



Wisconsin Fruit News

Volume 4, Issue 4 – May 24, 2019

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General Information

Plant Disease Diagnostic Clinic (PDDC) Update

By: Brian Hudelson, Sue
Lueloff, Alex Mikus, and Ann Joy

The PDDC receives samples of many plant and soil samples from around the state. The following diseases/disorders have been identified at the PDDC from May 11, 2019 through May 17, 2019.

Plant/Sample Type	Disease/Disorder	Pathogen	County
Fruit crops			
Apple	Root Rot	Phytophthora sp., Pythium sp.	Barron
Needled Woody Ornamentals			
Juniper	Gymnosporangium Rust	Gymnosporangium spp.	Waukesha

For additional information on plant diseases and their control, visit the PDDC website at pddc.wisc.edu. Follow the clinic on Facebook and Twitter @UWPDDC.

Does reducing herbicide rates save money or cause more problems than it's worth?

By: Jed Colquhoun, UW-Madison

Growers often review their records and past experiences to think about ways to reduce inputs such as labor, fertilizer and pesticides. With that we often hear the limbo question: "how low can you go?" In terms of herbicide use the risks and potential benefits of reducing application rates should be considered.

Risks:

- The most obvious and basic risk is poor weed control that plays into all of the other risks listed below.
- Crop yield and quality can be reduced by competition from weeds that survive application.
- Uncontrolled weeds mature to reproduction and form seeds (and/or vegetative tissue for perennials) that make future problems even worse, which might then require more inputs than originally anticipated. Moreover, weeds that survive sublethal injury to produce viable seeds start the selection pressure for herbicide-resistant plants. In short, dead weeds don't cause problems...
- Additional herbicide applications or control measures may be needed to manage escapes.
- While herbicides can be applied at lower rates than those listed on the label if the label doesn't prohibit you from doing so, you alone are liable for any problems such as those outlined above from a reduced rate use.

Potential benefits:

- Many growers look at reducing rates as a way to reduce costs, particularly for more expensive herbicides.
- For some herbicides, reducing the rate can also reduce the risk of crop injury and subsequent yield and quality loss. This risk reduction is particularly important when environmental conditions favor crop injury. For example, some soil residual herbicides are known to have more crop injury risk when applications are followed by cool, wet weather.
- In some cases, reducing the herbicide rate can also reduce associated environmental risks, such as leaching. However, keep in mind that such risks were considered when the full labeled rates were established, so this benefit may not be as clear-cut as it first seems, particularly if more applications are needed to control escaped weeds.

Several questions should be answered when considering herbicide rate reductions:

- What is the risk of selecting for resistant weeds for the herbicide site of action? Some herbicide sites of action are quite prone to selecting resistant weeds, while others have been used for decades with minimal or no herbicide-resistant weeds. Take a look at <http://www.weedscience.org/> to see a list of herbicide-resistant weed cases for the herbicide you're considering.

- Is there a weed threshold established for the particular target species, and if so what does that look like relative to your weed population (see example in Figure 1)? There are some weeds that are more aesthetically displeasing than damaging to the crop. Keep in mind, though, that weeds that reach reproductive maturity can make future problems worse – like fire, they’re easier to “extinguish” when small and limited in area!
- What is your previous experience both with crop tolerance and weed control with the herbicide in question? Good recordkeeping can make the rate decision quite easy – what’s worked for you in the past and were there any negative consequences to the rates you’ve used previously?
- What’s the crop status and has there been any environmental stress that could affect crop response to an herbicide application? Labels often include language like “crop injury risk is greater when air temperatures are above xx degrees” or “avoid applications in cool, wet weather”. These are based on research and experience – pay attention to them!

