# Vegetable Crop Update

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

**No. 17 – August 13, 2022**


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***Calendar of Events:***

**November 29-December 1, 2022** – Midwest Food Producers Assoc. Processing Crops Conference, Kalahari Convention Center
**January 29-31, 2023** – Wisconsin Fresh Fruit and Vegetable Growers Conference, Kalahari Resort, Wisconsin Dells, WI
**February 7-9, 2023** – UW-Madison Div. of Extension & WPVGA Grower Education Conference & Industry Show, Stevens Point, WI


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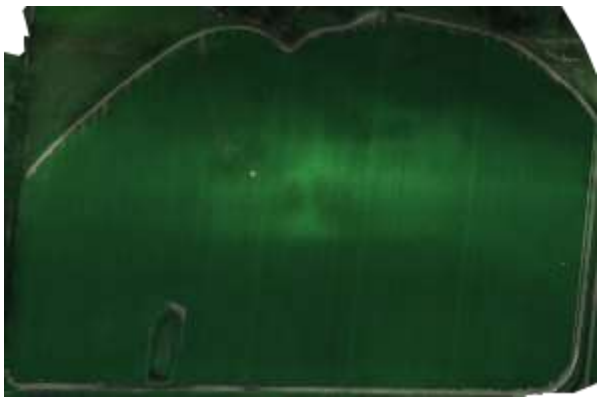
Based on growers' reports, yields for early digging varieties have been average to slightly above average so far. Quality is pretty good. Some reds are observed with scab issues. No internal defects like hollow heart are noticed yet. This summer we flew a commercial Caribou Russet field with varied N treatments. One of the treatments had 0 N at hilling. We could see yellower canopy color under this low N treatment in the image collected on July 19th, but the difference was not visible in the image collected on August 1st. The nitrate-N level in the irrigation water was 3.0 ppm.



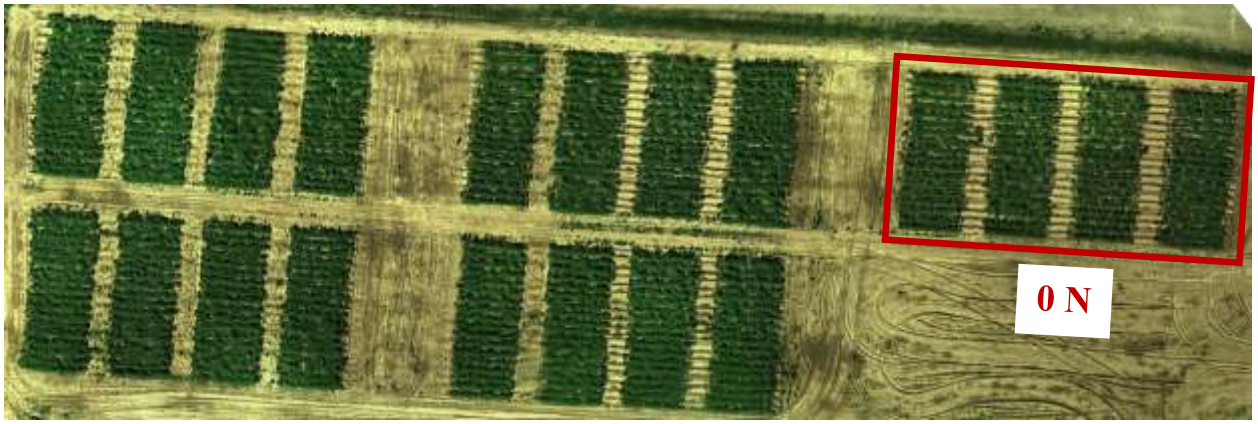
July 19th

August 1st

Similarly, some growers in our neighboring state are trying a different N management practice, where they only applied about 15% of the seasonal total N at planting, and split the rest of the N through a dozen of fertigations on a weekly basis, with the first fertigation occurring 8 days after emergence. The purpose of this practice is to reduce nitrate leaching potential when the plants don't have large rooting systems early in the season. They are able to maintain normal petiole nitrate-N levels with this practice. Stay tuned for final yield and quality data.

This week we flew our nitrogen trial at the UW Antigo Research Station. We had Snowden and Silverton seed potatoes grown under five different N treatments in this trial. The plots highlighted with the red box in the image below have not received any nitrogen fertilizer, the rest of the field have received 180 total N over the growing season with varied N amounts at varied timings. But we cannot identify any apparent canopy color difference

between the 0 N plots and the rest of the field. The canopy sizes of the 0 N plots were slightly smaller than the other plots, although not very obvious. The nitrate-N level in the irrigation water was 9.6 ppm.



