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

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In This Issue:

Calendar of Events:

July 6, 2023 – UW Langlade County Extension & WI Seed Potato Certification Program – Ag Research Station Field Day, Antigo, WI
July 13, 2023 – UW Agricultural Research Station Potato Field Day, Hancock, WI (1-4:30PM)
July 27, 2023 – WI Seed Potato Certification Program & WI Potato Coalition Early Generation Seed Potato Field Day, Lelah Starks Seed Potato Farm, Rhinelander, WI
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
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/

Please note that we have our **2023 Commercial Vegetable Production in Wisconsin Guide (A3422)** available at the link below as a free searchable, downloadable pdf. This provides information to help you select inputs (conventional and organic) to support healthy vegetable and specialty crop production in Wisconsin. https://learningstore.extension.wisc.edu/products/commercial-vegetable-production-in-wisconsin

Due to changes in printing service this year, we no longer have an online purchasing feature through the UW Madison Division of Extension. However, I had hard copies printed for distribution at our winter conferences and still have many to share. Please contact me (gevens@wisc.edu) with your needs.

Our four in-potato-field weather stations will be generating data for disease forecasts again in 2023! Current P-Day (Early Blight) and Disease Severity Value (Late Blight) Accumulations will be posted at our website and available in the weekly newsletters starting next week. 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 2023. Recall, 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 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/

Ben Bradford, Associate Researcher, Groves Lab, Dept. of Entomology, UW-Madison.

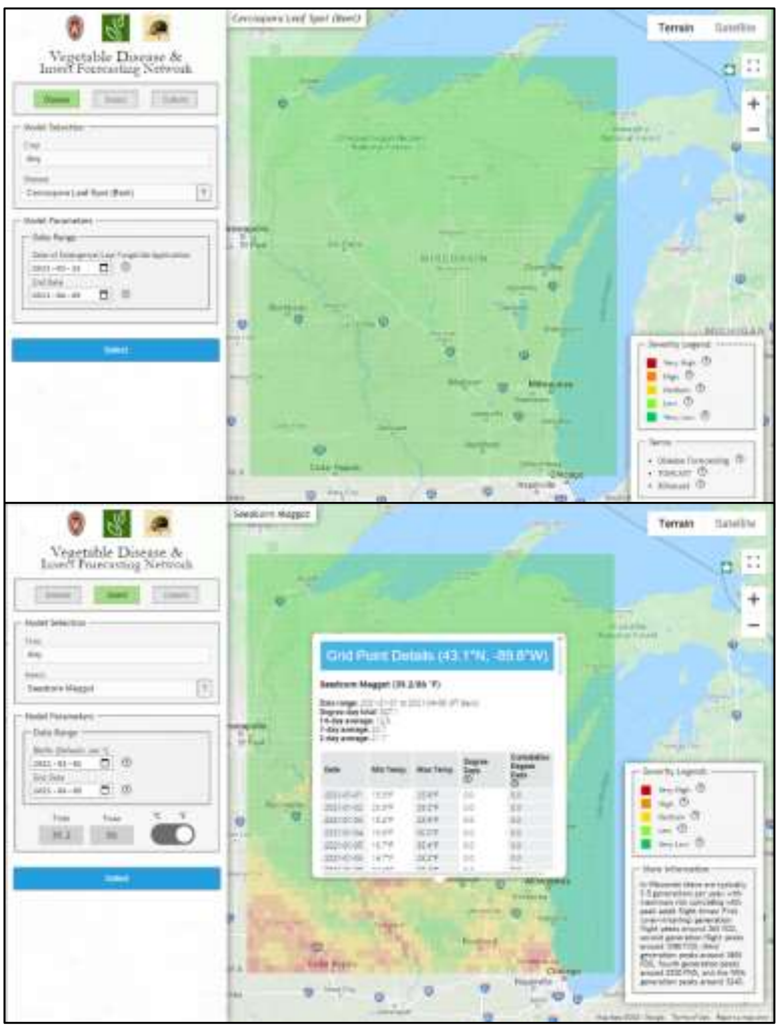
Email: **bbradford@wisc.edu**. Lab website: **https://vegento.russell.wisc.edu/**

An introduction to the Wisconsin Vegetable Disease and Insect Forecasting Network (VDIFN) website

One of the pillars of modern integrated pest and disease management strategies is the use of local climatic and environmental variables to model disease and insect pest risk for a particular field or region. Rather than treating for pests on a preset schedule or waiting for symptoms to appear, growers can anticipate the onset of increased pest risk using predictive models developed and tested for specific disease and insect risks to crops. The outcomes of the use of such models would be increased awareness of current and near future pest and disease risk, as well as the reduction in the use of pesticides and increased profits. There are many such predictive tools available on the market with different costs and benefits – here we present VDIFN, a free tool for growers and residents of Wisconsin that currently includes four plant disease models (*Cercospora* leaf spot, early blight, late blight, and carrot leaf blight), 24 insect models, and a custom degree-day map generator.

