Vegetable Crop Updates

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

Extension
UNIVERSITY OF WISCONSIN-MADISON

May 25, 2025

***In This Issue*:**

- Updates on potato fertility research and irrigation management in potato
- Seedcorn maggot management, Colorado Potato Beetle management, vegetable leafminers
- Disease forecasting updates for potato early blight and late blight
- Cucurbit downy mildew updates

Calendar of Events:

July 10, 2025 – UW Hancock Agricultural Research Station Field Day
July 17, 2025 – UW Langlade County Airport Station Field Day 1PM
December 2-4, 2025 – Midwest Food Producers Assoc. Processing Crops Conference, Kalahari Convention Center
January 12-13, 2026 – Wisconsin Agribusiness Classic, Kalahari Convention Center
February 3-5, 2026 – UW-Madison Div. of Extension & WPVGA Grower Education Conference & Industry Show, Stevens Point, WI

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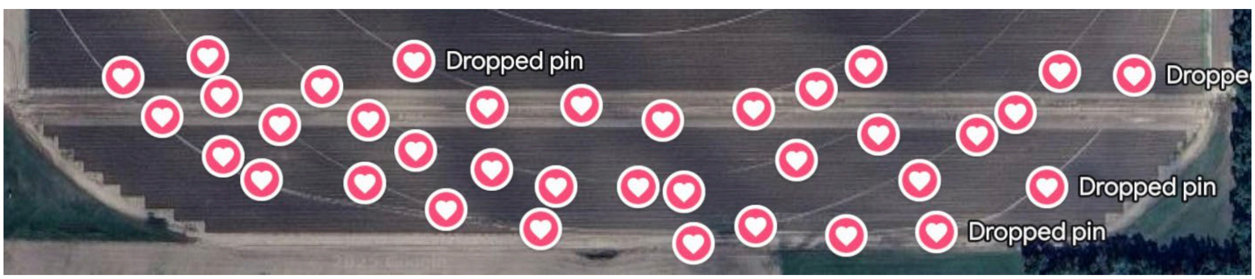
This summer, we will conduct our research on a commercial farm field that grows Colomba, a nitrogen-efficient user. The plan is to randomly select 36 spots over a 33-acre field to capture the field variability (Figure below).



During the fertigation period (possibly between June 15th and July 15th), we will collect petiole samples every week and test the nitrate-N content from each of these spots. We will also collect RGB, multispectral, and hyperspectral imagery from the whole field on the day of tissue collection. The objective is to use remotely sensed images and develop robust models that accurately predict petiole nitrate-N content and generate whole-field maps to indicate field variability. Traditionally, growers collect only one or two petiole samples to represent the entire field, which may lead to over- or under-application of nitrogen fertilizer in certain parts of the field. We would like to understand if the remote sensing technology can help us better understand how petiole nitrate-N content varies across a commercial field and make better nitrogen fertilization decisions.

Next, we will briefly discuss some key tips for potato irrigation management. As many of the seeds have emerged from the ground so far, I am providing a summary of volumetric soil water content for typical agricultural soils (Table 1), potato growth stages (Figure 1), and irrigation amounts at different growth stages.

	Soil Water Content on Volumetric Basis (%)							
	Field Capacity		Permanent Wilting Point		Available Water		Water Holding Capacity (in/ft)	
Texture Class	Average	Range	Average	Range	Average	Range	Average	Range
Sand	12	7-17	4	2-7	8	5-11	0.96	0.60-1.32
Loamy Sand	14	11-19	6	3-10	8	6-12	0.96	0.72-1.44
Sandy Loam	23	18-28	10	6-16	13	11-15	1.56	1.32-1.80
Loam	26	20-30	12	7-16	15	11-18	1.80	1.32-2.16
Silt Loam	30	22-36	15	9-21	15	11-19	1.80	1.32-2.28
Silt	32	29-35	15	12-18	17	12-20	2.04	1.44-2.40
Silty Clay Loam	34	30-37	19	17-24	15	12-18	1.80	1.44-2.16
Silty Clay	36	29-42	21	14-29	15	11-19	1.80	1.32-2.28
Clay	36	32-39	21	19-24	15	10-20	1.80	1.20-2.40

