



# Vegetable Crop Update

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

No. 16 – July 21, 2018

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## Calendar of Events

**July 26, 2018** – UWEX Langlade County Field Day & Potato Virus Y Detection Training Workshop, Antigo, WI

**August 2, 2018** – UW-Rhineland Field Day, Rhineland Agricultural Research Station, WI

**November 27-29, 2018** – Processing Crops Conference & MWFPA Annual Convention, Wisconsin Dells, WI

**January 15-17, 2019** – Wisconsin Agribusiness Classic, Alliant Energy Center, Madison, WI

**January 27-29, 2019** – Wisconsin Fresh Fruit & Vegetable Conference, Kalahari Conference Center, Wisconsin Dells, WI

**February 5-7, 2019** – UWEX & WPVGA Grower Education Conference, Stevens Point, WI

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**Current P-Day (Early Blight) and Severity Value (Late Blight) Accumulations (R.V. James, UW-Plant Pathology/R.V. James Designs, S.A. Jordan, & J. Hammel, UW-Plant Pathology):** A P-Day value of  $\geq 300$  indicates the threshold for early blight risk and triggers preventative fungicide application. A DSV of  $\geq 18$  indicates the threshold for late blight risk and triggers preventative fungicide application. **Red** text in table below indicates threshold has been met/surpassed. “-“ indicates that information is not yet available. Blitecast and P-Day values for actual potato field weather from Grand Marsh, Hancock, Plover, and Antigo are now posted at the UW Veg Path website at the tab “P-Days and Severity Values.” [www.plantpath.wisc.edu/wivegdis/contents\\_pages/pday\\_sevval\\_2018.html](http://www.plantpath.wisc.edu/wivegdis/contents_pages/pday_sevval_2018.html)

Asterisks indicate values generated from weather data sourced from NOAA (link below to interactive tool for accessing site specific DSVs). <https://agweather.cals.wisc.edu/vdifn/maps>

Location	Planting Date	50% Emergence	Disease Severity Value	P-Day	Date of DSV/P-Day Generation
<b>Antigo</b>	Early 5/12	5/28	39*	>175	7/20
	Mid 5/25	6/7	31*	>175	7/20
	Late 6/9	6/22	18*	175	7/20
<b>Grand Marsh</b>	Early 5/1	5/15	203	501	7/20
	Mid 5/15	5/28	196	423	7/20
	Late 6/1	6/12	176	313	7/20
<b>Hancock</b>	Early 5/2	5/16	48*	471	7/20
	Mid 5/17	5/30	43*	382	7/20
	Late 6/1	6/14	34*	268	7/20
<b>Plover</b>	Early 5/7	5/18	48	478	7/20
	Mid 5/20	6/1	34	386	7/20
	Late 6/2	6/15	30	275	7/20

**WI Potato Disease Risk Updates:** All commercial potato plantings have surpassed 18 DSVs and I recommend that they should be routinely receiving preventative fungicide applications to limit initial late blight infection. **No reports of late blight in Wisconsin at this time.**

**PDay values** have surpassed the 300 threshold for Grand Marsh, Hancock, and Plover for most plantings; Antigo PDays have been accumulated only since June 27 and are at 175. Early blight typically ramps up as we enter the month of August. Increase in disease comes results from increase in inoculum, but also increased age of the plant, increased moisture and limited airflow in lower canopy, and at times, nitrogen deficiency. Currently, there are good fungicide options available for potato early blight control, but careful product selection and timing is essential to achieve control and maintain efficacy of site-specific fungicides. It is critical that fungicide modes of action are alternated to follow resistance management recommendations. Tank mixes of site-specific fungicides with broad-spectrum protectants such as chlorothalonil or mancozeb aid in resistance management as well as provide broader protection against a range of foliar pathogens. Good coverage, particularly on lower canopy and oldest leaves will enhance early season control – leading to overall reduction in in-field disease pressure throughout the season.

Effective conventional foliar fungicides currently registered for early blight control include Aftershock, Bravo (or Equus, Echo, etc.), Cabrio Plus, Dithane (or Manzate, Penncozeb, etc.), Elixir, Endura, Evito, Gem, Headline, Iprodione (or Meteor, Rovral etc.), Luna Tranquility, Polyram, Priaxor, Quadris (or Equation, Satori, etc.), Quadris Opti, Quadris Top, Quash, Reason, Revus Top, Scala, Super Tin, Tanos, Top MP, and Vertisan. Further details on registered fungicides for Wisconsin potatoes can be found in the University of Wisconsin Commercial Vegetable Production in Wisconsin Guide A3422, <http://learningstore.uwex.edu/Assets/pdfs/A3422.pdf>.