**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/**

**Caterpillar pests (cole crops) –** (**https://vegento.russell.wisc.edu /pests/caterpillar-pests-of-cole-crops/**). Imported cabbageworms (also known as cabbage whites or small whites), cabbage loopers and diamondback moths are the three most significant caterpillar pests of Wisconsin cole crops, with the Diamondback moth increasing being the most significant. Diamondback moths are worldwide pests of cole crops and leafy greens, and have developed resistance to numerous insecticides. If prodcuers are observing losses in control with products containing *Bacillus thuringiensis* subsp *kurstaki* (e.g. DiPel) or *B. thuringiensis* subsp. *aizawai* (e.g. Xentari), this should be no surprise as this insect has demonstrated the capacity for resistance to the *B. tthuringensis* products. The cabbage looper attacks beets, celery, lettuce, peas, potatoes, spinach and tomatoes, in addition to cole crops. (**Fig. 1**).


**Figure 1.** C
of

Winter storage cabbage, Brussels sprouts, and later planted broccoli and cauliflower all remain vulnerable through the late summer and into early fall resulting from infestations of these pests. Vigilant scouting and response to established thresholds is important at this time of the season. Treatment thresholds are well established and based on the percent of infestation by any lepidopteran species and vary based on the stage of crop development. From the time cabbage plants begin to cup until early heading, if more than 20% of plants are infested, treatment is warranted. From early heading until harvest, the threshold again drops to 10% to protect market quality of the produce. If broccoli, cauliflower and sprouts are setting florets, curds or buds, then the 10% threshold should be considered.

Biological control occurs regularly in Midwest fields and can be highly effective in controlling populations of these insect pests that feed on cole crops. The three caterpillar pests are all susceptible to parasitism and predation by natural enemies throughout the growing season, but later season biocontrol is especially helpful and possible if we incorporate the use of reduced-risk compounds. In addition to the B. thuringensis products listed previously, registered compounds containing spinosyns are another reduced-risk insecticide option. Spinosyns are biologically based materials that are quite selectively active on caterpillar pests but are safe to beneficials and include registrations including Conserve® & Radiant®. Compounds in the IRAC Group 28 category containing chlorantraniliprole (Coragen®) and cyantraniliprole (Exirel®) should also be regarded as safe options which can help to conserve these later season natural enemies and enhance the potential for biological control.

**Caterpillar pests (sweet corn, dry beans, tomatoes, peppers, snap beans)** – (**https://vegento.russell.wisc.edu/pests/corn-earworm/**). Pest Survey specialists at Wisconsin Department of Agriculture, Trade and Consumer Protection (WI DATCP) collect and manage data on plant pests that threaten agricultural production. This program focuses on surveillance and early detection of economically significant pests, including insects and diseases relevant to WI agriculture. Data is collected through field-based sampling and from networks of cooperators across Wisconsin. Species-specific pheromone trapping is conducted for relevant pests in the state, and special reference should be paid to counts obtained for both corn earworm and

western bean cutworm over the pest 1-2 weeks in many portions of the state, with special emphasis to the southern half where trapping is concentrated.

Pheromone trap captures of adult corn earworm (*Helicoverpa zea*) of 5 to 10 moths per night for three consecutive nights indicate that moths are probably laying enough eggs to warrant treatment of fields that are in the vulnerable stages of crop development (silking corn, pod set, ripening tomato, etc).

After adult emergence and mating, female western bean cutworm (WBCW) will lay eggs in clusters usually on the upper leaves of corn plants. Although all stages of sweet corn can be attractive for egg laying, pre-tassel corn is probably the most attractive crop stage. In silking sweet corn, those egg masses may be closer to the ear. Egg masses will be light colored and progress through a tan stage before turning purple in color (**Fig. 2**), and the period of egg laying can last for several weeks. Pheromone traps are used to document adult emergence however, they do not predict risk of injury within a field. Pheromone captures from the WI DATCP, Home Pest Survey indicate that adults have been active since mid-July (**Fig. 3**). Scouting for egg masses in the crop is the best predictor of damage potential, and it is suggested that a minimum of 20 consecutive plants in 5 areas of a field should be monitored for eggs at intervals of 5-7 days. Foliar insecticides are only recommended after a vulnerable fruit has begun to develop (e.g. ear formation, fruit set, pod set) and an estimated 5% of plants possess visble egg masses (or small larvae) in the field.