Table 1. Volumetric soil water content for different typical agricultural soils. (Source: Jensen et al., 1990)

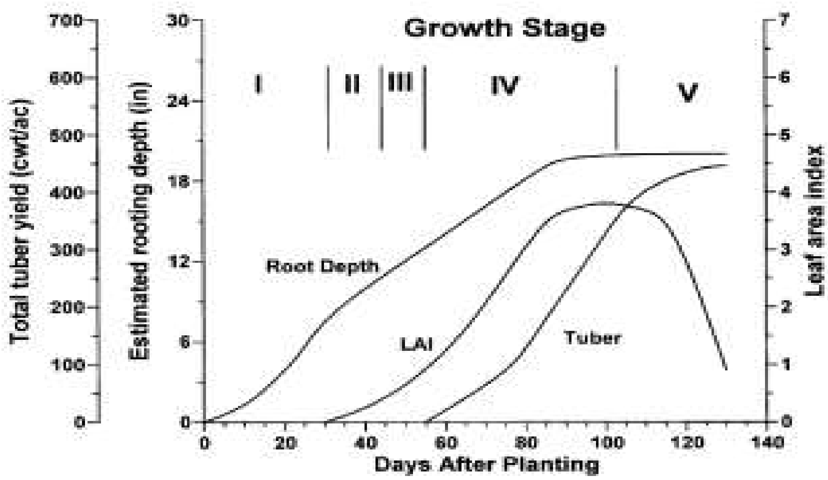


Figure 1. Five growth stages of potato root depth, leaf area index (LAI), and total tuber yield. (Source: King and Stark)

Stage I: planting to emergence, soil moisture in the top foot should be 65 to 80% field capacity (FC), no irrigation is recommended.

Stage II: emergence to tuber initiation, a soil moisture of 70% to 80% FC is preferred, with rapid developing canopy every week, irrigation starts low, ~ 0.5 inch per week, and gradually increase every week by about 0.5 inches, at tuber initiation, about 1.5 inches per week will be a good number.

Stage III: tuber initiation to full bloom, optimal soil moisture is 80% to 90% FC, and irrigation could be increased to about 2.5 inches per week on sandy soils. In areas and with varieties susceptible to common scab, maintaining soil moisture at 90 to 95% FC is suggested.

