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 15 – UW-Hancock ARS Field Day, 1:00PM, Hancock, WI
July 17 – Rhinelander State Farm Field Day, Lelah Starks Elite Foundation Seed Farm, Rhinelander, WI
August 25-27 – Wisconsin Farm Technology Days, Statz Bros., Inc. Farm, Sun Prairie, WI

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Early season disease considerations in vegetables: Often the earliest disease concerns in vegetable crops include damping-off and/or poor stand or emergence. Early season damping-off and seedling failures are often caused by one or more soilborne pathogens that are promoted by cool, moist soils. Slow or delayed growth of early planted seeds or transplants contributes to damping-off and seedling failures. Fungi and fungus-like pathogens that may be involved in disease include Pythium species (fungus-like 'water mold'), Rhizoctonia (fungus), and Fusarium (fungus). Each of these pathogens can overwinter in the soil or in infected plant debris and are typically 'weaker' pathogens that require a stressed plant to thrive. This group of pathogens can continue to be problematic even as plants mature; typical symptoms are root and crown rots.

Symptoms of damping off include soft, brown roots, collapse of lower stem or stem below soil line, and eventually plant wilting and death. The seeds themselves can be infected as soon as moisture enters the seed coat or as radicle emerges, resulting in pre-emergence damping-off which may be mistaken as poor germination or seed viability. Damping-off can be mistaken for plant injury caused by insect feeding, over-fertilization, high levels of soluble salts, extreme temperatures, excessive or insufficient soil moisture, or chemical toxicity in air or soil.

Management of damping-off requires several approaches including: 1) purchase of disease free plants and seeds, 2) plant into well-drained soil, 3) avoid setting transplants too deeply in the soil (avoid crowns below soil line), 4) avoid overcrowding plants to promote good airflow, 5) practice good crop rotation (rotate by plant families on a 2-3 year schedule), and 6) fungicide seed treatments fungicides and/or at-plant or banded fungicide applications. Be sure your transplants receive appropriate fertilizer at time of transplant, and it is often a good practice to allow time for plants to 'harden off' under outside field conditions prior to transplanting. This can be achieved by moving transplant flats outside of the production greenhouse to an area that may be sheltered from direct wind, but provides temperature conditions similar to the open-field setting. Once soil temperatures warm up above approximately 50ºF, incidence of pre- and post-emergence damping off is drastically reduced.

Wisconsin fungicide information can be found in the University of Wisconsin Extension Publication entitled "Commercial Vegetable Production in Wisconsin," publication number A3422 (http://learningstore.uwex.edu/assets/pdfs/A3422.PDF) and additional information is provided in weekly newsletters during the growing season (provided at the vegetable pathology website: http://www.plantpath.wisc.edu/wivegdis/).

Disease Forecasting: *What are DSVs and P-days?:* As we are gearing up for field season and generation of disease forecasting information, and have added new newsletters subscribers, it is necessary to provide some explanation of the late blight and early blight disease forecasting concepts. Locations of in-field weather stations/disease forecasts will include: Antigo, Plover, Hancock, and Grand Marsh. Blitecast (late blight forecasting): Computation of 18 disease severity values (DSVs) relies on maximum and minimum temperatures each day, the duration of relative humidity periods above 90% and the maximum/minimum temperatures during the relative humidity periods above 90%. For a given day, up to 4 DSVs can accumulate. We start the severity value calculations at approximately 50% crop emergence. When we reach a total of 18 severity values, we issue a warning which indicates that environmental conditions have been met which favor late blight. At 18 DSVs, the recommendation for preventive applications of effective late blight fungicides is made. An additional alert is issued when the first symptoms of late blight appear anywhere in the state. The determination of late blight management recommendations is made by taking into consideration DSVs, projected weather forecast, and presence/risk of inoculum. This information is published in our newsletter and will be disseminated in various other outlets as the season progresses.

Last year, we began offering an additional late blight forecasting tool which applies the same Blitecast concepts (described above) to weather sourced from additional stations and forecasted weather (NOAA). This information will be offered with fluid updates at the UW-Vegetable Pathology website in 2015 – and in static form in the once-a-week issue of the UW-Vegetable Crop Updates newsletter. This tool utilizes weather data from a state-wide (and national) network of information, rather than from in-field weather stations. Maps generated from this forecasting approach can be very useful in quickly identifying regional patterns of increasing disease risk – and can aid in planning of preventative fungicide applications should forecasted weather turn inclement.

