



Vegetable Crop Update

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

No. 5 – May 25, 2013

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Calendar of Events

July 23– Hancock Ag Research Station Field Day, Hancock, WI (tentative agenda begins at noon)

Vegetable Crop Update. A.J. Bussan. Professor of Horticulture, University of Wisconsin-Madison. Phone: 608-225-6842. ajbussan@wisc.edu.

Freezing temperatures across the Northern ½ to 2/3 of the state had potential to cause crop injury across multiple vegetable crops. Fortunately, light wind protected some crops from damage, but it depended on your general location, how open your production fields are located and how cold it got Friday morning.

Potatoes: The potato planting in Central Wisconsin has been pretty much done for at least a week. Muck growers are well into potato planting as well and will probably wrap up planting over the next few weeks. Planting is well underway in Antigo and Rice Lake areas, but intermittent showers have presented some challenges.

Many of the early planted potatoes have emerged in Central Wisconsin. Hilling started in some fields over 10 d ago and is progressing rapidly. The emergence of the crop by May 24 is good news relative to the production season. Some varieties, such as Superior and others have already begun to initiate stolons. The cool weather (<85 F air temperatures) over the next 7 to 10 d should allow for stolon growth and development and tuber initiation by early June. Obviously, this will be 10 or so d later than 2012, but should occur at timing to establish average to above average yield potential for much of the crop.

There are some issues with early crop development. Seed piece decay has occurred in some fields across numerous varieties. This has resulted in lack of any shoots, or shoots that are greatly weakened. The relatively warm soil temperatures and rapid emergence has reduced issues with Rhizoctonia to date. I have seen some stems with what appear to be lesions, but I have not seen any shoots that were pruned or killed by Rhizoctonia.



Frost damage occurred on the earliest emerging potatoes. This resulted in blackening of leaves that will likely turn necrotic. Seems like sensitivity to the cold depended on stage of growth as of yesterday morning. Larger plants with fully expanded leaves did not appear to be as sensitive, with most damage occurring on shoots that had just emerged. Of course, this depends on

the severity of the frost within the field. At this stage of growth, there will likely be any lasting damage to the crop. There are plenty of reserves in healthy seed pieces to regrow the shoot and keep the crop on pace.

Stem set looks to be fairly high with many plants have over 4 shoots per plant. This may increase tuber set to some extent. However, our research suggests that stem density is influenced by the seed whereas tuber set per stem can be influenced by the number of neighboring stems and or plants. I suspect we might end up with a slightly higher tuber set, but I believe we will be able to manage for it within the crop production scheme.

Processing vegetables: Peas have begun to elongate with the earliest planted crop in the 3-4 leaf stage. I would suspect we will see blossoms in peas within the next week. Sweet corn and snap bean planting have begun in earnest. I have not seen any emerged snap beans, but soybeans have emerged within 5 d of planting at Hancock. Any beans having emerged prior to Thursday will possibly have been nipped by the frost and should be inspected for stand health. Sweet corn has emerged that was planted prior to May 10 to 15. The crop should progress nicely as field corn is already at 2 lf stage if planted early.

Fresh market vegetables: Cole crops, spinach, and other cold hardy vegetables should have come through the frost with little damage. Asparagus and rhubarb harvest has begun in earnest and the cold weather should have little effect.

Any pepper, tomato, bean, vine crop or other summer annual crop would have been damaged if exposed to the cold weather. Frost occurred well North of Hwy 12 for the most part. Our research has shown that May 25 is a critical date for tomato, pepper, and eggplant transplanting. Delaying planting until after May 25 can delay first fruit harvest, whereas planting prior to May 25 has consistently shown little benefit unless in a high tunnel.

Vine crop planting should not begin until after May 25 unless done under floating row covers. There is no benefit to planting pumpkin or winter squash under floating row cover, rather plant after any threat of frost. However, melon benefits a great deal from floating row covers when planted in early May. This increases yield and allows for earlier harvest.

Vegetable Disease Update – Amanda J. Gevens, Assistant Professor & Extension Vegetable Plant Pathologist, UW-Madison, Dept. of Plant Pathology, 608-890-3072 (office), Email: gevens@wisc.edu. Vegetable Path Webpage: <http://www.plantpath.wisc.edu/wivegdis/> & Kenneth Frost, Research Associate, UW-Madison, Dept. of Plant Pathology.