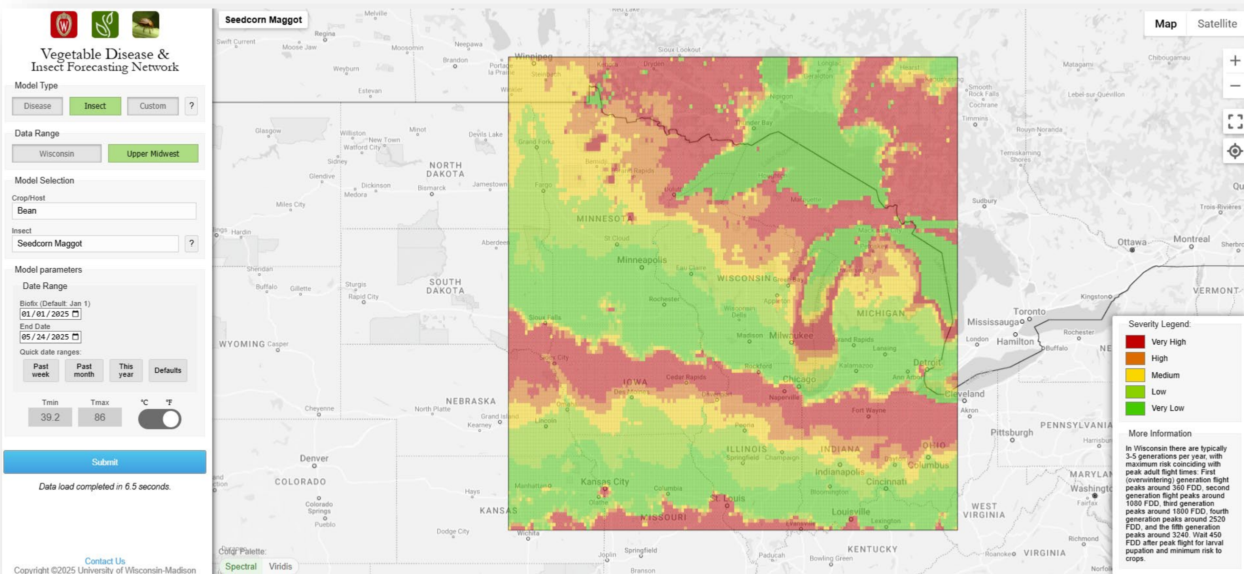
Stage IV: full bloom to plant senescence (tuber bulking), soil moisture should be at 80 to 90% FC. This is the period when plants have the highest water demand and are the most sensitive to water stress. Irrigation plus rainfall should be 2 to 2.5 inches per week or about 15 inches over the period.

Stage V: plant senescence to harvest, soil moisture should decline to 60 to 65% FC. Please note that these are rough numbers since irrigation management always depends on variety, soil health, weather, and on-farm cultural practices.

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/

Seedcorn Maggot (https://vegento.russell.wisc.edu/pests/seedcorn-maggot/) – Emergence of the 2nd generation of seedcorn maggot (SCM) is now entering the southwest corner of Wisconsin. More specifically, the emergence of adult flies from the 1st full generation will be complete and mated females will begin laying eggs in very southern portions of the state in the coming 10-12 days. Forecast daytime high temperatures (mid-70ºF) over the next week will move populations along predictably toward risks that will high across the southern portions of Wisconsin during the first week of June.



Adult SCM often swarm over recently tilled fields or gardens. Preferred egg deposition sites are locations with germinating or decaying seeds, plant residue, incorporated green manures or where organic fertilizers have been recently applied. Adults often mate and lay eggs within 2-3 days of following emergence. Eggs hatch 2-4 days later depending on soil temperature. The larval portion of the SCM life cycle occurs below ground over the course of a few weeks. A complete life cycle for SCM typically ranges from 15-22 days, and depending upon temperatures that occur during summer, there are typically 4-6 generations per year. Later generations rarely affect older plants as they have much greater tolerance for feeding on plant roots.

Seedcorn maggot and damage
Photo: Iowa State

Seedcorn maggot adult
Photo: Janet Graham

Since adult SCM are attracted to decaying organic matter, do not plant susceptible crops in fields where animal or green manure has recently been incorporated. The faster planted seeds germinate and grow, the less opportunity the maggots have to damage the crop. Delay planting until soil temperatures are at least 50°F before planting most susceptible crops. Peas and radish may be planted when soil temperatures are above 40°F. Plant seeds as shallowly as agronomically possible to speed germination. Soak untreated pea and bean seeds in water for 2 hours before planting to soften the seed coat.