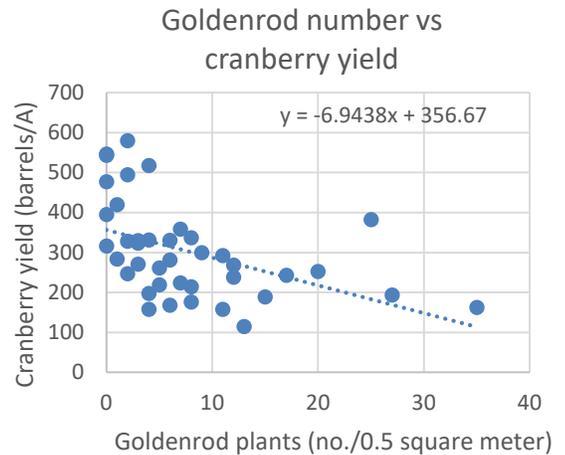


Figure 1. An example of weed density impact on cranberry yield.

As always, read and follow the label prior to any pesticide use!

UW-Madison/Extension Insect Diagnostic Lab update

By: PJ Liesch, UW Insect Diagnostic Lab

With the recent cool and rainy weather, insect reports from much of the state have been below average at the UW Insect Diagnostic Lab (IDL). Fruit insects reports from northern Wisconsin have been particularly low thus far with the cold temperatures and occasional snow flurries over the last two weeks. Insect activity is expected to increase with the warmer temperatures in the upcoming forecast. Reports of fruit crop insect activity submitted to the IDL from the last two weeks are summarized below:

Eastern tent caterpillars are active with small tents being observed in southern parts of Wisconsin. Because this species can attack a number of fruit trees, growers should keep an eye out for whitish silken tents while scouting their orchards.

Grapevine epimenis adults (moths) were recently observed in the La Crosse area and are likely active elsewhere in the state. Caterpillars of this species should be active in the near future. The caterpillars are minor pests of grapes and have a striking appearance: their bodies are covered with distinctive black and white stripes with orange patches at both the posterior and anterior ends of their bodies. The caterpillars also have a distinctive

behavior of curling grape leaves upwards and tying them together with silk.

Grape flea beetles have been active for a while with several reports coming in to the UW Insect Diagnostic Lab from around the state. This insect can damage emerging grape buds, so grape growers should have this pest on their radar.

White grub activity has been reported in turfgrass areas in eastern and southern Wisconsin, with grubs of rose chafers, Japanese beetles, and May/June beetles being observed in areas. The impact of last winter's polar vortex on populations of these insects is not yet fully known. Adult May/June beetles have been observed in southern Wisconsin recently. Rose chafer adults will likely be emerging within the next few weeks in parts of the state with sandy soil and have the potential to damage a number of fruit crops. It'll be a while for Japanese beetle adults, which typically begin to emerge *en masse* in early July.

Tarnished plant bugs are active and have been reported in several spots in southern Wisconsin. This species can be a pest of a wide variety of fruit and other crops.

Slugs have been reported from several home garden situations in southern Wisconsin. Slugs often thrive under rainy conditions and can damage low-growing fruits such as strawberries. If slugs are suspected, scouting after dark or on overcast days can be helpful to confirm their presence.

Plum curculio and codling moth have not formally been reported to the UW Insect Diagnostic Lab yet this year. However, based on accumulated growing degree days (GDDs) and weather patterns, activity is likely in southern Wisconsin for these two species in the near future and growers should be aware. See the May 16th issue of the **Wisconsin Pest Bulletin** for additional information: <http://datcpservices.wisconsin.gov/pb/index.jsp>

Pollinators are active around the state, so make sure to be mindful of their activity while spraying.

Berry Crops

Managing winter-injured blueberries

By: Dr. Amaya Atucha, UW-Madison Department Horticulture

Blueberry fields across the state are showing severe winter damage to buds and twigs. Several growers have asked me what they should do to speed recovery and how should they adjust fertilization. Here are a couple of recommendations:

- Summer pruning to remove all dead material. New shoots growing from damaged twigs will be weak and will have to be removed eventually, so just prune them now. In case of extreme damage growers can mow down aggressively so that this encourages new growth that will support next year's fruit production.
- Fertilizer rates should not be adjusted much, even when the crop load is low or there will be no fruit at all. Most of the N for this year's growth is coming from reserves in the trunks and roots. The N fertilizer

you are applying this year will support the fruit yield for the 2020 growing season. Make sure you review last year's results from soil and foliar analysis test to correct any deficiencies or to adjust fertilization as needed.