Considerations for late blight management: **Risk of survival of potato volunteers is likely low across Wisconsin.** When soil temperatures do not get low enough to kill potato volunteers, the tubers can remain alive through the winter and emerge as unwanted plants in spring. While volunteers can create stubborn weeds in the following season, they can also harbor pathogens, such as *Phytophthora infestans*, the late blight pathogen, and initiate disease in the subsequent production season. A model for estimating risk of survival of potato volunteers was developed by researchers at Michigan State University (MSU). The model, which categorizes risk of volunteer survival, is based on soil temperatures at 2 and 4 inches between November 1 and March 31.

- If tubers were exposed to temperatures < 27°F for >120 hours between November 1 and March 31 at 4 and 2 inches deep, then the risk of tuber survival is considered low.
- If tubers were exposed to temperatures < 27°F for <120 hours at 4 inches deep and >120 hours at 2 inches deep, then there is a moderate risk of tuber survival.
- If tubers were exposed to temperatures <27°F for <120 hours at 4 inches deep and <120 hours at 2 inches deep, then there was a high risk of tuber survival.

We analyzed soil temperature data from Hancock and Arlington, Wisconsin with this model and determined that Hancock had 262 hours at 2" and 197 hours at 4". Arlington had 234 hours at 2" and 192 hours at 4". As such, both locations would be considered at low risk of tuber survival. As you move northward in the state, soil temperatures remain cooler for longer periods of time and I would generalize that risk of volunteer survival would be even less.

DSVs and Late Blight: We will soon be posting Disease Severity Values (DSVs) for determining risk of late blight or "Blitecast" for in-potato-field weather stations in Grand Marsh, Hancock, Plover, and Antigo, Wisconsin, as we have supported in previous years. We offer forecasts for 3 different emergence dates for each of the 4 locations. A Blitecast value of 18 indicates threshold for application of a fungicides specifically targeting the late blight pathogen based on periods of temperature and relative humidity favoring disease progress.

New this year, we have been exploring the use of region-wide climate data from the NOAA national network and forecasted weather data to generate regional Blitecast risk values for current day and up to 72 hour future outlooks. Results of this initial effort are provided in Figure 1 below for current status, and forecasted status at 24, 48, and 72 hours. The Blitecast generated from forecasted environmental conditions can further inform fungicide decision-making, particularly in cases where rapid accumulation of DSVs is anticipated (and, predicted precipitation could limit ground access to fields for timely fungicide applications).

As of May 25 (Friday), we had significant accumulation of DSVs since the emergence date of May 22. This date was selected as average time of 50% crop emergence, for Central Wisconsin. Typically, we run our Blitecast model based on hours of duration of relative humidity above 90% with corresponding favorable temperature ranges. In this initial look, our model was run with a more conservative relative humidity threshold of 80%. In subsequent reports and newsletters, we will be adopting the 90% threshold as we have typically used for Wisconsin to effectively predict disease risk. Accumulation of less than 9 DSVs was common across the state, with a handful of sites reaching 9 (Figure 1 below). This accumulation represents 3 days of moderate temperatures with high relative humidity – conditions favorable to the late blight pathogen. As we look ahead 24, 48, and 72 hours, you will see little further accumulation of DSVs, indicating that weather conditions will likely be less conducive to late blight development. Be mindful that while we are not yet near the DSV 18 threshold, DSVs are accruing and we may not be too far away from the need for preventative fungicides for late blight management.

