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

No. 12 – August 4, 2024

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- Potato production updates: stress from heat and high rainfall showing late-season effects
- Potato colonizing aphids, Squash bugs in cucurbits, Western bean cutworm updates and management
- Potato and vegetable disease forecasting updates – thresholds met for late blight and early blight treatments
- Cucurbit downy mildew

Calendar of Events:

December 3-5, 2024 – Midwest Food Producers Assoc. Processing Crops Conference, Kalahari Convention Center
January 13-14, 2025 – Wisconsin Agribusiness Classic, Alliant Energy Center, Madison, WI
February 4-6, 2025 – UW-Madison Div. of Extension & WPVGA Grower Education Conference & Industry Show, Stevens Point, WI

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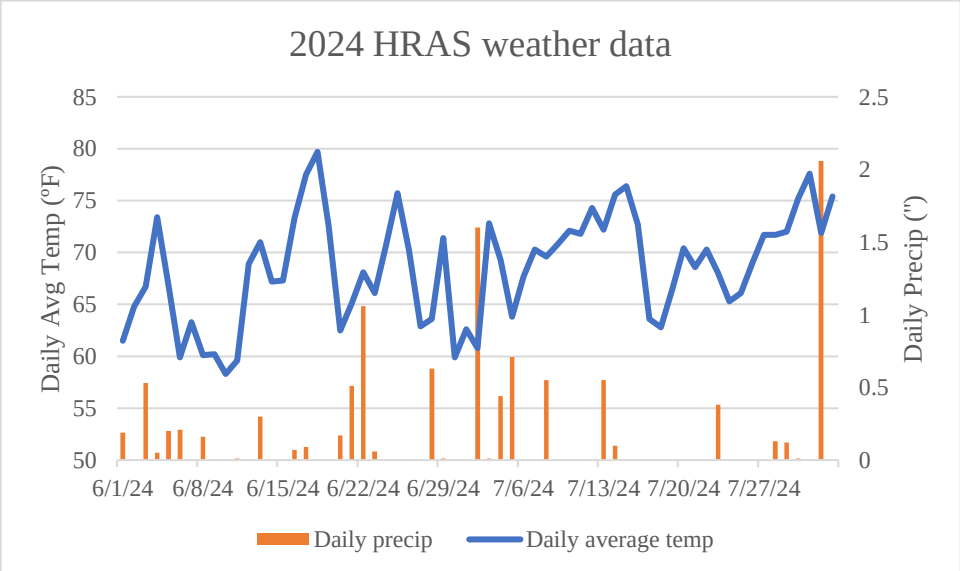
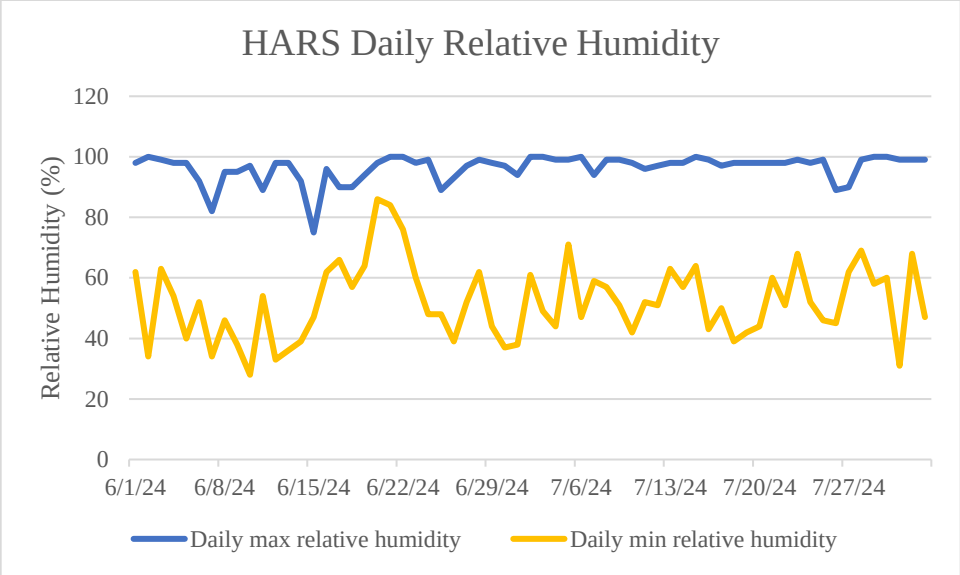
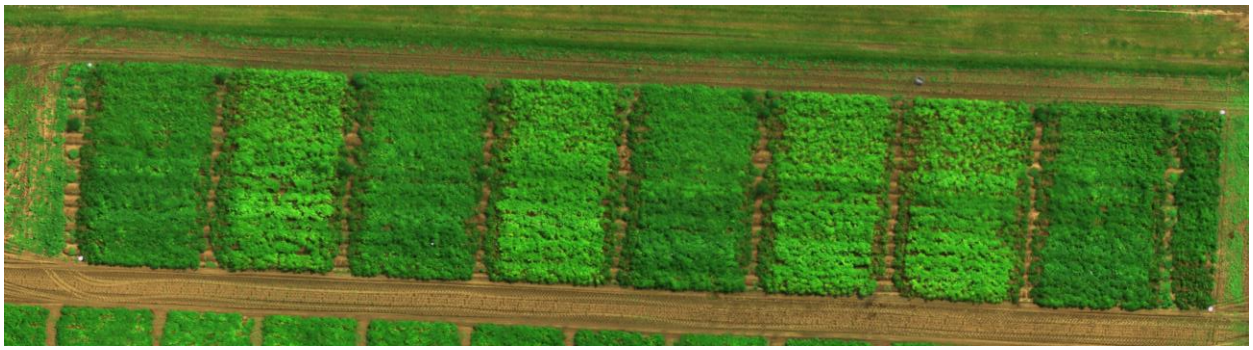
Due to the recent high humidity and heat, potato crops are going down quickly in many fields. Stresses have accumulated throughout the growing season. Some growers said that they were never able to keep nitrogen available this summer with the frequent heavy rain. On commercial fields, Agristo varieties (for making yellow French fries) have been good along with newer McCain varieties such as Lakeview. Goldrush had some seed issues but they look okay now. Plover has struggled with early dying along with most of the early potatoes. Caribou looks good so far.



