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. 16 – September 3, 2023

In This Issue:

- Potato and tomato early blight and late blight disease updates
- Cucurbit downy mildew updates
- Colonizing aphids
- Potato harvest and storage updates

Calendar of Events:

November 28-30, 2023 – Midwest Food Producers Assoc. Processing Crops Conference, Kalahari Convention Center
January 9-11, 2024 – Wisconsin Agribusiness Classic, Alliant Energy Center, Madison, WI
January 21-23, 2024 – Wisconsin Fresh Fruit and Vegetable Growers Conference, Kalahari Resort, Wisconsin Dells, WI
January 25-26, 2024 – Organic Vegetable Production Conference, UW Madison Division of Extension (Online)
February 2-3, 2024 – Organic Vegetable Production Conference, UW Madison Division of Extension, Alliant Energy Center, Madison, WI
February 6-8, 2024 – UW-Madison Div. of Extension & WPVGA Grower Education Conference & Industry Show, Stevens Point, WI

Amanda Gevens, Chair, Professor & Extension Vegetable Pathologist, UW-Madison, Dept. of Plant Pathology, 608-575-3029, Email: gevens@wisc.edu, Lab Website: https://vegpath.plantpath.wisc.edu/

Early blight of potato/tomato. Accumulations of P-days this past week were between 49-64 across the state of Wisconsin. In all locations and all planting dates, potato fields have surpassed the threshold and should continue to receive fungicide applications for early blight management depending upon the time-to-harvest of the field

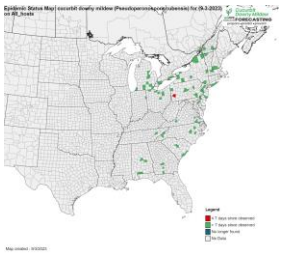
Late blight of potato/tomato. Accumulations of Blitecast DSVs were extremely low with a range of 0-1 this past week in the 7 sites detailed in our table, below. The usablight.org website (https://usablight.org/map/) indicates a new late blight report in the past week on tomato in Ontario County. So far, all characterizations of the late blight pathogen identified in North America this growing season have resulted in the US-23 type. Fungicides for the management of late blight in tomato and potato crops are provided: https://learningstore.extension.wisc.edu/products/commercial-vegetable-production-in-wisconsin. A specific list of fungicides for potato late blight in Wisconsin was also offered in a special report shared via email on July 28. https://vegpath.plantpath.wisc.edu/wp-content/uploads/sites/210/2023/08/2023-Potato-Late-Blight-Fungicides.pdf

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 again in 2023. 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 is from weather stations that are placed in potato fields in each of the four locations, as available. Data from an alternative modeling source: https://agweather.cals.wisc.edu/vdifn will be used to supplement as needed for missing data points and for additional locations (indicated with *). Data are available in graphical and raw formats for multiple locations at: https://vegpath.plantpath.wisc.edu/dsv/.

	Planting Date		50% Emergence Date	Disease Severity Values (DSVs) *through 9/2/2023*	Potato Physiological Days (P-Days) *through 9/2/2023*
Spring Green*	**Early**	Apr 3	May 9	12	**913**
	Mid	Apr 17	May 12	12	**891**
	Late	May 10	May 23	12	**822**
Arlington*	**Early**	Apr 5	May 10	11	**925**
	Mid	Apr 20	May 15	11	**887**
	Late	May12	May 25	11	**827**
Grand Marsh	**Early**	Apr 5	May 10	12	**882**
	Mid	Apr 20	May 15	12	**848**
	Late	May 12	May 25	12	**796**
Hancock	**Early**	Apr 10	May 17	12	**852**
	Mid	Apr 22	May 19	12	**846**
	Late	May 14	May 28	12	**797**
Plover	**Early**	Apr 14	May 19	16	**839**
	Mid	Apr 24	May 20	16	**834**
	Late	May 19	May 29	16	**785**
Antigo	**Early**	May 1	May 28	13	**747**
	Mid	May 15	June 3	13	**702**
	Late	June 7	June 23	13	**567**
Rhinelander*	**Early**	May 7	June 1	9	**717**
	Mid	May 18	June 5	9	**682**
	Late	June 9	June 24	9	**558**