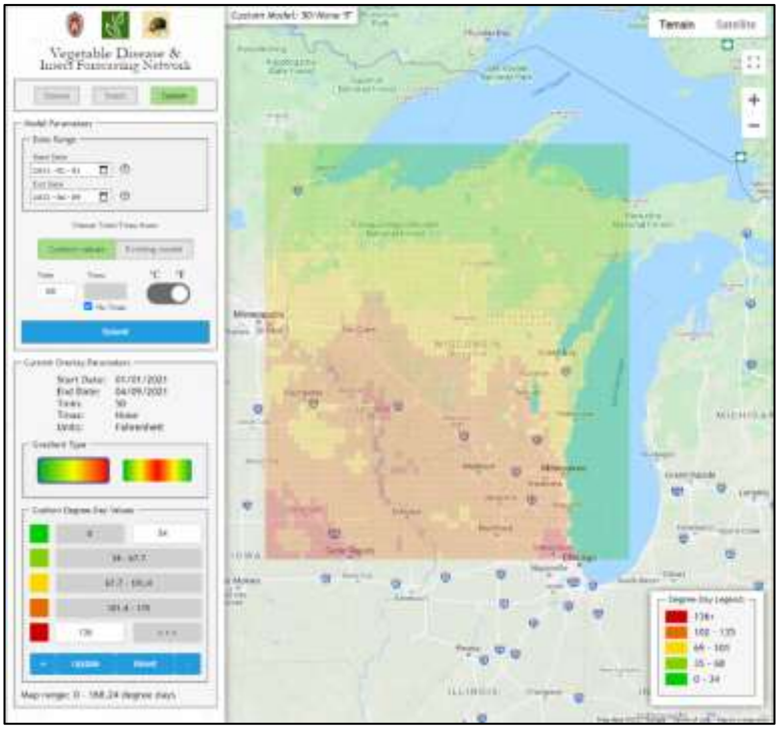
VDIFN uses gridded weather data downloaded daily from National Oceanographic and Atmospheric Administration (NOAA) servers. Data include daily min/max temperatures and relative humidity, which are fed into various models and converted into daily disease severity values (or equivalents) or degree-days. These disease severity value and degree-day accumulations are then displayed on the map as color-coded risk scores based on the estimated risk to susceptible crops. Clicking on an individual grid cell brings up the daily history of weather data and disease severity values or degree-days for that location. Unfortunately, VDIFN does not currently have the ability to use weather forecasts to run the models out into the future.

How to use VDIFN (https://agweather.cals.wisc.edu/vdifn)



When you visit VDIFN you will see the navigation and settings pane on the left, the map and pest severity display in the center, and a legend on the lower right. You can switch between disease, insect, and custom model modes with the buttons across the top of the left panel. Pick a model using the **Model Selection** section, and use the **question mark box** to get more information on the disease or insect. After selecting a model, note that the **date range** boxes populate with defaults for each model, but can be adjusted if desired.

Click on an **individual grid point** to bring up more details for that specific location, including a detailed history of weather readings and daily and cumulative disease severity value or degree-days (depending on the model selected). For the following example, I brought up the **Seedcorn Maggot** insect model, which is indicating some level of risk across southern Wisconsin. The **legend** explains that this corresponds to the adult mating and egg-laying flight of the first (overwintering) generation. There will be several more successive generations this year occurring at different degree-day accumulations.



The **custom model**, shown here, is a little more complicated to use, but essentially it allows you to generate and visualize any degree-day model of your choosing (or select the parameters of one of the insect models). Degree-days essentially quantify the amount of heat energy available in a given day for insect development and are calculated from daily min and max temperatures. The map then will show you how much heat has accumulated between the dates that you specify (generally Jan 1 to present). This is an easy way to visualize the progression of the seasons, or you can cross-reference the degree-days to plant or insect developmental milestones. The **color gradient** can be customized using the inputs on the lower left of the page shown. The amount of gradations can be increased or decreased using the **plus/minus buttons**, and any adjustments to the min/max color points can be applied with the **update button**. Use the **reset button** to even space the color gradient between the minimum and maximum degree-days present on the map. The second **gradient type** can be used if you want to emulate the green-red-green color pattern of the insect models, and you can specify the start, peak, and end of the color gradient.

We encourage readers of this newsletter to explore VDIFN and share any feedback with us. We are actively developing this site and can add additional disease or insect models if requested. For more information on degree-days or insect models, visit the Groves lab website: https://vegento.russell.wisc.edu/ipm/degree-day-modeling/.

Weather station network to expand across Wisconsin aiding farmers and others

Chris Kucharik, Professor and Chair, Department of Agronomy, University of Wisconsin-Madison
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At sunrise, a weather station is seen in a field at UW–Madison's Arlington Agricultural Research Station in Arlington, Wis., Wednesday morning, March 15, 2023. Photo by Michael P. King

A new era for weather data in Wisconsin is on the horizon, thanks to an effort at the University of Wisconsin–Madison.

Wisconsin weather has become increasingly more unpredictable and extreme since the 1950s, posing challenges for farmers, researchers, and the public. But with the help of a statewide network of weather stations known as a mesonet, the state would be better equipped to deal with the future obstacles of a changing climate.