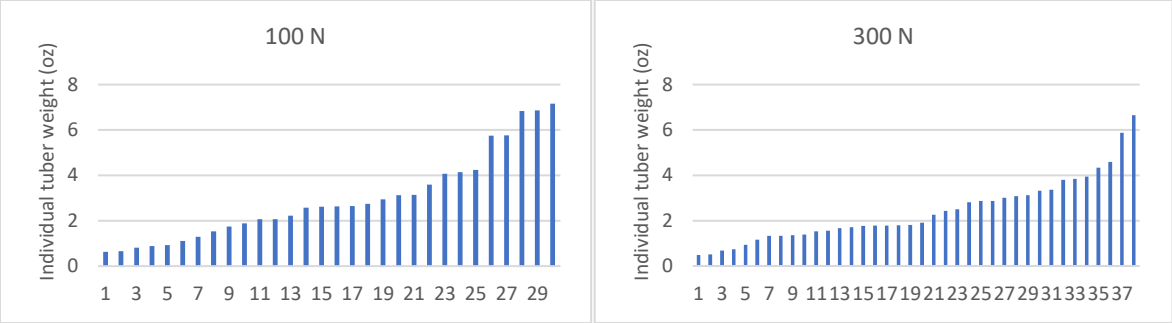


At HARS, our potato plants are not doing very well either. I have seen early blight, early wilting, and blackleg diseases in our variety plots so far. I dug a couple of Russet Burbank plants under the 100 vs 300 lb N/acre treatments on Thursday, and could see very obvious nitrogen effects on canopy color, canopy size, average tuber size, total weight and size distribution between the two N treatments.



100 lb N/acre: average tuber wt 3 oz
Total wt of two plants 5.5 lb

300 lb N/acre: average tuber wt 2.4 oz
Total wt of two plants 5.7 lb



It is apparent that the lower N rate at 100 lb/acre has resulted in a substantially yellower canopy color from the aerial image, which was an indication of them running low on "gas". The lower N rate showed lower tuber set and tended to produce larger individual tuber sizes with the limited resources. I would expect to see a lot higher total weight and the average tuber size catching up under the higher N rate in the next couple of weeks.

