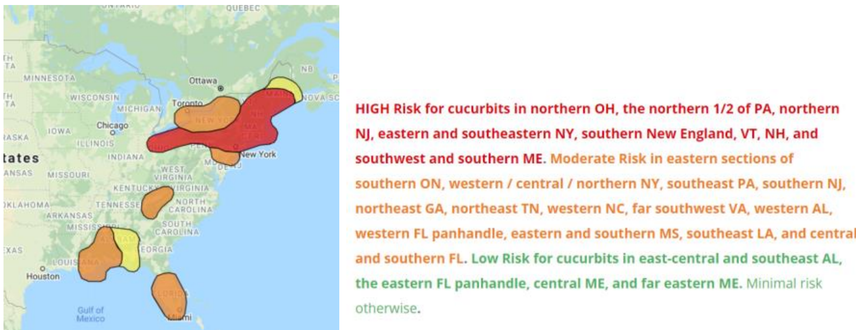
The **early blight** P-Day threshold of 300 has been exceeded in all potato plantings of Wisconsin. Early blight is active around Wisconsin in the lower and mid-canopies. A listing of details of currently registered fungicides for early blight management can be found in our 2021 Wisconsin Vegetable Production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

Performance of newer fungicides in our Hancock trials from recent years is provided at our website: https://vegpath.plantpath.wisc.edu/field-trials/

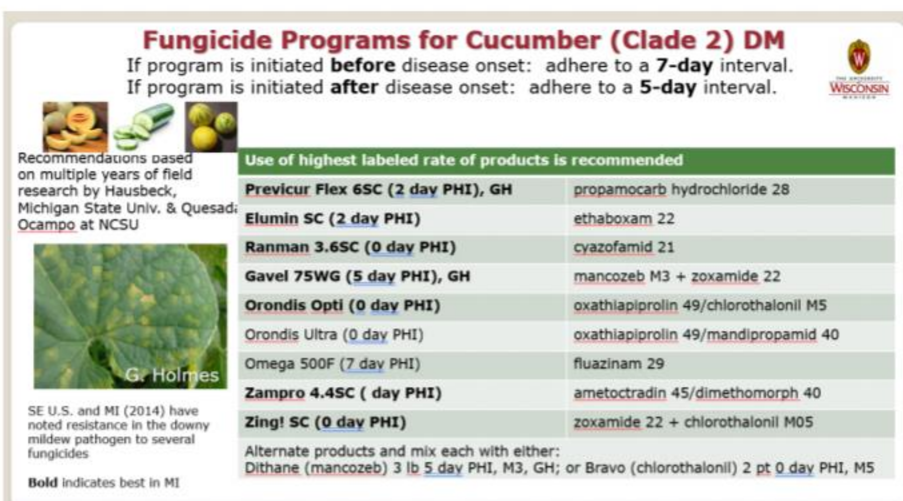
Cucurbit Downy Mildew Update: Cucurbit downy mildew was reported in PA (cucumber), NY (cucumber), NC (cucumber), MI (cucumber), RI (cucumber), OH (cucumber, cantaloupe), VA (cucumber), DE (cantaloupe), GA (watermelon), AL (cucumber, squash, cantaloupe, pumpkin, watermelon), Ontario Canada (cucumber), and TN (cucumber) over the past week.

This season, so far, the disease has been documented in AL, DE, FL, GA, LA, MD, MI, MS, NC, NJ, NY, OH, Ontario Canada, PA, RI, SC, TN, and VA.

There is no predicted movement of the pathogen into Wisconsin at this time– as reflected in the recent forecast (for Sunday July 25, 2021) depicted below from https://cdm.ipmpipe.org/



Because of the incidence of downy mildew on cucumbers, only, so far in the upper midwestern region, the recommended fungicides for preventative management of downy mildew in Wisconsin include the following: Previcur Flex 6SC (2 day PHI), Elumin SC (2 day PHI), Ranman 3.6SC (0 day PHI), Gavel 75WG (5 day PHI), Orondis Opti (0 day PHI), Zampro 4.4SC (0 day PHI), and Zing! SC (0 day PHI). Alternate producdts and mix each with either mancozeb (5 day PHI), or chlorothalonil (0 day PHI).