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. 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 2023 Commercial Vegetable Production in Wisconsin Guide, Extension Document A3422. https://learningstore.extension.wisc.edu/products/commercial-vegetable-production-in-wisconsin

Cucurbit Downy Mildew. The Cucurbit Downy Mildew forecasting webpage (https://cdm.ipmpipe.org/) is not forecasting the movement of the pathogen, but the group is offering reporting of findings of cucurbit downy mildew from the US (see current map below showing red counties with new reports from IN, PA, VA, NJ, and MD). **To date, there have been no reports of downy mildew here in WI**. We should be considering preventative treatment of cucumber and melon crops here due to the likelihood of the disease resulting from clade 2 downy mildew. https://vegpath.plantpath.wisc.edu/2023/08/28/update-15-aug-27-2023/



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

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

Colonizing aphids – **https://vegento.russell.wisc.edu/pests/aphids/**

As described in earlier newsletter submissions, populations of aphids continue to increase rapidly across the state. Significant populations continue to escalate in fruiting vegetables (tomato, pepper, eggplant), brassica (cole) crops, sweet corn and potato. In each of these instances, there may be different species of aphids that are associated with these different crops.

Across many vegetables, there are several aphid species that are capable of attacking many crops. Aphids that pose the most serious problem to Wisconsin vegetable production include the green peach, melon, corn leaf, and potato aphids.

Common name	Scientific name	Description	Host plants
Asparagus aphid	*Brachycorynella asparagi*	Small, bluish-gray in color, powdery	Asparagus
Bean aphid	*Aphis fabae*	Dark green to sooty black	Artichoke, asparagus, bean, carrot, corn, lettuce, parsnip, rhubarb, spinach, squash
Cabbage aphid	*Brevicoryne brassicae*	Gray-green with a powdery, waxy covering	Broccoli, Brussels sprouts, cabbage, collards, kale, kohlrabi, and radish
Corn leaf aphid	*Rhopalosiphum maidis*	Bluish-green	Corn
Green peach aphid	*Myzus persicae*	Yellowish-green with 3 dark lines on their backs	Beet, celery, cole crops, cucurbits, lettuce, pepper, potato, spinach, tomato
Melon aphid	*Aphis gossypii*	Pale yellow to brown or nearly black with black cornicles	Asparagus, bean, beet, celery, cucurbits, okra, spinach
Pea aphid	*Acyrthosiphon pisum*	Pale green with black legs	Peas
Potato aphid	*Macrosiphum euphorbiae*	Pink to green in color, relatively large	Potato, tomato, eggplant, sunflower, peppers, peas, beans, apple, turnip, corn, sweet potato, asparagus, clover, roses

Aphids, also known as plant lice, are soft-bodied, sucking insects that feed on plant sap and excrete a sugary honeydew that attracts ants and creates the conditions for sooty mold, a type of fungus (saprophytic) that feeds on decaying organic matter.

It is difficult to generalize the life cycle of all aphids because of the diversity of their life habits, which can range from single to multiple hosts. One of the unique characteristics of aphids that sets them apart from all other insects is their ability to bear live young. The female aphids can reproduce without mating and will hold the eggs in their bodies to give birth to live young. By eliminating mating and egg laying, aphids have successfully shortened their life cycle and thereby increased their reproductive capability immensely.

Throughout the summer, wingless females predominate. However, winged forms may arise when populations become too large for the available food source. In late summer, in response to the shortened daylight hours, wingless females and males are produced for the purpose of mating and laying fertilized eggs that will survive adverse winter conditions. Look for "hot spots" of aphid activity scattered throughout the field. Because of the spotty nature of infestations, look for aphids on a number of plants in several areas. Examine both the terminals and the underside of mid-canopy leaves of 25 consecutive plants or sample units and determine the proportion of plants as infested or un-infested. Given the huge reproductive potential of aphids, an infestation level of 5%-10% indicates a potentially damaging infestation. Repeat checks at weekly intervals to determine the need to treat.