Vegetable Insect Update – Russell L. Groves, Professor and Department Chairperson, 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 colonizing aphids – (https://vegento.russell.wisc.edu/pests/aphids/). Aphids that colonize potatoes are increasing rapidly in many portions of the state. Two aphid species that will infest potato include the green peach aphid (*Myzus persicae*) and potato aphid (*Macrosiphum euphorbiae*). Potato colonizing aphids will feed and reproduce on potato as a preferred host.

The green peach aphid is the most destructive and insecticide-resistant aphid in Wisconsin. Many crops are attacked including greenhouse transplants of pepper, tomato, and cabbage, along with beet, carrot, broccoli, Brussels sprouts, lettuce, eggplant, and potato. Green peach aphids are 1/8 inch long, yellowish green, peach, or dirty red in color, and can be found on the undersides of leaves. This aphid is a very efficient vector of many virus diseases. Scouting is usually done by examining the undersides of leaves and looking for aphid activity. In potatoes, remove 25 leaves per sample from the lower half of 25 different plants, with at least 10 sample sites per field. Treat if more than 10 aphids are found per 100 leaves in seed fields or more than 30 per 100 leaves in table stock or processing potatoes.

Green peach aphid (Myzus persicae)
Photo: Scott Bauer

Potato aphids are larger than green peach aphids and come in both red and green colors. They attack eggplant, tomato, and potato and are most often found on young, actively growing tissue. To sample for potato aphids, remove leaves from the terminal parts of 35 plants and count the number of aphids. Repeat in at least 10 locations per field. When aphid counts exceed 20 per 100 in seed potato and 50 per 100 leaves in table or processing potatoes, control measures are suggested.


Photo: Whitney Cranshaw

Winged aphids of either species will inoculate PVY into the plant during its taste testing and then subsequently feed long term in the phloem while it deposits offspring on the plant. The non-winged offspring are likely to acquire the virus and then can spread it as they walk to adjacent plants. If the aphid colonies become too large and too crowded, winged forms of these species will be generated and those will fly to other plants or longer distance to other fields taking the virus with them. Colonizing aphids usually feed on new, succulent shoot tips or young leaves, often on the underside of the leaf.

If colonizing species are present, it is critical to scout seed potatoes at this time in the production season to determine whether any potato colonizing species have become established. If scouting reveals any small clusters of wingless aphids, it is very likely to be green peach or potato aphids. Once observed, it is essential to consider application of an appropriate aphicide to limit the development of these populations. As listed in an earlier newsletter, there are several aphid specific compounds registered for use, and are all considered very good for the control of colonizing species.

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 significant threat by introducing and moving virus into and within a field. The standard use of systemic insecticides (neonicotinoids) on most potatoes has minimized the populations of colonizing aphids, but as the season continues into August, much of the systemic neonicotinoids have been diminished in the phloem leaving the plant unprotected from colonizing species.

Foliar applications of paraffinic oils have also been shown to modify the feeding behaviors of both potato colonizing and non-potato colonizing aphids alighting onto the potato canopy as they move through the local landscape. Specifically, these investigations have revealed that aphids are discouraged from probing on leaves that possess residues of compounds containing residues of paraffinic oils, resulting in limited inoculation attempts.

Trade name	Chemical name	Mode of Action Class	Max labeled rate (single application)
Admire Pro	imidacloprid	Group 4A	1.3 fl oz/ac
Actara 25WG	thiamethoxam	Group 4A	3.0 oz/ac
Assail 30SG	acetamiprid	Group 4A	4.0 oz/ac
Belay	clothianadin	Group 4A	3.0 fl oz/ac
Beleaf 50SG	flonicamid	Group 29	2.8 oz/ac
Exirel 10SL	cyantraniliprole	Group 28	13.5 fl oz/ac
Fulfill 50WG	pymetrozine	Group 9B	5.5 oz/ac
Movento HL	spirotetramat	Group 23	2.5 fl oz/ac
PQZ	pyrifluquinizon	Group 9B	3.2 fl oz/ac
Sefina Inscalis	afidopyropen	Group 9D	6.0 fl oz/ac
Sivanto HL	flupyradifurone	Group 4D	7.0 fl oz/ac
Torac	tolfenpyrad	Group 21	21.0 fl oz/ac
Transform 50WG	sulfoxaflor	Group 4C	1.5 oz/ac
Venom 70SG	dinotefuran	Group 4A	1.5 oz/ac

Squash bugs (cucurbit crops) – (https://vegento.russell.wisc.edu/pests/squash-bug/). Squash bugs continue to be an emerging problem in Wisconsin. In recent weeks, these insects have become more prevalent, causing damage to vine crops in commercial fields and home gardens alike. The key to management is early detection. Squash bugs feed on all vine crops, but pumpkins and squash are the preferred hosts with gourds and melons favored next.

