



Vegetable Crop Update

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



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Calendar of Events

July 18, 2019 – UW-Hancock Agricultural Research Station Field Day, Hancock, WI

July 25, 2019 – UWEX Langlade County Airport Research Station Field Day, Antigo, WI

August 2, 2019 – UW-Lelah Starks Elite Foundation Seed Potato Farm Field Day, Rhinelander, WI

December 3-5, 2019 – Midwest Food Producers Association Annual Convention/Processing Crops Conference, Wisconsin Dells, WI

January 26-28, 2020 – WI Fresh Fruit & Vegetable Growers Conference, Wisconsin Dells, WI

February 4-6, 2020 – UWEX & WPVGA Grower Education Conference, Stevens Point, WI



We are very pleased to announce that Dr. Renee Rioux will join us later this summer as the new Director of the WI Seed Potato Certification Program and research/teaching Assistant Professor with the UW-Madison Dept. of Plant Pathology. Please see comments from Dr. Rioux, below. We look forward to welcoming her this July 18 at the UW-Hancock ARS Field Day!

“I will join the Department of Plant Pathology at UW-Madison late this July in the role of Assistant Professor of Plant Pathology with administrative duties for the Wisconsin Seed Potato Certification Program. I am a Maine native and became enthralled with plant pathology while pursuing my Masters degree on Rhizoctonia diseases of potato at the University of Maine.

I completed a PhD in Plant Pathology at UW-Madison in 2014 and have spent the past five years in private sector Research & Development roles. Most recently, I worked for Bayer Crop Science as a Product Development Manager for crop nematicides and biofungicides. I am excited to return to Wisconsin with my husband, Nick, who also holds a PhD from UW-Madison, and one year old son, Craig, and am looking forward to getting to know and working with members of the state's seed potato industry.”

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

Overall in the past two weeks, potatoes and vegetables are doing well. Below are the potato crop growth updates based on my observations on June 20th between Hancock and Plainfield.

Planting period	Ground cover	Flowering percentage of the field	Tuber size
April 10 th – April 20 th	Up to 100%	Almost 100%	Up to 1''
April 20 th – April 30 th	Around 75%	About 40%	Up to ½''
May 1 st – May 10 th	Around 40%	Having flower buds but not blooming yet	Start tuber initiation (hooking)

During the stage of tuber initiation to full bloom, optimal soil moisture is 80% to 90% field capacity (FC), and irrigation could be about 2.5 inches per week on sandy soils, if no rain events occur. In areas and with varieties susceptible to common scab, maintaining soil moisture at 90 to 95% FC is suggested.

Some growers started their fertigation to supplement nitrogen that might be leached out of the rooting zone after the total rain amount falling (>2'') between June 14th and 16th. Petiole nitrate-N analysis is a common approach to indicate in-season immediate plant N status. Table below shows the expected average ranges of petiole nitrate-N at different growth stages.

Petiole Nitrate-Nitrogen Expected range (%)	
Tuber Initiation	1.70 to 2.20
Tuber Bulking	1.10 to 1.50
Maturation	0.60 to 0.90

Considering irrigation for vegetable crops:

Most vegetables require at least 1 inch of water per week during the growing season, so per acre will require about 27,000 gallons. This amount will soak down to about 8 inches in the soil. Watering to a depth of 5 to 6 inches encourages the growth of deeper roots. Avoid quick, shallow irrigation, because it encourages shallow root growth. Shallow roots are more susceptible to damage by sun and heat. Early morning is a good time to irrigate. Morning water prepares plants for the stress of midday heat and allows them to grow uninterrupted.

For specific vegetables:

Beans: during pollination, flowering, and pod development. Blossoms may drop and pods may fail to enlarge if watering is inadequate; 1 gallon per week per foot of row (to measure the number of gallons use a drip emitter and timer).

Cantaloupe: during flowering, fruit set, and fruit development. Keep the soil evenly moist throughout the season; 1 1/2 gallons per plant per week or 18 inches per season.