Professor and Agronomy Department Chair Chris Kucharik in 2019.
Photo by Michael P. King/UW–Madison CALS.

"Mesonets can guide everyday decision-making for the protection of crops, property, and people's lives while also supporting research, extension and education," says Chris Kucharik, professor and chair of the UW–Madison Department of Agronomy, as well as faculty member with the Nelson Institute for Environmental Studies. Kucharik is leading a major project to expand Wisconsin's mesonet network with assistance from Mike Peters, director of UW–Madison's Agricultural Research Stations.

Unlike many other agricultural states, Wisconsin's current network of environmental monitoring stations is minimal. Almost half of the 14 weather and soil monitoring stations are at UW research stations, with the others concentrated in Kewaunee and the Door Counties on private fruit orchards. Data from these stations is currently hosted by Michigan State University's mesonet.

Moving forward, these stations will move to a designated Wisconsin-based mesonet — called Wisconet — and the total number of stations will increase to 90 to better monitor all regions of the state. This effort is supported by a $2.3 million grant from the Wisconsin Rural Partnership, a U.S. Department of Agriculture-funded UW initiative, as well as $1 million from the Wisconsin Alumni Research Foundation. The expansion of this network is seen as a critical step in providing the highest quality data and information to those who need it.

Each station contains equipment to measure atmospheric and soil conditions. Instruments above ground measure wind speed and direction, humidity, air temperature, solar radiation, and liquid precipitation. Below ground, soil temperature and moisture levels are measured at certain depths.

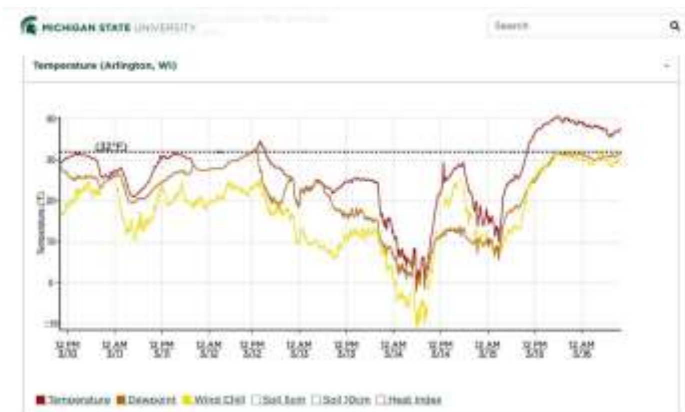
Data from Wisconsin's existing stations can currently be accessed on Michigan State's "Enviro-weather" website but will be switched over to a Wisconsin-focused site — at wisconet.wisc.edu — sometime this summer. Kucharik and his team are working to build a simple, open-access site where users can not only view and download station data in real-time but find practical guidance for using that data to make real-world decisions.

"Our growers rely on weather data to make important decisions on their farms on a daily basis. It affects when crops are planted, irrigated, and harvested," says Tamas Houlihan, executive director of the Wisconsin Potato and Vegetable Growers Association (WPVGA). "So we're very excited about utilizing this expanded mesonet in the near future."

In February, Kucharik presented the mesonet plan at a WPVGA grower education conference. Andy Diercks, a Wisconsin farmer and frequent collaborator with UW–Madison's College of Agricultural and Life Sciences and Division of Extension, was in the audience and liked what he heard.

"Many of our agronomic decisions are based on weather we've experienced, or weather we expect to arrive within the next few hours or days," says Diercks. "It's our goal to keep water, nutrients, and crop protectants where plants can use them, but we can't succeed if we don't fully understand the current conditions in the air and soil, and what to expect in the near future," like an unforeseen heavy rain event washing away a recent fertilizer application.

The benefits the environmental mesonet will have for farmers is evident, but many others will benefit as well.



Temperature data for a weather station at UW–Madison's Arlington Agricultural Research Station in Arlington, Wis., is seen on a Michigan State University website on Thursday, March 16, 2023. Image by UW–Madison CALS.

"The National Weather Service regards these networks as valuable because they're able to verify — and lead to a better understanding of — extreme events," says Kucharik, who earned his PhD at UW in atmospheric sciences. "A research-grade network of weather stations evenly spread across the state provides the NWS that many more data points."

While call-in reports from people's backyard weather stations are valuable, a mesonet can provide a more consistent and complete picture.

Mesonet data could also aid researchers, transportation departments, environmental managers, construction managers and anyone whose work is influenced by weather and soil conditions. There are even opportunities for these stations to help support K-12 education, as school grounds could be a potential home for environmental monitoring stations.

"It's another way of getting more students connected to something that affects their everyday lives," says Kucharik. "You can connect that science to all sorts of other fields in agriculture, forestry, and wildlife ecology."

The installation of Wisconsin's new mesonet stations is slated to start this summer and is expected be completed in fall of 2026.

INFORMATION FOR THE MEDIA:
Contact: Chris Kucharik at kucharik@wisc.edu or (608) 890-3021
Photos: https://flic.kr/s/aHBqjAw4K1