Adults are about ½ -3/4-inch long, brownish-black, flat, shield-shaped bugs. They are sometimes mistaken for stink bugs. Adults congregate and emit a strong odor when crushed. Immature squash bugs initially have red heads and legs with whitish-green bodies, but later have black heads and legs with gray bodies. Eggs are 1/16-inch, reddish orange to brown-colored and are laid in clusters on the undersides of leaves along the center vein.

Squash bugs are a major pest of squash and pumpkins. Nymphs and adults feed on plant juices and release toxins into leaves. Feeding causes wilting, and leaves become dry and brown or black along the edges. This wilting may appear similar to bacterial wilt, but bacterial wilt is spread by the cucumber beetle. Early symptoms of infestation include yellow spotting on the leaves. Later in the season, adults will also feed on fruit, which can cease development and begin to rot. Young plants are more susceptible to severe damage.

Unmated adults overwinter in Wisconsin in protected areas. Eggs are laid in late June and early July when cucurbit vines begin to develop. Eggs hatch in about 10 days. The nymphal stage lasts 4-6 weeks. Nymphs undergo 5 molts before reaching maturity. Adults appear in late July and early August. There is one generation per year. The female lays eggs over an extended period of time, and all life stages may appear at once on the plant.

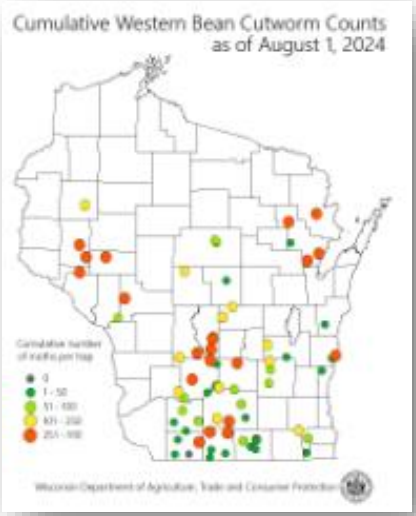
Squash bug (Anasa tristis)
Photo: Jeffrey Hahn, Univ. of Minnesota