Cornell University has been developing an enhanced late blight forecasting tool that also offers a Blitecast for forecasted weather. Dr. Bill Fry and his research group have been integrating additional parameters in the forecasting tool which modify the spray recommendation based on varietal resistance and previous fungicide applications (and likely residues). Here in WI, we are working with this tool for potato late blight management in comparison to our in-field forecasting and current management approaches. For more information on Cornell's Late Blight Decision Support System (DSS) tool, please refer to link below.
http://newa.cornell.edu/index.php?page=potato-late-blight-dss

Growers have been very careful to plant disease-free seed, to destroy cull potatoes prior to new crop emergence, and to control volunteers. Other potential sources of late blight in WI come from overwintered infected tomato plants, nightshade weeds, and the introduction of infected transplants. No reports of late blight infected seed potatoes or tomato transplants have emerged from WI at the time of this report.

To aid in the reporting of late blight in the U.S., a reporting platform (website) and working group has been established through a federally-funded coordinated agricultural project led by Dr. Howard Judelson at the University of California-Riverside. The website: http://www.usablight.org/ indicates location of positive reports of late blight in the U.S. and provides further information on disease characteristics and management. My UW-Plant Pathology program is collaborating on this project along with 15 other institutions. At this time, potato and tomato late blight has been reported in a few Florida counties. In the potato cases, the genotype of the late blight pathogen has been US-23 – the type that predominated most of the US and WI diseases cases in 2014.

The Potato P-Day accumulator is based on potato physiological development ('Russet Burbank') and accumulated weather conditions to generate early blight recommendations. Once we reach 300 P-Days, calculated from emergence onward, our spray recommendations take both the P-Day and severity value totals into account to generate 5 day, 7 day or 10 day spray interval recommendations. The interval is variable depending on prevailing weather conditions and the presence of disease in the area. Typically, P-Day 300 is reached in early July and when potato rows are just beginning to touch (row closure).

We will being posting our disease forecasts once our production season gets underway.

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New Resources for Irrigation Managers: As the 2015 growing season approaches, thoughts turn once again to getting into the fields and planting. After planting, the daily management of your investment becomes the priority. Maintaining optimal root zone soil moisture conditions is one of several important management activities. Too much water application can leach valuable nutrients out the root zone while insufficient soil moisture can adversely impact crop yield and quality. Irrigation has become an important tool to manage root zone soil moisture. Tools to manage root zone soil water include soil moisture tracking (irrigation scheduling) and monitoring. Irrigation scheduling along with rainfall forecasts can be used to project soil moisture conditions into the near future (1-3 days) while soil moisture monitoring can be used to ground truth scheduler predictions. UW Extension as recently developed two new publications and a crop irrigation web site to assist you in making irrigation water management decisions. Both publications are available at the UWEX Learning store webs site (Learningstore.uwex.edu/) in both electronic (PDF) and hard copy form.

New Publications

1) *Irrigation Management in Wisconsin – The Wisconsin Irrigation Scheduling Program WISP* Publ. No. A3600 is an update to an older version with the same name. The new publication includes some new information on water evaporation rates from sprinkler irrigation systems, but also retains the original information.

2) *Methods to Monitor Soil Moisture* discusses the advantages and disadvantages of various moisture monitoring technologies as well as approximate costs. Sensor configurations (stationary versus portable) and options for data display and management are also included. The cost for soil moisture sensors has come down and quality has improved significantly over the last 5 to 7 years. There is now a sensor for every application and budget

New Web Site

Understanding Crop Irrigation is the new UW Extension web site will that continue to be updated with the latest information. The site includes links to the new publications, an Excel spreadsheet version of the scheduler and a list of equipment suppliers. Future (this summer) additions include soil-water release curves and a complete irrigation webinar training series.

Wisconsin Irrigation Scheduling Program (WISP)

Though not a new tool, WISP continues to be improved. WISP is an irrigation water management tool designed to help optimize crop water use efficiency by tracking the root zone water inputs and outputs. Using WISP's water balance predictions, along with soil moisture monitoring, a grower can plan irrigation timing and amount to take maximum advantage of natural rainfall while minimizing over-application of water. WISP uses the checkbook method to track water inputs (rainfall and irrigation) on a daily basis and losses through evapotranspiration (ET) and deep drainage. The WISP tool is available at on the web at: **wisp.cals.wisc.edu.**

We will do our best to keep you informed of new resources as we become aware of them via this newsletter and the *Understanding Crop Irrigation* web site. Like all areas of agricultural production, technologies and equipment continue to evolve. Soil mapping and precision irrigation water application are just a couple examples of current trends. A willingness to evolve your production management system to take advantage of new technologies can improve product quality and yield.