- Split your fertilizer to make smaller application but more frequently, instead of the 2 or 3 applications of fertilizer at a higher rate that are recommended in a “normal” year.
- Stop N fertilizer application by mid-July to avoid delays in cold acclimation during fall.

Look out for Eastern flower thrips

By: Christelle Guédot, UW-Madison

Weather has been fluctuating a lot in the last month and the wind has been blowing regularly at least around Madison. Winds in the spring, particularly those coming from the South, may announce the arrival of “aerial plankton”, which includes a list of insect that use this air pump to bring them up North from southern states (Figure 1). Among the many insects that travel on southern air currents, of particular importance in strawberry, is the Eastern flower thrips (EFT). Until recently, EFTs has been presumed to migrate on these wind currents at altitudes as high as 10,000 feet. Recent research has suggested that EFTs may be overwintering in Wisconsin wheat (Russ Groves, personal communication) and special attention should be given to monitoring this insect in strawberry and other crops.

Monitoring for EFTs should start as soon as the first flowers begin to open and continue by sampling all varieties as they begin to bloom. Look at 10 blossoms per site, with 10 or more sites per variety. Shake/tap blossoms in white bowl or tray. You could also place flower blossoms inside a zip-lock bag, shake to dislodge thrips and allow counting. Yellow sticky cards can be

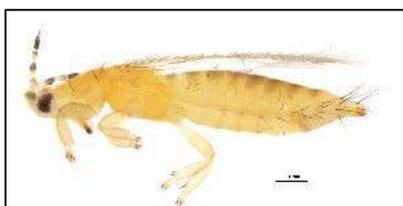


Figure 2. Eastern flower thrips, *Frankliniella tritici*. BIOUG03211-B05CBG. Photography Group, Centre for Biodiversity Genomics. Creative Commons.

used to detect the presence of thrips. Although no formal threshold has been established for ETF, chemical control is warranted with populations exceed 2-10 thrips per blossom or small berry. This is a broad range of densities and other states that do not see a lot of thrips damage recommend 10 thrips per blossom. More research is needed to establish the correlation between densities and damage. For insecticide recommendations once you reach this threshold, please refer to the [2019-2020 Midwest Fruit Pest Management Guide](#).

For more information on this insect, its identification, biology, monitoring, and control, please refer [this article](#) from a previous issue of this newsletter. I have not yet received any report of EFTs being present in Wisconsin strawberry, so please let me know if you have found some in your berries so that we can inform all growers in Wisconsin via this newsletter.

Happy growing season!

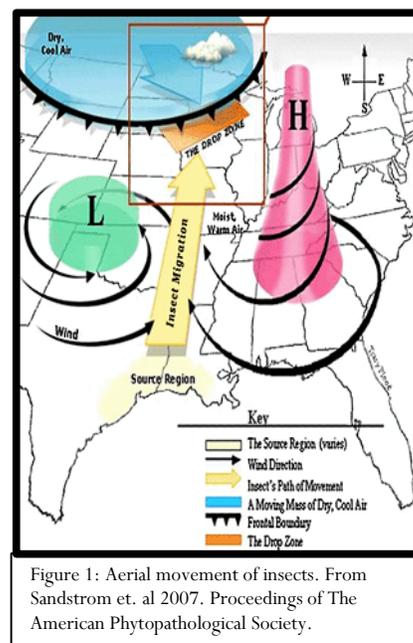


Figure 1: Aerial movement of insects. From Sandstrom et. al 2007. Proceedings of The American Phytopathological Society.