Squash bug nymphs
Photo: 'Pollinator' on Wikipedia

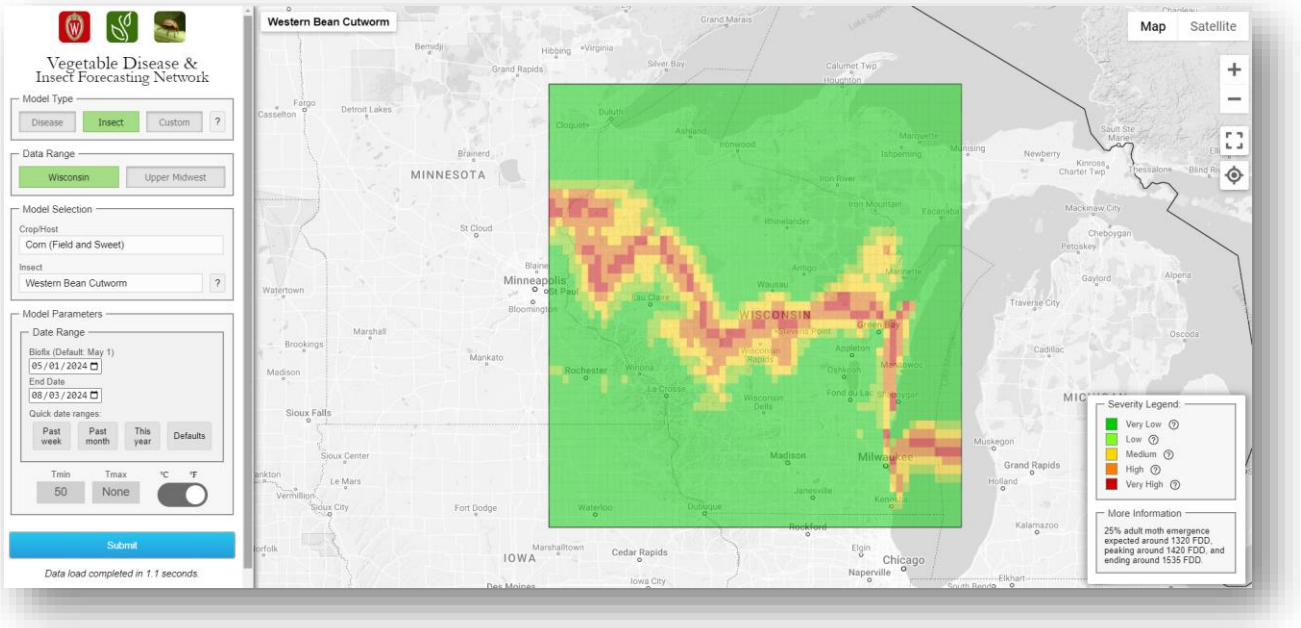
Because they are protected by the lower surfaces of leaves, squash bugs may be difficult to control. Although it is unlikely to find large populations of the adults early in the season, growers should check their transplants or new seedlings for the presence of adults. The threshold for treatment is one egg mass per plant during flowering. Inspect the lower leaf surface for squash bug eggs. In terms of management, destroy crop residues in the fall to reduce the number of overwintering adults. Crop rotation will also reduce the incidence of infestation. Trellised plants are less susceptible to squash bug infestations. Young nymphs are the most susceptible to control practices, while adults are more difficult to control. In smaller plantings, adults can be congregated by placing boards on the ground near the plants as a hiding place. The squash bugs will aggregate at night under the boards, which can then be destroyed each morning.

Western bean cutworm – (https://vegento.russell.wisc.edu/pests/). Western bean cutworm adults are well into flight in southern Wisconsin, and it is important to scout for eggs. Foliar treatments are suggested when > 5% of the plants scouted possess an egg mass. On whorl stage corn, the best timing is to initiate applications when egg masses are dark colored which indicates that hatch will start soon and the corn has a developing ear that is forming. Captures from the Wisconsin Home Pest Survey confirm significant numbers of adult moths continue to be captured over the past week (since Aug 1).

When given a choice, adult females prefer pre-tassel corn to lay eggs upon because the pollen being shed is an important food source for larvae prior to moving to the ear. Infestations are often aggregated within a field so thorough field scout is needed. Survey at least 5 different areas of a field and count egg masses on 20 consecutive plants in each of these 5 regions. Often eggs are found on the upper leaf surface on the uppermost leaves. Use the sun to backlight those leaves and look for the shadow of the egg mass(es). Later during the adult flight, also look for larvae that may have already hatched, and often these will be found in leaf axils feeding on pollen.



Pheromone traps (see capture data included) are the best method to document the timing of adult emergence, but the magnitude of these captures do not always predict risk of injury within a field. Again, scouting for egg masses is the best predictor of damage. If corn is pollinating or silking during scouting, it is also a good idea to inspect the tassel and silk for early instar larvae. Adult moths remain active in terms of mating and egg laying for as much as 25-30 days after their initial emergence. The risk for continued infestations and colonization of fields will likely continue through the first half of August in southern Wisconsin and will likely continue throughout August in central and northern portions of the state.



Vegetable Disease and Insect Forecasting Network (VDIFN) map of risk for infestation by Western bean cutworm, (WBC), https://agweather.cals.wisc.edu/vdifn (sourced 08/04/2024). Notice areas within the 'orange or red shaded' zones indicate high risk zone for adult moth oviposition, and these zones bisect the center of the state, but will be advancing into northern portions of the state in the week to come. Sweet corn and green bean producers with susceptible crop stages (silking corn, pin-bean stage green bean) should be scouting for these mobile insects.