**Figure 2.** Western bean cutworm egg mass nearing hatch (Photo: EIPM UW-Madison).

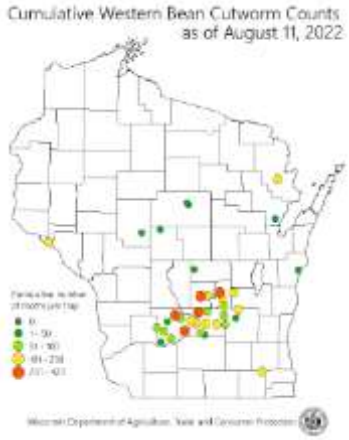



**Figure 3.** WI DATCP cumulative WBCM pheromone captures (https://datcp.wi.gov/Pages/Programs_Services/WesternBeanCutworm.aspx).

A relatively new flight model for WBCW was developed and validated to predict the timing of adult moth flights using degree day calculations beginning Mar 1, with a 38°F lower threshold and a 75°F upper threshold. The new cumulative flight model indicates that 25% of moth flight should be completed when 2,577 Fahrenheit degree days (FDD) have accumulated. Field scouting to estimate egg densities are recommended after this time has surpassed and where adult activity measured from pheromone traps suggest moths remain active. The custom map making function of the Wisconsin Vegetable Disease and Insect Forecasting Network (VDIFN) illustrates that scouting should now be underway throughout much of the state where vulnerable crops exist (**Fig. 4**).

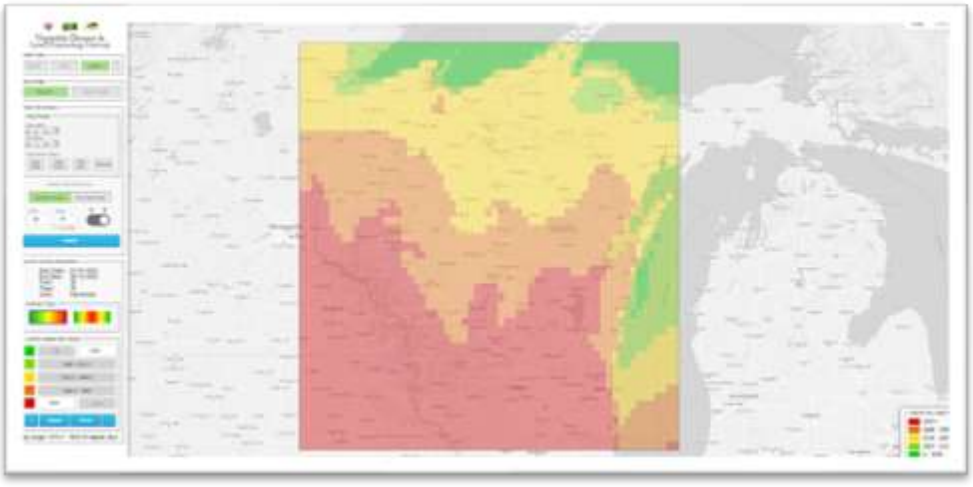


**Figure 4.** Vegetable Disease and Insect Forecasting Network (VDIFN) map of risk for infestation by Western bean cutworm, (WBCW), https://agweather.cals.wisc.edu/vdifn (sourced 08/13/2022). Notice areas within the 'orange or red shaded' zones indicate high risk zone where greater than 25% of adult moth flight has been surpassed.

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**Current P-Day (Early Blight) and Disease Severity Value (Late Blight) Accumulations.** 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 in 2022. 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 will come 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. Data are available for each weather station at: https://vegpath.plantpath.wisc.edu/dsv/.

| Location | Planting Date | | 50% Emergence Date | Disease Severity Values (DSVs) 8/12/2022 | Potato Physiological Days (P-Days) 8/12/2022 |
|---|---|---|---|---|---|
| **Grand Marsh** | **Early** | Apr 5 | May 10 | **54** | **705** |
| | **Mid** | Apr 20 | May 15 | **54** | **664** |
| | **Late** | May 12 | May 25 | **54** | **606** |
| **Hancock** | **Early** | Apr 7 | May 12 | **27** | **667** |
| | **Mid** | Apr 22 | May 17 | **27** | **647** |
| | **Late** | May 14 | May 26 | **25** | **588** |
| **Plover** | **Early** | Apr 7 | May 15 | **89** | **652** |
| | **Mid** | Apr 24 | May 20 | **89** | **618** |
| | **Late** | May 18 | May 27 | **88** | **583** |
| **Antigo** | **Early** | May 1 | Jun 3 | **33** | **526** |
| | **Mid** | May 15 | June 15 | **29** | **452** |
| | **Late** | June 10 | June 24 | **29** | **367** |

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 (stations are not situated within potato fields). 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.

**We have reached thresholds for preventative fungicide treatment in potatoes to manage early blight in all potato plantings in Wisconsin. Accumulations of P-Days were relatively low (30-48) over the past week.** Potatoes should be on a preventative fungicide program with effective disease management selections to limit early blight.