Grape variety development stages: May 22, 2019

By: Jacob Scharfetter, Andi Nelson, and Amaya Atucha

At the West Madison Agricultural Research Station (WMARS) in Madison, WI, shoot development across most cultivars were at E-L stage 7 (“First leaf separated from shoot tip”). However, due to frost damage experienced the last weekend of April, many secondary buds have also broken and are at E-L* stages 3 (“Woolly bud tip”) through 6 (“Nearly first leaf separated from shoot tip”). This season, grapevine behind in development compared to the same period in 2017 and 2018 seasons. This is mostly the result of the cool and wet spring we have experienced so far this year. At the Peninsular Agricultural Research Station (PARS), all varieties are at E-L stages 2 (“Bud scales opening”) and 3 (“Woolly bud tip”).

Following photos were taken on May 22, at West Madison Agricultural Research Station



Brianna
“First leaf separated
from shoot tip”
E-L stage 7



Crimson Pearl
“2 to 3 leaves
separated”
E-L stage 9



Frontenac
“First leaf separated
from shoot tip”
E-L stage 7



Itasca
“2 to 3 leaves
separated”
E-L stage 9



La Crescent
“First leaf separated
from shoot tip”
E-L stage 7



Marquette
“3 leaves separated”
E-L stage 10



Petite Pearl
“First leaf separated
from shoot tip”
E-L stage 7

Date: April 1 – May 24,
2019

Growing Degree Days
(Base 50°F)

	2019	2018	2017
Location: WMARS	169	306	226
Location: PARS	45	107	53

Growing degree-day accumulation from April 1 to May 10 for the past three seasons. Currently, the 2019 season is running behind in GDD accumulation compared to 2017 and 2018 seasons. Degree-days were calculated using a base 50°F, starting on April 1 as a biofix. We calculated degree days using the NEWA website, and you can visit their “About degree days” page to learn more about the degree days and the formulas used for their respective calculations (<http://newa.cornell.edu/index.php?page=about-degree-days>).

**E-L stands for Eichhorn-Lorenz Phenological stages to describe grapevine development*

No more grape flea beetle?

By: Christelle Guédot, UW-Madison Department of Entomology

On 5/13/19, grape flea beetles were found in low numbers at the West Madison vineyard, with about 5% of vines with at least one flea beetle.

As of 5/22/19, no grape flea beetle or any other insect were observed at the West Madison or Peninsular Agricultural Research Stations (WMARS and PARS respectively). Scouting at WMARS on Wednesday May 22 was conducted on a sunny day which suggests that flea beetles are likely about done feeding on grape buds. This makes sense as most buds at the West Madison vineyards are in the E-L stage 7 (see article on Grape Variety Developmental Stages in this issue for more info), with leaves separating from the shoot tip. Once the buds expand, there is no economic damage incurred by grape flea beetle to be concerned about.



1. Adult flea beetle feeding on swollen grape bud. Photo credit: Dean Volenberg, UW-Extension

At PARS, scouting on 5/20/19 was conducted late in the day which may explain the lack of flea beetle activity and as buds have not yet expanded (E-L stage 2-3), more activity may be expected in the next week or two in Door County.

Thanks to Jacob Scharfetter, Andi Nelson, and Annie Deutsch for scouting at the research stations.

Happy growing season!

Bitter pit management

By: Dr. Amaya Atucha, UW-Madison Department Horticulture



The following article summaries Dr. Atucha's conversation with Peter Werts and John Aue during the May 14th AppleTalk conference call hosted by the IPM Institute of North America.

Managing bitter pit under a normal crop load

The standard recommendation to manage bitter pit in Honeycrisp has been to apply 5 to 15 lb. of actual calcium per acre. If blocks have a history of bitter pit or will likely have a lower crop load, stick with a higher rate of calcium. Penn State University has a calcium rate calculator for individual product comparisons (<https://extension.psu.edu/orchard-nutrition-calcium-rate-calculator-for-individual-product-comparisons>).