Sweet corn: corn requires consistent, even watering; water is critical during silking, tasseling, and ear development. Water when tassels on small cobs begin to shrivel and 10 days before cobs are picked. Water stress can cause tassels to shed pollen before silks on ears are ready for pollination; lack of pollination may result in missing row of kernels and reduced yields.

Cucumbers: even, consistent watering during bud development, flowering, fruit development; 1 1/2 gallons per plant per week or 25 inches per season.

Eggplants: even, consistent watering from flowering through harvest; 1 1/2 gallons per plant per week or 18 inches per season.

Peppers: even, consistent watering from planting to fruit set and enlargement; 1 pint per plant a week when young, increasing to 1 1/2 gallons per plant a week or 18 in per season.

Squash: even, consistent watering during bud development, flowering, fruit development; 1 1/2 gallons per plant per week or 18 inches per season.

Tomato: consistent, even watering is critical during flowering, fruit set, and fruit enlargement; 2 1/2 gallons per plant each week or 24 inches per season. More water may be needed for non-mulched plants. Older late-maturing varieties may require less water near harvest.

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

Degree-Day Accumulations – Accumulating degree days for insects continue to be slower than average for this week of the year, but again we remain slightly ahead of national, 30 year averages (**Fig. 1**). Projected lower to mid 80° F temperatures for later in the week could hasten the population development of some pests. Pests that are already infesting crops, and others that will be projected by early July. Pests to look ahead towards include onion thrips developing in transplant and direct-seeded onion, Diamondback moth, squash bugs, and Squash vine borer together with Japanese beetle into early July.

Imported cabbageworm - Imported cabbageworm larvae continue to develop towards later instars (growth stages of larval development). It usually completes five larval instars in 2 to 3 weeks, depending upon temperature, but their development has been a little slow. When mature they are approximately 1 inch long. Imported cabbageworm larvae may be distinguished from other cabbage infesting pests by observing their typical sluggish behavior when prodded. These later larval instars may start to move to other parts of the plant (developing, or cupping heads) or to nearby plants. Once they reach Economic Thresholds (ETs), efforts to control these later stages should be considered. Suggested control: <https://learningstore.uwex.edu/Assets/pdfs/A3422.pdf>.

Diamondback moth – Initial infestations of Diamondback moth have been observed in select fields in central and southern Wisconsin. Diamondback moth eggs are tiny, flat, circular and cream-colored, laid singly or in small clusters on the underside of leaves. A single diamondback moth can lay up to 300 eggs in her lifetime, but probably average about half that number. The larvae are small in size (up to 3/8 inches long at maturity) pointed at both ends and range in color from green to yellow. The diamondback larvae are commonly found on the leaf surface and will wiggle back and forth when disturbed, often falling from the plant. Adults are small grayish-brown, night-flying moths with a 1-inch wingspan. Diamond-shaped markings on the wings, which give them their name, are evident when the wings are folded over the back at rest. Behavioral differences between the caterpillars can aid in their identification. The cabbageworm will usually remain motionless when disturbed, whereas, the diamondback moth will wiggle its body around. The cabbage looper will either inch away or try to defend itself by whipping its head around.

Potato leafhopper – Both adult and nymphal (immature) potato leafhoppers (PLH) are becoming prevalent in potato and early bean crops following their initial establishment in alfalfa. Adult numbers were greater in the past week, but nymphs are now becoming obvious in sweep samples after eggs have hatched. Large PLH populations migrate from alfalfa fields after harvest in June and early July causing their numbers to seemingly “explode” overnight. Female PLH live about 1 month and will lay 2 to 3 tiny white eggs each day in stems and large leaf veins of host plants. Tiny nymphs emerge from these eggs in 7 to 10 days and molt 5 times over a period of about 2 weeks before turning into adults. There are typically 2 PLH generations per year in Wisconsin, and populations decline significantly in August. Snap beans and potatoes should be scouted regularly for PLH activity. Leafhoppers tend to migrate into other crops in early summer after alfalfa is cut. This is a key time to watch for early migrants in vegetable plantings. With snap beans, the greatest amount of injury caused by PLH occurs during the seedling stage.