Fungicide Programs for Cucumber (Clade 2) DM

If program is initiated **before** disease onset: adhere to a **7-day** interval.
If program is initiated **after** disease onset: adhere to a **5-day** interval.

Recommendations based on multiple years of field research by Hausbeck, Michigan State Univ. & Quesada Ocampo at NCSU

G. Holmes

SE U.S. and MI (2014) have noted resistance in the downy mildew pathogen to several fungicides

Bold indicates best in MI

Use of highest labeled rate of products is recommended	
Previcur Flex 6SC (2 day PHI), GH	propamocarb hydrochloride 28
Elumin SC (2 day PHI)	ethaboxam 22
Ranman 3.6SC (0 day PHI)	cyazofamid 21
Gavel 75WG (5 day PHI), GH	mancozeb M3 + zoxamide 22
Orondis Opti (0 day PHI)	oxathiapiprolin 49/chlorothalonil M5
Orondis Ultra (0 day PHI)	oxathiapiprolin 49/mandipropamid 40
Omega 500F (7 day PHI)	fluazinam 29
Zampro 4.4SC (day PHI)	ametoctradin 45/dimethomorph 40
Zing! SC (0 day PHI)	zoxamide 22 + chlorothalonil M05
Alternate products and mix each with either: Dithane (mancozeb) 3 lb 5 day PHI, M3, GH; or Bravo (chlorothalonil) 2 pt 0 day PHI, M5	

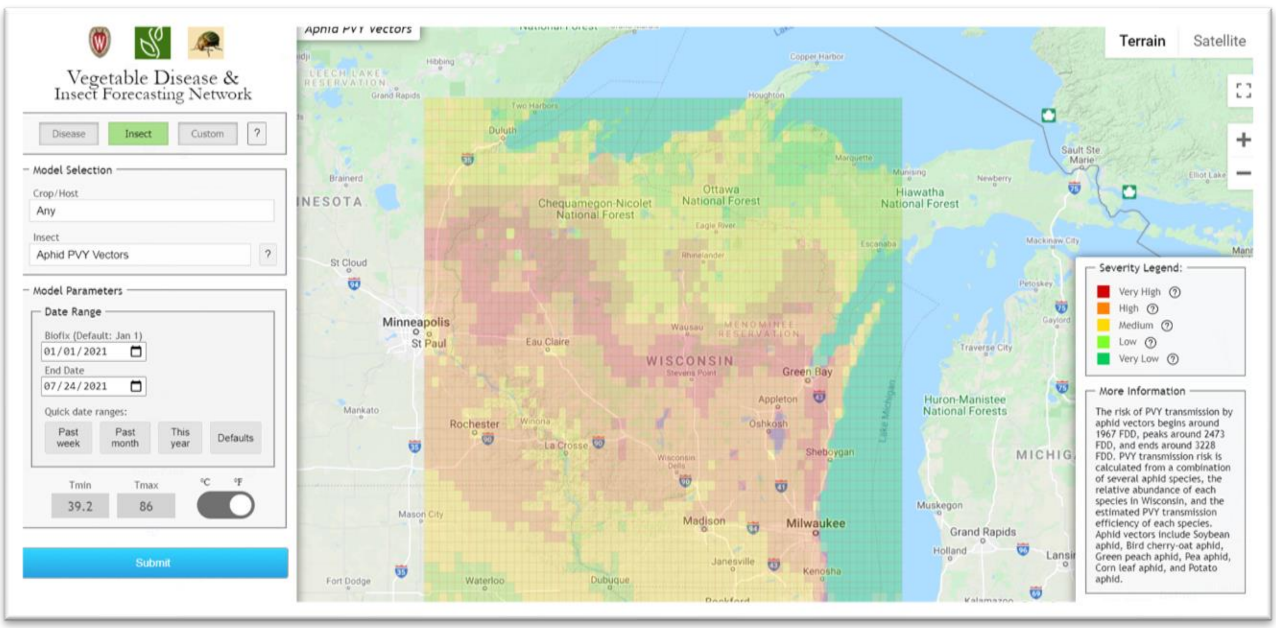
Vegetable Insect Update – Russell L. Groves, Professor and Department Chair, UW-Madison, Department of Entomology, 608-262-3229 (office), (608) 698-2434 (cell), e-mail: rgroves@wisc.edu