There are a few different calcium application recommendations depending on the source of the information. Washington State University recommends six to 12 calcium applications of 1 to 1.5 lb/acre between petal fall and two weeks before harvest. This equates to about 2 to 4 lb/acre of calcium chloride. Cornell recommends three to four covers of 1 to 2 lb/acre of calcium chloride (100 gal./acre) starting one week after petal fall, followed by two sprays of 3 to 4 lb./acre of calcium chloride two weeks before harvest. These applications should be completed on 14-day intervals. The application window for calcium is quite large, but growers should apply as soon as possible to mitigate the potential for bitter pit issues later on.

Fruit will accumulate calcium beginning at petal fall and will continue to absorb calcium until harvest. Avoid using products derived from calcium nitrate or applying nitrogen in general as it competes with calcium. If a nitrogen deficiency is expressed, e.g., yellow leaf coloration, nitrogen can still be applied but should be done in accordance to foliar tests to avoid over applying and to ensure it doesn't affect calcium uptake. Calcium travels through the tree via transpiration or within the water stream. If vigorous shoot growth is occurring, calcium will be deposited into the shoots and leaves rather than the fruit. This is especially true where there is a light crop; therefore, timing and application volume are crucial as well as minimizing stress within the tree.

Light crop load

Where there is a light crop load, the most important thing to do is to not apply any nitrogen. There is likely enough nitrogen in the soil to sustain growth for this season. Reduce or eliminate any potassium, as demands are less with a lighter crop. The main reason that Honeycrisp is prone to bitter pit is the large gap in the ratio of calcium to nitrogen, magnesium and potassium within the fruit. A low crop load correlates to low levels of these

calcium competitors.

Current research using applications of Apogee (prohexadione calcium) to control shoot growth, reduce vigor and push calcium into fruit, is being completed by Dr. Duane Greene from the University of Massachusetts. The best time to apply Apogee is around pink because it takes up to two weeks to take effect. Apply a concentration of 9 oz. to 12 oz. per 100 gallons at pink, and a second application two to two and a half weeks later at 6 oz. per 100 gallons, if trees are still vigorous due to low crop load. Apogee is especially recommended if you know you have a low crop load and must control shoot growth. Important: Do not mix Apogee with calcium and make sure the water pH is not too high. Calcium and high pH can suppress the effects of Apogee.

Researchers at Penn State University are working on a modeling tool to predict the incidence of bitter pit based on the nitrogen and calcium content within the peel compared to the shoot length. Researchers measured the length of the terminal shoots and collected fruit skin samples three weeks prior to harvest. Preliminary results are showing a 70% correlation with this method; longer shoots and a higher ratio of nitrogen to calcium lead to a higher chance of bitter pit. There is a 50-60% greater incidence of bitter pit when the background color is too green at harvest. Read more on the study here: <https://extension.psu.edu/preharvest-assessment-of-the-potential-for-bitter-pit-in-honeycrisp>

Harvest and storage management

Harvest and storage practices also play a role in bitter pit occurrence. It is recommended to store bitter pit prone apples at a lower temperature for no longer than six weeks. This means the timing of harvest needs to be kept in mind. If apples are stored for longer periods of time, they should be harvested early and for apples stored for shorter periods of time, they should be harvested later. Apples that aren't prone to bitter pit need to be conditioned to reduce soft scald, which is first seen one to two months into storage.

- Conditioning fruit (7 days at 50 F) reduces risk of low temperature storage disorder (i.e., soft scald and soggy breakdown), but increases risk of bitter pit.
- Bitter pit usually develops during the 1st month of storage and it is not progressive.
- Reduce the potential of bitter pit by NOT conditioning fruit and reduce potential soft scald by storing at 38 F.
- Depending on the risk fruit should be treated differently:
 - High risk of bitter pit: NO conditioning and store at 38 °F or lower if you will be marketing the fruit in less than 6 weeks from harvest.
 - Low risk of bitter pit: condition the fruit and store at 38 °F
 - Storage temperatures lower than 38 °F are safe in the short term, but beyond 1 or 2 months there is higher incidence of soft scald and soggy break down.