**Presence of brown spot in Wisconsin:** Brown spot, caused by another *Alternaria* species (*A. alternata*), is a foliar and tuber disease, very similar to early blight. Brown spot lesions, like early blight, are dark brown to black, with target patterning, but tend to be smaller and darker in color. Brown spot typically appears first in the mid-canopy compared to early blight which is seen first on oldest, lower canopy leaves. The tuber phase of brown spot is called black pit, and like early blight, requires wounding for infection. The conditions that favor disease development is similar for both diseases. The brown spot pathogen (*A. alternata*) can also become resistant to azoxystrobin and other single site fungicides.

**Azoxystrobin resistance:** The introduction of strobilurins, or QoI (quinone outside inhibitor) fungicides such as kresoxim methyl (Sovran), azoxystrobin (Quadris), pyraclostrobin (Headline), trifloxystrobin (Gem), famoxadone (component of Tanos), and fenamidone (Reason), offered a fungicide group with a broad spectrum of disease activity, reduced environmental impact, and reduced toxicity to mammals compared with other conventional materials for control of early blight on potato. Azoxystrobin and kresoxim-methyl were released commercially in the U.S. in the late 1990's and by 2001-2003, approximately 80% of the total Wisconsin potato acreage was treated with QoI fungicides (avg of 3 applications per year) alternated with chlorothalonil or mancozeb. In our survey of past recent years (2013-17), we found a high percentage of early blight pathogen populations that were resistant to azoxystrobin; brown spot pathogen populations had some sensitivity earlier in the production seasons with greater resistance in August samplings.

**Recently registered fungicides for potato early blight control:** Luna Tranquility (Bayer CropScience), a pre-mix of fluopyram and pyrimethanil, is currently registered for use on potato in the U.S. Fluopyram is a new fungicide in the carboxamide or FRAC Group 7 category and pyrimethanil is in the anilino pyrimidine (AP) or FRAC Group 9 category. In our trials at the Hancock Agricultural Research Station in WI, we had excellent results with programs including Luna Tranquility in 2010 for control of early blight control. The Luna Tranquility label includes suppressive activity for potato on white mold, black dot, and Rhizoctonia. Velum Prime (fluopyram), while not on the list at the start of this early blight

article because it is an in-furrow treatment targeting nematode control, has provided apparent systemic long lasting control of early blight and white mold in the early season. Over the past 3 years we have been trialing fluopyram applied in-furrow at Hancock Ag Research Station on ‘Russet Burbank’ and it consistently has held early blight at bay until early August. Quash (Valent USA Corp), metconazole, received a supplemental label for use on potato in the U.S. Metconazole is a Demethylation inhibitor (DMI) or in the FRAC Group 3 category. In our Hancock trial, we had similar early blight control with Quash and Luna Tranquility in 2011. The Quash label includes activity on white mold, black dot, and Rhizoctonia. Quadris pre-mixes (Syngenta Crop Protection), Quadris Top (azoxystrobin+difenoconazole) and Quadris Opti (azoxystrobin+chlorothalonil) are now registered and have activity on early blight and black dot on potato. Both contain azoxystrobin a Quinone outside inhibitor (QoI) or in the FRAC Group 11 category. Early blight control performance was similar with Quadris Top, Quash, and Luna Tranquility in 2011. Vertisan (DuPont Crop Protection), penthiopyrad, recently received registration on potato. Penthiopyrad is a new fungicide in the carboxamide (SDHI) or FRAC Group 7 category. In our Hancock trial, we had similar early blight control with Quash, Luna Tranquility, Quadris Top, and Vertisan in 2011. Most recently registered are BASF’s new fungicides, Xemium (Group 7 carboxamide) and Priaxor (Xemium+pyraclostrobin a QoI strobilurin). Both fungicides have performed well in our Hancock potato early blight trials and have activity against black dot, Rhizoctonia, and white mold. Miravis Prime (Group 7 +12) from Syngenta should be receiving state registrations sometime 2018-19; this new SDHI with fludioxonil has performed well for early blight, brown spot, and white mold. With the registration of new fungicides for potato early blight, we have additional tools with which to appropriately and effectively alternate modes of action for both enhanced disease control and management of fungicide resistance. Keep in mind that several of the new fungicides contain a carboxamide (Group 7). Endura (boscalid) is also a carboxamide and is currently widely used in Wisconsin for early blight control.