Vegetable Entomology Webpage: https://vegento.russell.wisc.edu/

Potato virus Y (PVY) – **https://vegento.russell.wisc.edu/pests/plant-pathogens/**

The risk for increased flight activity by late season, potato-colonizing and non-potato colonizing aphid species is upon us in the potato seed growing areas of northern Wisconsin. Risk models available through the Vegetable Disease and Insect Forecasting Network (VDIFN) (https://agweather.cals.wisc.edu/vdifn?panel=insect&model=pvy-vectors) illustrate an enhanced risk for migration and movement of aphids.

Potato virus Y – Risk Index for virus transmission (25 July 2021)

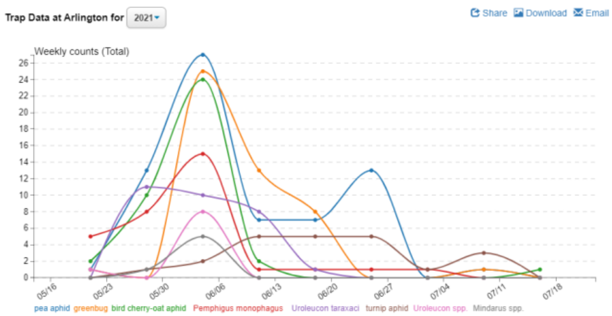


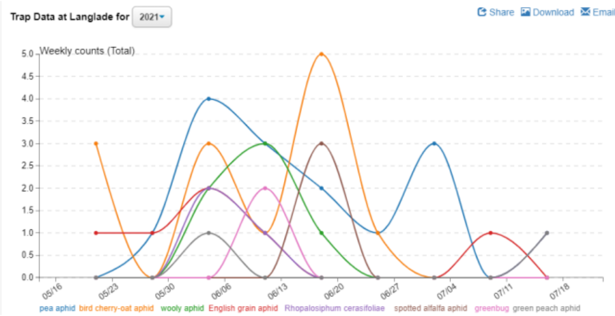
https://agweather.cals.wisc.edu/vdifn

Remember, PVY is transmitted by aphid species that feed and reproduce upon (colonize) as well as those that only taste-test (non-colonizing) potato. Colonizing aphids will feed and reproduce on potato as a preferred host. Non-colonizing, winged aphids are those species that do not feed on potato but may taste test several plants as they move through the field, acquiring and inoculating virus as they go. While colonizing aphids are generally more efficient vectors of PVY than non-colonizers, the sheer numbers of migrating, non-colorizing aphids can pose a serious threat by introducing and moving virus into and within a field.

The standard use of at-plant, systemic insecticides on most potatoes has minimized the populations of colonizing aphids so most of the PVY spread occurring in our region is due to transient, non-colonizing aphids. Soybean aphid, grain aphids (e.g. Corn-leaf aphid, Bird cherry-oat aphid, English grain aphid) and aphids in forage crops (Melon aphid, Pea aphid) are the prominent PVY vectors in our region, and the abundance and activity of each of these species has contributed to the model.

Every time winged aphids disperse and migrate, they probe along the way until they find a suitable host plant. This happens in spring and fall and periodically throughout the summer. Current capture data for 2021 from the Suction Trap Network site (https://suctiontrapnetwork.org/data/), illustrate the early summer activity of several species in both southern (Arlington, WI suction trap) and northern (Antigo, WI) locations.