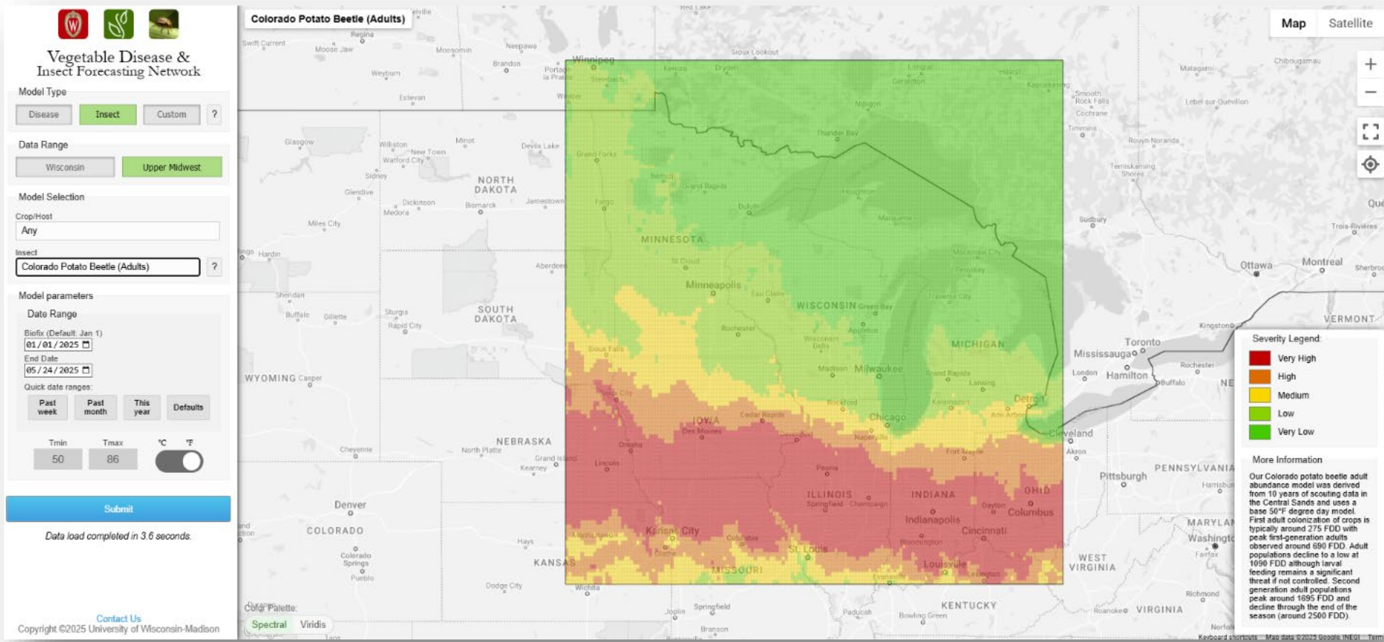
SCM is a recurring issue for many producers. Two common chemical delivery techniques are available for SCM management: seed treatment or an at-plant soil application. Numerous combinations of insecticidal compounds and fungicide are available as pre-plant seed treatments directly from the seed vendor. Many of these components for SCM management are reduced risk insecticides which have lower non-target impacts and these include spinosad, cyantraniliprole, and chlorantraniliprole.

Colorado potato beetle – (https://vegento.russell.wisc.edu/pests/colorado-potato-beetle/)

Begin checking for Colorado potato beetle (CPB) adults in now in late May and after potato plants have emerged. Adults and initial egg masses have been observed in very southwest Wisconsin, and populations will become evident across portions of southern Wisconsin in the next week. Early detection of infestation is especially critical where producers wish to use perimeter sprays to limit advancing populations. Early applications containing the adulticide indoxacarb (Avaunt®) can be applied to outer rows to control advancing populations of overwintering adults moving into fields from waterways or hedgerows. Producers should consider tank mixes containing piperonyl butoxide (PBO) to enhance the performance of indoxacarb when targeting CPB. Formulations of PBO containing greater than 85% active ingredient should be considered. Compounds containing novaluron (Cormoran, Rimon) can also be initiated in perimeter applications to limit the number of viable eggs laid by adult females.