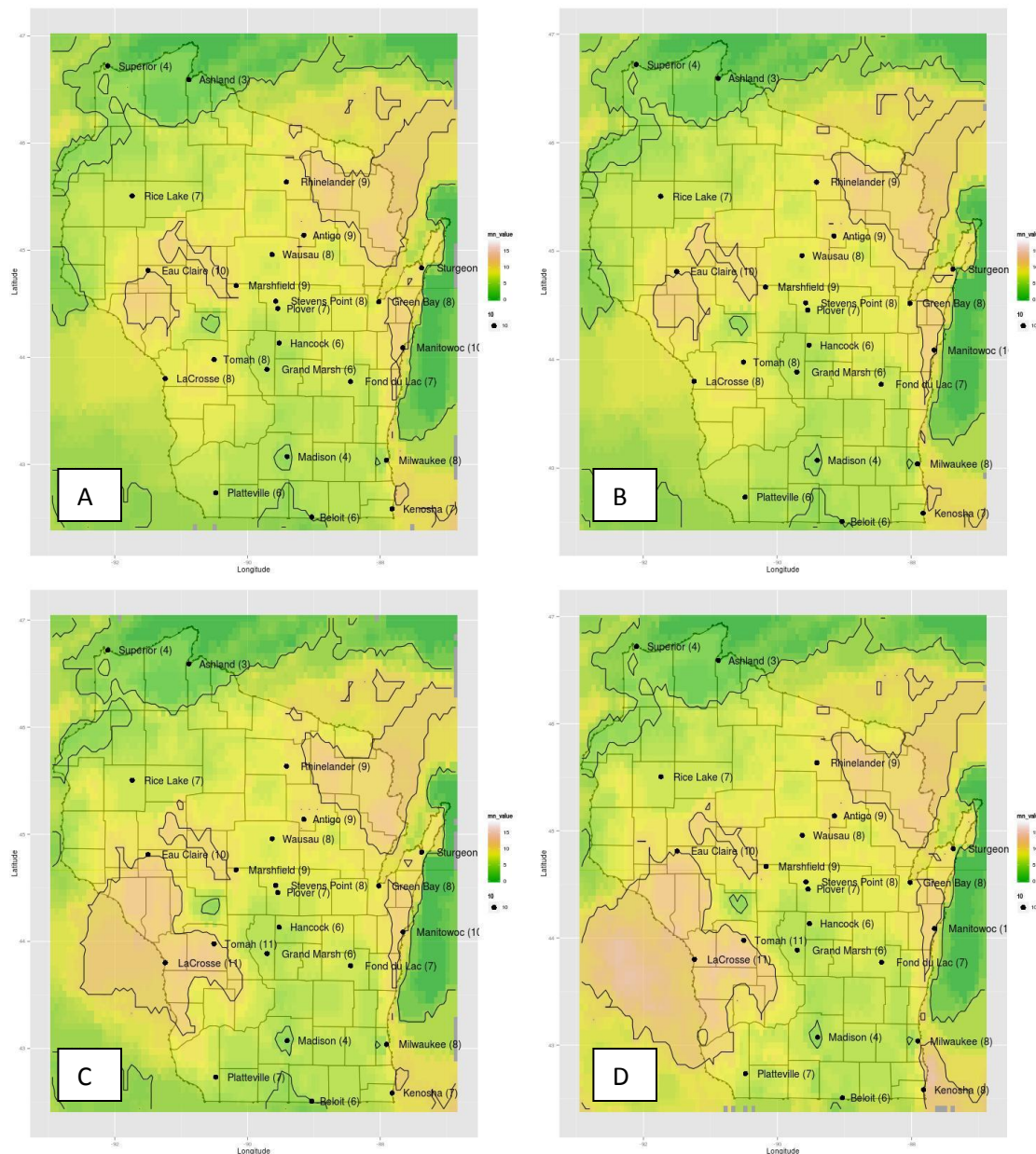
Late blight status in the U.S. No reports of late blight in Wisconsin at this time. There have been no recent reports of late blight in tomato or potato crops in the U.S. in recent weeks. To date this production year, late blight has been reported in several counties in FL on tomato and potato (primarily of the US-23 clonal lineage). 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.

The 2013 A3422 Commercial Vegetable Production in Wisconsin guide is available for purchase through the UW Extension Learning Store website: <http://learningstore.uwex.edu/Commercial-Vegetable-Production-in-Wisconsin2013-P540.aspx>

A pdf of the document can be downloaded or is available at the following direct link: <http://learningstore.uwex.edu/Assets/pdfs/A3422.pdf>

Disease Updates: Figure 1. A. Current DSVs. B. 24 hr-forecasted DSVs. C. 48 hr-forecasted DSVs. D. 72 hr-forecasted DSVs. DSVs generated from potato emergence date of May 22, 2013.



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

Vegetable Entomology Webpage: <http://www.entomology.wisc.edu/vegento/index.html>

Springtails - Springtails (order Collembola) are very small, jumping insects that sometimes alarm producers by appearing in large numbers in moist indoor areas such as soil in hoop and greenhouses (**Fig. 1**). They usually appear in the spring and early summer, but can be found year-round in moist environments. Because this spring has been very damp and cool, populations of these insects have been notable. Springtails are very small, wingless insects that get their name from the ability to jump up to several inches high by means of a tail-like mechanism tucked under the abdomen. Springtails prefer to live in moist soil, especially soil amended with compost, in leaf litter and organic mulches, and under bark or decaying wood. They feed on decaying plant material, fungi, molds, or algae. Most springtails are harmless scavengers, feeding mainly on decaying organic matter. Some species may damage plants by chewing on the roots and leaves of seedlings. The seedlings may appear wilted and may die if damaged when young. Damage occurs as minute, rounded pits on young leaves or roots, or as irregular holes in thin leaves. Mature plants are not significantly injured. Springtails rarely cause enough damage to plants to warrant control measures.