In the specific instance of seed potato production, where the risk of virus transmission is so high during the late season, acceptable infestation levels of colonizing aphids should not exceed even 1% (and this seems like an unrealistic threshold for this 2023 season). But one must be diligent to limit the numbers of colonizing aphids as these species can elevate infection levels very rapidly at this time of year. Given the environmental growing conditions for the 2023 seed production season, it is my expectation to see record yields. But these records can be negated by high infection prevalence in summer inspections and subsequent post-harvest winter test results that render the seed crop unusable.

A few quick guidelines when attempting to manage PVY in seed:

• Don't plant (or re-plant) a problem! Replant only the best foundation or certified seed potatoes. This is the absolute best defense any grower can have against PVY.

• Isolate seed fields from commercial production. Proximity to commercial potato increases your chances for disease spread considerably.

• Use border crops to surround high-valued seed lots. Border crops can "cleanse" PVY from aphid sytlets (mouthparts) before the aphids move into potatoes.

• Time planting and top kill to avoid peak aphid flights. Prevent late-season virus infection by planting and top-killing seed potato fields early.

• Spraying for potato-colonizing aphids can reduce spread of PVY within the field under circumstances where they have colonized and gained access. Spray only when scouting indicates green peach or potato aphid populations are above threshold levels.

• Plant immune or PVY resistant cultivars whenever possible and avoid planting tolerant cultivars in close proximity to fields with susceptible cultivars.

• Maintain adequate protection of the crop canopy from aphid inoculations through the entire period of vine desiccation. Do NOT discontinue use of paraffinic oils or insecticides until the canopy is completely dead.

Yi Wang, Associate Professor & Extension Potato and Vegetable Production Specialist, UW-Madison, Dept. of Horticulture, 608-265-4781, Email: wang52@wisc.edu.

With the ongoing potato harvest under warm temperatures, many are concerned about the effects of heat on tuber storage quality. Ideally potatoes should be harvested when tuber pulp temperatures range between 50 to 55°F. Realistically, the recommendations are between 45 and 65°F.

Environmental conditions during harvest can greatly vary depending on daily weather change and time of day. Monitoring pulp temperatures and adjusting harvest time of the day is necessary to fall within the recommended temperature range. However, this range may be modified if harvesting in a rocky field, growing a susceptible variety, or growing conditions during the season such as heat or drought stress, early dying, and over- or under-watering increase crop susceptibility to bruising or disease at harvest.

There are several consequences to harvesting tubers with warm pulp temperatures. First of all, tuber loss caused by Pythium leak and pink rot could substantially increase. Pulp temperatures above 70°F dramatically increase the chance for potatoes to be infected with *Pythium* even without major wounding. Although pink rot does not need a wound to infect and decay a tuber, the chance for infection greatly increases as the tuber gets wounded, especially when pulp temperatures raise above 60°F. Even if handling and operating are carefully done, pulp temperatures of and above 70°F increase the risk of pink rot development if the inoculum is present. Secondly, tuber weight loss during storage will be higher. Elevated harvest temperatures encourage greater evaporation of water from the potatoes and maintain higher rates of respiration, resulting in greater weight loss that can never be recovered.

At harvest, there is a tremendous amount of heat from field heat and high tuber respiration rates. For example in a 100,000 cwt storage, if potatoes with 65°F pulp temperature at harvest are put into storage with no cooling air, that 65°F temperature can increase to 70°F after 12 hours just from the heat of tuber respiration alone. This 100,000 cwt storage can generate millions of BTUs per day from respiration that needs to be removed before the crop can start to be cooled.

Therefore, if tuber pulp temperatures are already high, and the heat from respiration is high, you will need to remove that heat and get air on the potatoes as soon and as much as possible. Initiate a step-down process of exhausting heat, cooling the crop, and maximizing run time. If there may not be sufficient natural cooling air available to manage this heat load, refrigeration is a good option to cool potatoes down. Yet it needs to be pointed out that the system must have the capacity to handle the high heat load, and fresh air must be provided to purge carbon dioxide out of the building.

If using outside cooling air only, maximize run time by bringing fresh air in 1 to 2°F lower than the coolest potatoes, and continue with this step-down process until you reach the desired curing temperature. Current control panels can be programmed to do this automatically. Do not simply set the set point to 55°F – this will not maximize run time. The longer potatoes are above 55°F in storage, the greater the risk for disease breakdown. Ventilation is critical to getting control of the heat load in storage.