Table 1. Rate of beetle development using degree days
See VDIFN (base: 52°F; max: none; biofix: 1st eggs)

Life stage	Degree days	Accumulated degree days	Treatment
Egg	120	120	Not susceptible – do not treat
First instar	65	185	Most effective time to apply Btt
Second instar	55	240	Most effective time to apply conventional insecticides
Third instar	60	300	Most effective time to apply conventional insecticides
Fourth instar	100	400	Most effective time to apply conventional insecticides
Pupae	275	675	Not susceptible – do not treat



Scout field edges by quickly scanning plants and surrounding soil for the presence of live adults. Often adult beetles will drop from small plants to the soil as a defensive tactic, typically observing the area surrounding plants will help for early detection. Second, carefully examine lower leaf surfaces of plants for clusters of bright yellow-orange, waxy eggs. Additionally, focus early season scouting on border rows that are adjacent to either previous solanaceous crops or unmanaged non-crop areas. These have the greatest probability for early infestation by adult CPB and greater densities egg masses.

Vegetable leafminers – (https://vegento.russell.wisc.edu/pests/colorado-potato-beetle/)

The term leafminer is commonly used to describe flies, moths, sawflies or beetles in the larval stage. However, leafminers that feed on vegetables most commonly belong to the order Diptera – the flies. Leafminers feed on the mesophyll tissue between the upper and lower surfaces of leaves. This region of the leaf is where the plant converts light to energy through the process of photosynthesis. Economic crop damage occurs most often in vegetables harvested for edible foliage, such as spinach or chard. There are three primary garden leafminer pests in the state of Wisconsin: pea (Liriomyza huidobrensis, Blanchard), vegetable (Liriomyza sativae, Blanchard) and the spinach (Pegomya hyoscyami, Panzer). Increasingly a fourth, serpentine (Liriomyza brassicae, Riley), has become more common in greenhouse settings. Growers should note that many of these leafminer species do not persist at economically damaging levels in the state and may be a sporadic pest on vegetables. Significant problems may arise when transplants are sourced from southern regions. Many regions of the southeastern United States have large, persisting leafminer populations with significant insecticide resistance problems. Growers in Wisconsin should take great care to inspect all transplant material sourced from outside the Midwest ensuring plants are healthy and free of leafminer, other arthropod pests and plant pathogens.

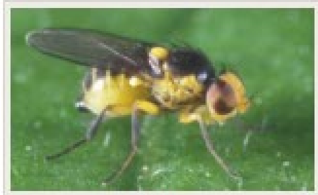
Fly (Dipteran) leafminers have a very similar life cycle among several species. Leafminers have a relatively short life span that is temperature dependent. In Wisconsin, overwintering species pupate in the soil or in leftover crop residue. Adult flies emerge in the spring and lay eggs below the leaf surface of susceptible host plants. When eggs hatch, the larvae immediately enter the leaf and begin to consume the mesophyll tissue between the upper and lower leaf surfaces. Leafminer larvae are generally cylindrical in shape, tapering to a point at the head end. Larvae are typically white to yellowish-white in the most species. When larvae reach physiological maturity, they may remain in the plant or drop to the ground to pupate. Numerous generations of leafminers occur per year. Depending on timing and crop first generation typically causes the majority of damage.

Leaf miner damage on tomato
Image source

The damage that results from leafminer activity may appear as blisters, blotchy mines or serpentine tunneling. Frass (feces) of the larvae can contaminate leafy tissue intended for human consumption. Stunting, due to a reduction of photosynthetic leaf surface area, can also be a problem in vegetable crops not exclusively sold for foliage consumption. Spinach leafminer produce serpentine mines initially but later produce large, blotchy feeding areas. Larvae of the vegetable leafminer may feed on multiple leaves prior to completing the larval portion of their life cycle.

Liriomyza huidobrensis
Image source

It is critical to identify leafminer infestation before the marketability of the crop is affected; this threshold differs greatly among crops. Effective control of leafminer occurs early in the pest's larval life cycle. Many leafminer species deposit eggs on the lower leaves often avoiding new growth. Focus upon these surfaces when looking for early leafminer damage. Yellow sticky cards may be helpful for monitoring adult leafminer flights. Challenging adult identification may make this scouting tactic impractical for most producers.