Seed Maggots - The emergence and flights of the first generation of seed corn maggot flies is well underway at several locations in central Wisconsin and has past at several sites in southern Wisconsin (**Fig. 1**). Recall that this insect has a base temperature of 39°F and the emergence of adult fly populations are expected at accumulated degree days of 360, 1,080, and 1,800 Fahrenheit (°F) degree days (**Fig. 2**). The first three generations of onion maggots will occur when totals of 680 degree days (spring), 1950 degree days (summer), and 3230 degree days (fall) respectively, have been reached using a slightly different base temperature of 40°F (**Fig. 2**). Most growing degree day information for both plants and insects is based on a base temperature of 50° F, but several flies are active at lower base temperatures. Adult flies will lay eggs at the base of plants, where larvae tunnel into underground portions of plants. Subsequent generations in early July and August-September can also damage crops of onions. Remember that cultural control of onion maggot centers on removing and destroying cull onions and rotating this year's plantings as far as possible from last year's. As onions mature, they are less susceptible to onion maggot infestation unless they are damaged by cultivation equipment. Soil applications of Lorsban can be used to control onion maggot in dry bulb onions and the new Farmore DI 400 and 500 seed treatment formulations are available to minimize damage. The preventative soil insecticide applications are recommended for the control of the first generation larvae if you have previously documented damage from the previous year's crop which exceeds 5 to 10%. Foliar insecticide applications should be avoided since they are generally ineffective on adult populations as they irregularly move in and out of fields. Resistance has been documented in both maggot species and therefore, pesticides must be selected which do not exacerbate insecticide resistance.

Calculating Degree Days - Degree-days (DD) can be calculated by several methods. The simplest form of degree-day calculation is by the rectangle or historical method which uses

simple averaging. It is less accurate, but provides adequate results and can be done by hand. Degree-days for a single day using the rectangle method can be calculated using this formula:

$$(\text{Daily Max Temp (}^{\circ}\text{F)} + \text{Daily Min Temp (}^{\circ}\text{F)} / 2) - \text{Minimum Threshold}$$

And then these DD can be summed over time to generate an accumulated DD estimate for a given date. Other common methods of calculating degree-days are the triangular, sine wave, and cosine curve methods. All of these methods calculate degree-days as the area under the daily temperature curve and are laboratory uses a modified sine wave calculation for all of the DD reported (**Fig. 2**). Most degree-day models use the sine-wave curve to calculate the number of degree-days. The sine method assumes that the daily temperature cycle takes the form of a sine wave. A sine curve is produced over a 24-hour period using the maximum and minimum temperatures from that day. Degree-days are accumulated in the area under the curve between the upper and lower thresholds.

Flea beetles – Populations of adult flea beetles continue to be an issue in several fresh and direct market operations. These insects are one of the most difficult-to-manage pests of leafy greens and early season cole crops, especially in hoop or greenhouses. The adults are active leaf-feeders that can, in large numbers, rapidly cause significant damage and may even kill young plants. Symptoms of flea-beetle feeding are small, rounded, irregular holes; heavy feeding makes leaves look as if they had been peppered with fine shot. Cultural controls for this insect include perimeter trap crops using highly attractive mustards, row covers, and the use of transplants which can tolerate greater levels of damage. Specific insecticides containing spinosad, plus bifenthrin and permethrin can provide good control for about a week. Applications of insecticides containing imidacloprid (e.g. Provado) or thiamethoxam (Actara) can also provide good control. However, to protect seedlings, applications usually must be reapplied often. The plants produce continuous new growth and the highly mobile beetles may rapidly reinvade plantings. As with all pesticides, carefully read and follow all label directions.

Aster Leafhoppers – Very modest levels of migrating populations of the Aster leafhopper (ALH) appear to be underway throughout central portions of the US. Importantly, the Aster Yellows phytoplasma (AYp) is vectored by the aster leafhopper in a persistent, propagative manner. The leafhopper acquires the phytoplasma by feeding on infected plants and may carry and transmit the bacterium over great distances. Once the phytoplasma is acquired, leafhoppers remain infected and may transmit AY for the remainder of their adult life. Migrant leafhoppers have arrived in low levels across portions of southern Wisconsin over the past week as southern weather systems assist in moving the insects northward. Levels of AYp (infectivity) within the migrating leafhoppers are usually low (0-3%) and insect numbers are influenced by these spring weather patterns in the migration pathway. In the previous 3 weeks, very few weather events were conducive to movement of the insects. Recall, local leafhopper populations in Wisconsin will often overwinter in small grains (e.g. wheat, rye, and barley) and perennial weeds. The first Wisconsin native adults typically enter carrot fields in early to mid-June and are typically infected at higher levels (2-10%) when compared to migrants.