Soil type and rootstocks

A large portion of calcium within the tree is derived from the soil. Sandy soils are poor in all nutrients and are more prone to bitter pit problems. Heavy soils with high concentrations of potassium, magnesium and ammonium, which competes with calcium, will also cause more bitter pit problems. Quick drying soils have the same issue. Root growth, especially in the spring, is essential to encourage calcium uptake. Prior to planting new trees, apply dolomitic lime or calcium lime to assist with calcium uptake. Only use dolomitic lime with calcium and magnesium, if magnesium is low. If magnesium is not low, use calcium lime. Soil pH also must be

monitored. If the pH level is too low, there will be less calcium available to uptake. Maintain soil pH between six to seven and monitor pH and organic trends over time. If nitrogen applications are acidifying the soil, the pH will need to be adjusted upwards. Soil tests should be completed every three to four years.

Ongoing research at Cornell University has been investigating how rootstock selection influences the propensity of bitter pit. Anecdotal results are showing that Bud9 has fewer bitter pit occurrences than Geneva rootstocks because it is much less vigorous. Within the Geneva rootstocks, G214 and G969 are less susceptible to bitter pit than G41 and G11.

Irrigation

Irrigation is critical and required for low-vigor trees and rootstocks. Smaller roots need to be kept moist to promote uptake of calcium. Roots grow every year and new roots are the most efficient at uptaking calcium. Reduced root growth due to dry or unhealthy soil in the initial growth phase may result in a higher occurrence of bitter pit.

Grower questions

Grower: Some companies try to promote their calcium product saying it is better quality because it is more easily absorbed into the fruit. Is this "luxury" calcium worth the extra expense?



Amaya Atucha: No, all that matters is the amount of calcium within the product and if it includes nitrogen. Calcium chloride will work as well.

Grower: We normally use a foliar application of 1 lb. of 20-20-20 to correct nutrient deficiencies. Is that sufficient nitrogen and potassium to effect bitter pit?

Amaya Atucha: We are looking for a balance between crop load and shoot growth. If trees are stressed and have a potential for a normal to heavy crop, then nitrogen should be applied. If the crop is light, nitrogen is going to encourage shoot growth. Any shoot growth longer than five inches correlates to potential bitter pit issues. If you have a normal crop, go ahead with regular nutrient management.

This article was taken from an Apple Talk conference call by the [IPM Institute of North America](#) on May 14, 2019.

Door County Fruit Pest Reports

By: Annie Deutsch, Agriculture Educator, Extension Door County

I will be posting weekly fruit crop pest updates on the Door County Extension Website:

<https://door.extension.wisc.edu/horticulture/fruit-crop-pest-reports/>. These reports are similar to what Matt Stasiak, retired superintendent of the Peninsular Agricultural Research Station, posted weekly to their website. All reports will be archived on that website, so you can look back if need be.

Each week, there will be some weather information, pest reports for apples, tart cherries, and grapes, and notes about any upcoming events.

There are 8 weather stations in Door and Kewaunee counties connected to the Enviroweather network operated by Michigan State University (<https://www.enviroweather.msu.edu/>). I'll include some weather information and growing degree day totals from the Sturgeon Bay station and make note of anything significant that may have happened at one of the other locations (for example apple scab infection periods).

The fruit crop reports are based on observations of plant development from the Peninsular Agricultural Research Station. Additionally, employees at the station run a scouting network throughout the county. Any insect trap catches or observed diseases will be noted for each fruit crop. In collaboration with DATCP, I will be trapping for brown marmorated stink bug as well, so if I catch anything, I'll include that information. The report for May 21 is below. If you have any questions about these reports, please don't hesitate to contact me: annie.deutsch@wisc.edu or 920-746-2263.