Liriomyza sativae
Photo: Lyle J. Buss

Threshold levels for leafminer control have not been established for many crops due to sporadic nature of the pest in Wisconsin. Based upon the crop adjust infestation tolerances to the end product. For instance, when growing beets for direct consumption of greens demand a lower threshold for control than beet for roots. Adjustments may also be made based upon the spatial distribution of the pest in the plant. If the majority of leafminers are found in older wrapper leaves of chard, which are commonly discarded, control may not be necessary.

Pegomya hyoscyami male
Photo: Nikita Vikhrev

Younger plants are generally more susceptible to damage than older ones. On leafy green crops such as spinach, lettuce, and chard, a 5% damage threshold is commonly used. Basic Integrated Pest Management (IPM) principles such as accurate identification, infestation monitoring and realistic action thresholds are all critical components for adequate management of this pest complex.

Liriomyza brassicae
Image source

Because leafminers are protected within the plant, foliar insecticidal control is often difficult. Foliar protectants must be applied prior to egg deposition on the crop. Window of activity is a concern and may require several applications for adequate control of asynchronous emergence of leafminer. Newer reduced risk insecticide groups, such as the diamide class (chlorantraniliprole, IRAC MoA 28), may provide excellent systemic control of the leafminer complex in several crops, especially where insecticide resistance to older chemistries is suspected. Organic control options can include spinosad (Entrust SC) and pyrethrum/azadirachtin (Azera).

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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 and late blight in Wisconsin.

	Planting Date		50% Emergence Date	Disease Severity Values (DSVs) *through 5/24/2025*	Potato Physiological Days (P-Days) *through 5/24/2025*
Spring Green	**Early**	Apr 5	May 10	3	80
	Mid	Apr 18	May 14	3	52
	Late	May 12	May 26	TBD	TBD
Arlington	**Early**	Apr 5	May 10	3	77
	Mid	Apr 20	May 15	3	40
	Late	May 10	May 24	0	4
Grand Marsh	**Early**	Apr 7	May 11	0	66
	Mid	Apr 17	May 14	0	46
	Late	May 12	May 27	0	TBD
Hancock	**Early**	Apr 10	May 15	0	35
	Mid	Apr 22	May 21	0	9
	Late	May 14	June 2	TBD	TBD
Plover	**Early**	Apr 14	May 18	0	14
	Mid	Apr 24	May 22	0	7
	Late	May 19	June 7	TBD	TBD
Antigo	**Early**	May 1	May 24	0	1
	Mid	May 15	June 1	TBD	TBD
	Late	June 1	June 15	TBD	TBD
Rhinelander	**Early**	May 7	May 25	TBD	TBD
	Mid	May 18	June 8	TBD	TBD
	Late	June 2	June 16	TBD	TBD

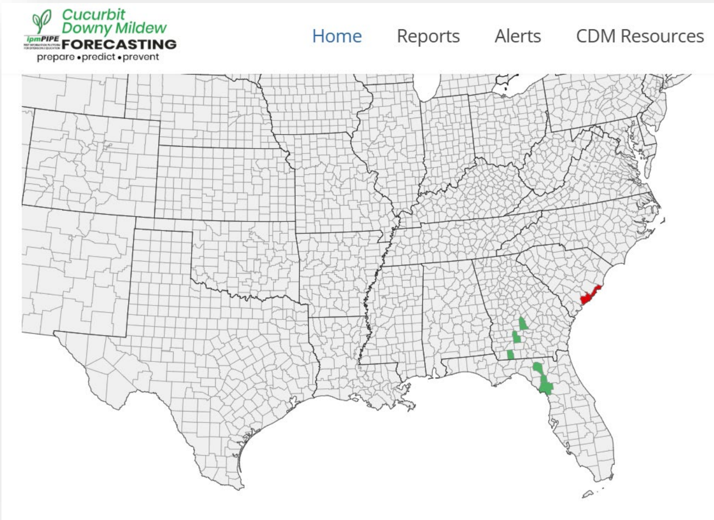
Late blight of potato/tomato. The usablight.org website (https://usablight.org/map/) indicates a US-23 late blight strain type confirmation in Collier County FL in 2025. The site is not comprehensive. This genotype/clonal lineage is generally still responsive to phenylamide fungicides meaning that Ridomil and Metastar fungicides (mefenoxam and metalaxyl) can still effectively control late blight caused by these strain types. We accumulated just 3 Blitecast Disease Severity Values over the past week in Spring Green and Arlington, WI. No other locations accumulated DSVs this past week.