**All monitored Wisconsin locations accumulated very few to no DSVs this past week (0-10) indicating a low-risk week for promoting late blight in potato plantings in Grand Marsh, Hancock, Plover, and Antigo. All plantings have now reached/exceeded the threshold for receiving a preventative application of fungicide for the management of late blight.** A fungicide list for potato late blight in Wisconsin was provided in last week's newsletter and is available here: https://vegpath.plantpath.wisc.edu/2022/07/03/update-10-july-3-2022/

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 2022 Commercial Vegetable Production in Wisconsin Guide, Extension Document A3422, linked here: https://learningstore.extension.wisc.edu/products/commercial-vegetable-production-in-wisconsin

According to usablight.org there have not been recent diagnoses of late blight in tomato or potato crops in the US. For this year, there were just 2 reports entered back in March in southern Florida (US-23 clonal lineage/strain type) and 2 reports from eastern Ontario Canada on tomato in late July. No further reports have surfaced.

**Cucurbit Downy Mildew:** During this past week, cucurbit downy mildew was confirmed on cucumber and/or cantaloupe in MI, OH, NH, PA, and VA. Previously this growing season the disease was confirmed in: AL, CT, DE, FL, GA, MA, MD, MI, NC, NH, NJ, NY, OH, PA, SC, and VA. No findings of cucurbit downy mildew in our Wisconsin-based sentinel plots in Dane County. Red counties below indicate recent reports (less than 1 week old) of cucurbit downy mildew.

**https://cdm.ipmpipe.org/**

As a reminder, the pathogen is now known to have two 'strains' for clade types. The type (Clade 2) which infects cucumber, can also infect melon. Due to fungicide resistance within the downy mildew pathogen population, especially in Clade 2, selection of fungicides is important. Management of cucurbit downy mildew requires preventative fungicide applications as commercial cultivars are generally susceptible to current strains (Clades) of the pathogen. Management information can be sourced here: https://vegpath.plantpath.wisc.edu/2022/07/03/update-10-july-3-2022/

**Basil Downy Mildew:** In each of the past 10 years, we've had confirmed reports of downy mildew caused *Peronospora belbarii* on basil in Wisconsin. The disease was observed in Dane County today. Information, here, is summarized from a Plant Disease Diagnostic Clinic fact sheet by Drs. Marian Lund and Brian Hudelson (https://pddc.wisc.edu/2016/10/14/basil-downy-mildew/). Basil downy mildew is a devastating disease that affects the leaves, branches, and stems of many types of basil (i.e., plants in the genus *Ocimum*), plants commonly used for cooking. Green-leafed varieties of sweet basil are particularly susceptible to the disease, while purple-leafed varieties of basil, Thai basil, lemon basil, and spice basil are less susceptible. Certain ornamental basils (e.g., hoary basil) appear to be highly resistant to the disease. Basil downy mildew was first reported in the United States in 2007 and has since spread widely to wherever basil is grown, including Wisconsin.

**Figure 1**. Typical symptoms and signs of downy mildew on basil. Note yellowing of leaves in angular or vein limited patterns and pathogen sporulation on leaf undersides. Photo credit to Dr. Russ Groves.

Symptoms of basil downy mildew typically develop first on lower leaves, but eventually an entire plant will show symptoms. Initial symptoms include leaf yellowing (which gardeners often think is due to a nitrogen deficiency) followed by leaf browning. Affected leaves also curl and wilt, and on the undersides of the leaves, a gray-purple fuzzy material will develop (Figure 1). This pathogen can be easily introduced into a garden each year via contaminated seed, on infected transplants, or via wind-borne spores. Once introduced into a garden the pathogen can spread by wind, by rain splash, or via items (e.g., hands, clothing, garden tools) that come into contact with infected plant and then are used to work with healthy plants. The pathogen thrives in humid, warm environments and can spread rapidly, decimating an entire basil crop.

There is no known cure for basil downy mildew. If you see basil downy mildew, harvest any asymptomatic leaves on infected plants, as well as other healthy basil plants in your garden. Use these materials immediately. Try growing resistant varieties (ie: Eleonora). If you grow basil from seed, check to see if the seed you are buying has been steam-treated to kill the downy mildew pathogen. Be aware however, that this information may be difficult to find, because steam treatment of basil seed is relatively new. **More information** https://www.vegetables.cornell.edu/pest-management/disease-factsheets/basil-downy-mildew/

Whatever type of basil you choose, try to grow your plants in a manner that will keep them as dry as possible, thus creating an environment that is less favorable for the downy mildew pathogen to develop and infect. good airflow and rapid drying of plants when they get wet. Avoid overhead watering (e.g., with a sprinkler) that will wet leaves and spread the pathogen; instead, use a drip or soaker hose to water.