**National Late Blight Updates:** <http://usablight.org> **No late blight was reported in this past week with dry weather prevailing in many locations.** Prior to that time, reports had come from PA on tomato & potato, NY on tomato, and FL on tomato and potato. The clonal lineages/strain types are not yet known for the PA reports. Prior to this, and the previously reported NY tomato late blight case, most cases reported to the usablight website in 2018 have been the US-23 pathogen genotype. US-23 has been the predominant genotype in Wisconsin, and across the U.S., in recent years. US-23 can still generally be managed well with use of phenylamide fungicides such as mefenoxam. However, a potato sample from northeastern FL was sent to my lab earlier this spring and was the US-8 genotype. This information does pose some additional concern for management as US-8 cannot be managed with phenylamide fungicides as isolates are resistant to the fungicide.

**A list of registered fungicides for late blight in potato for Wisconsin** can be found in past Vegetable Crop Updates Newsletter #6 (May 20, 2018) and at link below:  
<http://www.plantpath.wisc.edu/wivegdis/pdf/2018/2018%20Potato%20Late%20Blight%20Fungicides.pdf>

Further **information on fungicides** and other vegetable crop management inputs in the 2018 Commercial Vegetable Production in Wisconsin guide (A3422): <http://learningstore.uwex.edu/Assets/pdfs/A3422.pdf>

**No downy mildew on cucurbits in our UW Hancock Agricultural Research Station sentinel plots on 7/12/18.** The cucurbit downy mildew reporting and forecasting site <http://cdm.ipmpipe.org/> indicated new confirmations of downy mildew in MD, NC, SC, VA, on various cucurbit crops during the past week. In 2018 so far, the site has documented confirmations of downy mildew in AL, DE, FL, GA, MD, NC, NJ, PA, and SC on primarily cucumber, acorn squash, and cantaloupe. A map showing forecasted movement of the downy mildew pathogen from active sources of inoculum is provided, below, from 7/21/18. No risk of movement to WI at this time. **I have also been watching several basil downy mildew sentinel plots this summer and I have seen none of this disease so far this year.**

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Later this week I visited some farms and talked to some folks who have experienced moderate to severe heat stress issues in their field raising the Goldrush variety. It is very obvious that Goldrush was extremely susceptible to the heat that occurred during the Memorial Day weekend. As I mentioned in my 6/30 newsletter, sprouts that were couple of inches above or below the soil surface when the heat wave hammered Central and Southern Wisconsin between 5/25 and 5/28 showed burned tips and regrowth of weak vines. Many varieties such as Russet Norkotah, Russet Burbank and Silverton showed these symptoms, but Goldrush tend to be the worst.

Now as the stolons are growing and tubers are bulking, some tuber setting problems start to show up. For those Goldrush fields that suffered from the Memorial Day heat, stolons were abnormally thick and short (Figure 1), and therefore tubers were bulking in clusters near the mother tuber and growing against each other (Figure 2). Flat tuber surface and odd-shaped tubers might be a problem at harvest. I also saw brown cankerous spots on the stems near the soil surface (Figure 3), similar to *Rhizoctonia* infection, as well as regrowth of new little tiny sprouts from the “burnt” surface (Figure 4). Disease test cannot isolate known *Rhizoctonia* strains from these suspicious tissues, and further research needs to be done to investigate if these were merely caused by sun burn or had secondary disease infection. Another symptom is short rooting systems, which makes it harder for the plants to uptake water and nutrient from the soil.

Responses of the growers to this “heat stress issue” include: if petiole level is good, spoon feeding more frequently but lightly to ensure an environment with sufficient “food and water” for the plants; if petiole nitrate level is on the lower side, apply at least 50 units of N/acre to give the plants a “shocking signal” in order to push them to grow stronger roots to uptake and use N. Additionally, weekly checking on tuber bulking will be helpful to make informed decision about the timing of harvest before tuber shape becomes a challenge that penalizes your profitability.



Figure 1



Figure 2



Figure 3



Figure 4