When to scout for potato leafhopper																		
	April			May			June			July			August			September		
	early	mid	late	Early	Mid	Late	Early	Mid	Late									
Potatoes																		
Beans																		

Colorado potato beetle –Adults are slowing in their to colonize potato fields, and more and more adults are reaching field centers. Many egg masses are hatching, and large numbers of early larvae are present in fields in southern and central Wisconsin. Adult emergence and colonization of fields is still underway in the seed production areas of Antigo, Wisconsin. Applications of tolfenpyrad (Torac), spinosad (Blackhawk), spinetoram (Radiant), or abamectin (Agri-Mek) should be initiated this coming week now that large numbers of egg masses have hatched, and a few 2nd instar larvae are present from the earliest hatched egg masses. Applications of the 1st generation larvicides often require 2-3 subsequent re-applications spaced on a 7-10 day interval to achieve sufficient control of this damaging generation. First and second generation applications options are provided in the supplemental Table 1.

Amanda Gevens, Associate Professor & Extension Specialist, UW-Madison Plant Pathology, gevens@wisc.edu, 608-575-3029. <https://wivegdis.plantpath.wisc.edu/>

Our disease forecast calculations indicate slowly accumulating risk values for late blight and early blight. **It is likely that we will reach DSV threshold of 18 in early and mid-planted potatoes in the Grand Marsh location by early this week.** This threshold indicates need for preventative fungicide applications for late blight. In most early potatoes in southern and central WI, row touch has been surpassed and fields with aerially-applied fungicides may have already made preventive applications of fungicides for mitigating early blight and/or late blight. Please see the table below for details at each location. Late blight fungicides registered for use in Wisconsin are available at the UW-Potato & Vegetable Pathology website or at link: <https://wivegdis.wiscweb.wisc.edu/wp-content/uploads/sites/210/2019/06/2019-Potato-Late-Blight-Fungicides.pdf>

At this time of the growing season, it now possible to see early blight lesions in lower canopies. Our UW-Hancock ARS foliar fungicide trial for early blight will initiate sprays within the first week of July (just after P-Day 300 threshold). Fungicides for early blight management

The late blight reporting website <https://usablight.org/2019-map/> is continuing to track locations of confirmed late blight in the U.S. I routinely track this site and report findings through this newsletter. To date, reports were confirmed from FL. No recent detections.

Current P-Day (Early Blight) and Disease Severity Value (Late Blight) Accumulations (Many thanks to Ben Bradford, UW-Madison Entomology; Stephen Jordan, John Hammel, & Samuel Meyer, UW-Madison Plant Pathology). A P-Day value of ≥ 300 indicates the threshold for early blight risk and triggers preventative fungicide application. A DSV of ≥ 18 indicates the threshold for late blight risk and triggers preventative fungicide application. Red text in table indicates threshold has been met/surpassed. Weather data used in these calculations comes from stations that are in potato fields. Data are available in graphical and raw data formats for each weather station at: <https://wivegdis.plantpath.wisc.edu/dsv/>

<i>Location</i>	<i>Planting Date</i>	<i>Emergence Date (50%)</i>	<i>Disease Severity Values (DSVs) 6/21/19</i>	<i>Potato Physiological Days (P-Days) 6/21/19</i>
<i>Grand Marsh</i>	Early Apr 10	May 20	14	230
	Mid May 1	June 1	12	152.8
	Late May 20	June 9	10	94.31
<i>Hancock</i>	Early Apr 10	May 22	6	237.33
	Mid Apr 25	May 27	5	201.43
	Late May 15	June 8	3	111.91
<i>Plover</i>	Early Apr 22	May 27	5	192.48
	Mid May 1	June 1	5	158.08
	Late May 29	June 13	3	67.86
<i>Antigo</i>	Early May 14	May 29	3	103.27
	Mid May 24	June 8	3	96.36
	Late Jun 1	June 20	0	14.22