Early blight of potato. We are beginning to accumulate P-Days in potatoes at 50% emergence. Accumulations were modest over the past week with cooler days. P-Day values will continue to amass (up to ~10 per day) and develop conditions optimum for early blight disease caused by *Alternaria solani*. Earliest inoculum typically comes from within a field and from nearby fields. Once established, early blight continues to create new infections due to its polycyclic nature – meaning spores create foliar infection and the resulting lesion on the plant can then produce new spores for ongoing new infections in the field and beyond. Early season management of early blight in potato can mitigate the disease for the rest of the season. https://vegpath.plantpath.wisc.edu/diseases/potato-early-blight/

Fungicides can provide good control of early blight in vegetables when applied early on in infection. Multiple applications of fungicide are often necessary to sustain disease management to time of harvest due to the typically high abundance of inoculum and susceptibility of most common cultivars. For Wisconsin-specific fungicide information, refer to the Commercial Vegetable Production in Wisconsin (A3422), a guide available through the UW Extension Learning Store website which is annually updated. Or, for home garden fungicide recommendations, see Home Vegetable Garden Fungicides (D0062), a fact sheet available through the UW Plant Disease Diagnostic Clinic website. Always follow label directions carefully.

For custom values, please explore the UW Vegetable Disease and Insect Forecasting Network tool for P-Days and DSVs across the state (https://agweather.cals.wisc.edu/vdifn). This tool utilizes NOAA weather data. 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. 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 2025 Commercial Veg. Production in WI Extension Document A3422: https://cropsandsoils.extension.wisc.edu/articles/2025-commercial-vegetable-production-in-wisconsin-a3422/

Cucurbit Downy Mildew: I will continue to track cucurbit downy mildew in the US and report via this newsletter. This information helps us understand the potential timing of arrival of the pathogen in our region, as well as the strain type which can give us information about likely cucurbit hosts in WI – as well as best management strategies. During this past week, downy mildew was confirmed on cucurbits (cucumber) in South Carolina. Clade 1 downy mildew strains infect watermelon and Clade 2 strains infect cucumber. I will be hosting a cucurbit downy mildew sentinel plot at the UW Hancock Agricultural Research Station this summer. This 'sentinel plot' is a non-fungicide treated collection of cucurbit plants which are observed weekly for disease symptoms. I will report the presence/absence of downy mildew from this plot in this newsletter throughout the growing season. Additionally, I keep an eye on the downy mildew spore trapping work of Dr. Mary Hausbeck at Michigan State University and include this information as relevant to WI https://veggies.msu.edu/downy-mildew-news/ . At this time, no spores reported from the MI traps.



Cucumber downy mildew was confirmed in South Carolina over this past week. Green counties indicate a former report of the disease greater than 7 days ago. From: https://cdm.ipmpipe.org/

For more information and management: https://vegpath.plantpath.wisc.edu/2022/07/03/update-10-july-3-2022/ and https://hort.extension.wisc.edu/articles/cucurbit-downy-mildew-identification-and-management/#:~:text=on%20this%20site.-,Wisconsin%20Horticulture,been%20found%20primarily%20on%20cucumber.