Figure 1. Images of adult Crucifer flea beetle (A: *Phyllotreta cruciferae*), Aster Leafhopper (B: *Macrostelus quadrilineatus*), Springtails (C: *Sminthurid* spp.), and immature (maggots) of Seed corn maggot (D: *Delia platura*)

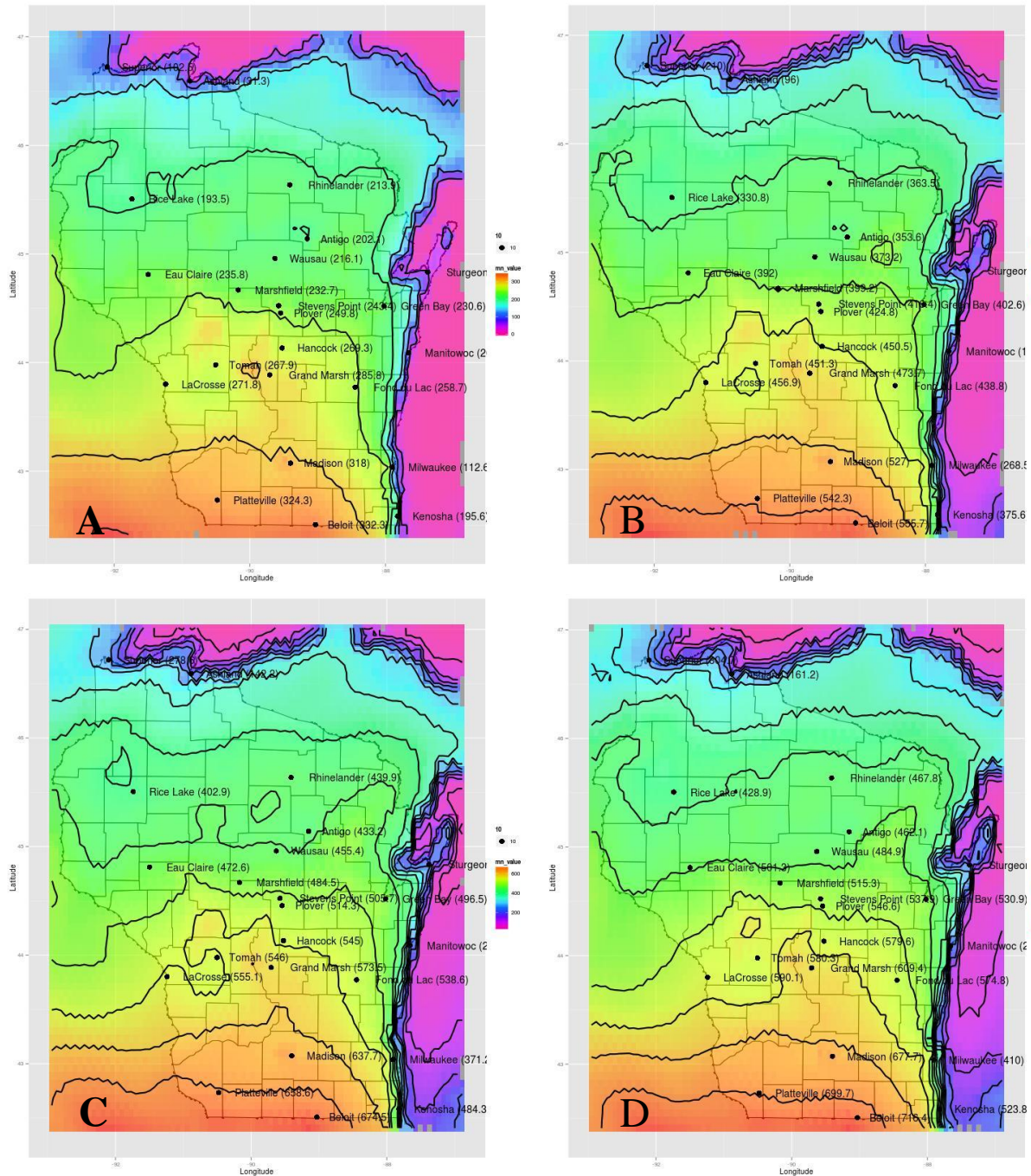


Figure 2. Estimated Degree Day (DD) accumulations using the modified sine-wave for each of four base temperatures 50 (A), 43 (B), 40 (C), and 39 (D) degrees F.