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Current P-Day (Early Blight) and Disease Severity Value (Late Blight) Accumulations will be posted at our website and available in the weekly newsletters. Thanks to Ben Bradford, UW-Madison Entomology for supporting this effort and providing a summary reference table: https://agweather.cals.wisc.edu/thermal-models/potato. 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. Data from the modeling source: https://agweather.cals.wisc.edu/vdifn are used to generate these risk values in the table below. I've estimated early, mid-, and late planting dates by region based on communications with stakeholders. These are intended to help in determining optimum times for preventative fungicide applications to limit early/late blight in WI.

	Planting Date		50% Emergence Date	Disease Severity Values (DSVs) *through 8/3/2024*	Potato Physiological Days (P-Days) *through 8/3/2024*
Spring Green	**Early**	Apr 3	May 9	**46**	**722**
	Mid	Apr 17	May 12	**46**	**705**
	Late	May 10	May 25	**41**	**604**
Arlington	**Early**	Apr 5	May 10	**22**	**717**
	Mid	Apr 20	May 15	**22**	**686**
	Late	May 12	May 25	**20**	**607**
Grand Marsh	**Early**	Apr 5	May 10	**43**	**694**
	Mid	Apr 20	May 15	**43**	**666**
	Late	May 12	May 25	**36**	**592**
Hancock	**Early**	Apr 10	May 17	**52**	**648**
	Mid	Apr 22	May 21	**50**	**618**
	Late	May 14	June 2	**45**	**538**
Plover	**Early**	Apr 14	May 18	**41**	**643**
	Mid	Apr 24	May 22	**37**	**611**
	Late	May 19	June 7	**33**	**496**
Antigo	**Early**	May 1	May 24	**42**	**560**
	Mid	May 15	June 1	**42**	**519**
	Late	June 1	June 15	**29**	**420**
Rhinelander	**Early**	May 7	May 25	**21**	**547**
	Mid	May 18	June 8	**20**	**452**
	Late	June 2	June 16	**20**	**404**

Late blight of potato/tomato. Late blight diagnostics are available at no cost to WI growers and gardeners. Dr. Brian Hudelson of our UW Plant Disease Diagnostic Clinic and Dr. Amanda Gevens of UW-Potato & Vegetable Pathology can offer confirmation of the pathogen. Dr. Gevens will also offer strain typing of the pathogen. The usablight.org website (https://usablight.org/map/) indicates a few reports of late blight from the US so far in 2024 including NY tomato (from GH earlier in the spring) and MI (US-23 from potato). Please keep in mind that the site is not comprehensive. Outside of this site, I'm aware of 2 Ontario Canada confirmations of potato and tomato late blight (US-23), and a Florida late blight sample from potato (March 2024). I'm aware of no new reports in the past week.

We accumulated 5-10 Blitecast Disease Severity Values over the past week in WI. **All WI locations are above the threshold for late blight disease severity values and should receive preventative fungicide application to reduce the risk of disease.** An updated listing of fungicides for WI potato late blight management for 2024 can be found at the link below. Base protectants such as chlorothalonil and mancozeb offer broad-spectrum control of fungal and oomycete (water mold – like late blight) pathogens. https://vegpath.plantpath.wisc.edu/wp-content/uploads/sites/210/2022/07/2024-Potato-Late-Blight-Fungicides.pdf

Early blight of potato. All areas of production have reached the threshold for the application of foliar fungicides to limit early blight. Temperatures were optimal this past week for promoting early blight. https://vegpath.plantpath.wisc.edu/diseases/potato-early-blight/

Cucurbit Downy Mildew: Michigan confirmed downy mildew on **cucumber** in 14 counties so far this season (Washtenaw, Saginaw, Tuscola, Ingham, Bay, Iosco, Arenac, Muskegon, Sanilac, Midland, Clinton, Livingston, Allegan and Lapeer). OH also confirmed cucumber downy mildew this past week. To date, downy mildew field infections, and spores from air sampling in MI, have been of Clade 2 - cucumber and cantaloupe strain type. No field disease confirmations were made in Wisconsin.

Confirmed reports of cucumber downy mildew this past week in OH and PA. In red, US counties with reports of cucurbit downy mildew during the past 7 days. Green counties indicate a former report of the disease greater than 7 days ago. From: https://cdm.ipmpipe.org/

Management information can be sourced here: https://vegpath.plantpath.wisc.edu/2022/07/03/update-10-july-3-2022/