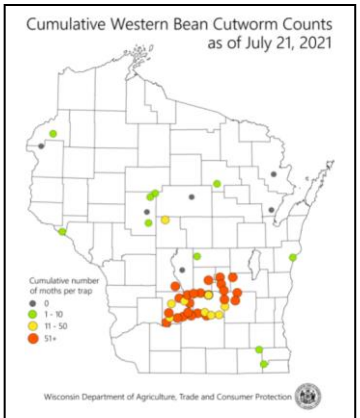
First notice the differences in the total numbers of aphids captured by the scale of the Y-axis on the graph (weekly counts). Greater numbers of captures have occurred in the southern site (Arlington) as compared to Langlade. Notice the early season movement of pea aphid, greenbug, bird cherry-oat aphid in late May and early June that we often see as these species are moving from overwintering hosts to their summer hosts. Notice also the recent (albeit very low) capture of Green peach aphid at the Langlade site. These capture hints toward activity of a potato colonizing species in the region, and scouts and pest management practitioners should be very vigilant to scout fields and look for colonizing species. If small groups of wingless individuals are observed on the under-surfaces of leaves in potato, then insecticide applications should immediately be considered for these fields.

Green peach aphid (*Myzus persicae*). This is perhaps the most efficient vector of PVY in potato. Body color varies from yellow to all shades of green, to pink, red, or black. Small groups of wingless aphids suggest colonization of potato is underway. Photo credit: David Voegtlin, University of Illinois

Recall that in our areas, many aphids produce eggs to survive winter on a primary plant host. In spring, eggs hatch and winged aphids migrate to secondary, summer host plants. While most offspring do not have wings and will move only to adjacent plants, winged forms will be produced when the colony gets crowded or in response to poor, or changing host plant quality. These winged aphids will migrate to other plants. Migration in mid-summer (e.g. grain aphids) or late summer (e.g. soybean and pea aphids) when aphids take flight to find overwintering host plants to lay eggs, is when we anticipate this elevated risk. These are the aphids commonly moving through potato fields and spreading PVY, and we anticipate seeing increased captures of these species in the week(s) to come at the Suction Trap Network site (https://suctiontrapnetwork.org/data/).

Western bean cutworm - https://vegento.russell.wisc.edu/pests/#leps

One generation of western bean cutworm occurs each year, and adult moth emergence usually begins in early July. After mating, females will lay eggs on available plants such as field corn, sweet corn, popcorn, or dry beans, but will also lay eggs on tomatoes, nightshade, and ground cherry. Scouting for western bean cutworm should begin when the first moths are noticed. Pheromone data from the WI DATCP's Home Pest Survey (https://datcp.wi.gov/Pages/Programs_Services/PestSurvey.aspx), illustrate that the western bean cutworm moth flights usually begin in early July. Pheromone traps have been established by the WI DATCP at sites throughout Wisconsin to monitor the annual emergence and flight of western bean cutworm moths. When trap catch peaks (generally late-July into early August),begin scouting corn, starting with pre-tassel fields.



WI DATCP's Home Pest Survey (https://datcp.wi.gov/Pages/Programs_Services/PestSurvey.aspx)

Scout pre-tassel or just-tasseling fields initially, as females prefer these stages for egg laying. Check 20 plants in 5 areas of the field for egg masses to determine the proportion (or percentage) of infested plants. Use a threshold of 5% or more plants with egg masses as your trigger for a need to consider control. Scouting also allows you to target just the fields over threshold, since the infestation in an area can be patchy, varying greatly from field to field based on crop stage at the time of peak adult flight

The emergence date of moths can be predicted by calculating growing degree days, beginning May 1, using a base temperature of 50°F. The Vegetable Disease and Insect Forecasting Network (VDIFN) (https://agweather.cals.wisc.edu/vdifn?panel=insect&model=pvy-vectors) site currently illustrates an enhanced risk for adult western bean cutworm flight across central Wisconsin, and these data are consistent with the pheromone capture data from the WI DATCP Home Pest Survey.

Western bean cutworm – adult flight activity (25 July 2021)