Even with temperatures in the low 40s, there was an apple scab infection period at all the weather stations in Door and Kewaunee counties this weekend. There was an average of 50 hours of leaf wetness recorded. Symptoms from any infections that may have occurred would be apparent in about 7-10 days.

Due to the cool temperatures, nothing has progressed much from last week. Apples at the station are still at tight cluster in most blocks and apple scab sprays should be ongoing on a 7-10 day schedule for susceptible varieties (see disease section below).

Cherries have progressed a bit and are approaching open cluster. There is a bit of green fruitworm feeding on the buds at the station, but no action is needed. Grapes are finally moving a bit and bud scales are opening.

Below is a degree day comparison of the last five years. We are at about half the degree day accumulations from average. Based on MSU enviroweather models, we are about 7-14 days behind normal growing degree days base 50 (see map).

Date 5/13	2015	2016	2017	2018	2019	5 yr avg
Base 50	151	124	105	154	63	120

INSECT & DISEASE CONTROL

APPLE

Disease Pressure – Apple scab spray programs should be ongoing to protect apple scab susceptible varieties (e.g. McIntosh and Cortland), as the 1/2 inch green through first cover time period is the most critical time for primary scab infections to occur. Keep these varieties covered with fungicide treatments through the end of primary scab season; typically mid to end of June in Northeast WI. Applications of copper can still be made to reduce fire blight inoculum. These copper sprays will also provide protection from apple scab infection.

Insect Pressure – Green fruit worm adults continue to fly and lay eggs. Scout for presence of their hatching larva as well as overwintering oblique-banded leafroller larva starting at the ½ inch green stage of development through petal fall. So far, no plum curculio adults have been caught. Codling moth traps were placed in orchards county-wide last week.

CHERRY

Disease Pressure – Little to worry about because of plant stage. Fungicide applications targeting cherry leaf spot will need to begin after bract leaves begin to unfold, so probably not for another few weeks.

Insect Pressure – Green fruit worm adults continue to fly and lay eggs. Once significant leaf tissue begins to develop, scout for presence of their hatching larva as well as overwintering oblique-banded leafroller larva. Spotted wing drosophila traps were placed in select orchards last week; traps will be placed county wide this week.

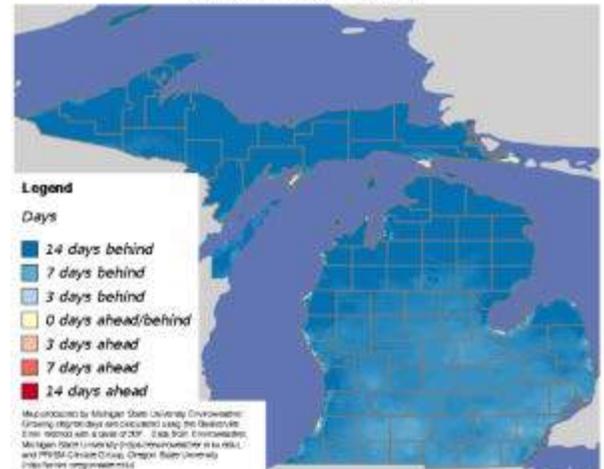
GRAPE

Disease Pressure – Little to worry about because of plant stage

Insect Pressure – I found a tiny bit of flea beetle damage on buds at the research station. As buds begin to swell, keep an eye out for grape flea beetle damage.

****Mark your calendar for July 18, 3-5pm, for the 2019 Vineyard Walk at the Peninsular Ag Research Station!****

Heat accumulation compared with normal (in days):
March 1 - May 20, 2019



Calendar of Events

July 11, 2019 – Apple Summer Field Day

Bushel & a Peck Market
Chippewa Falls, WI

July 18, 3-5pm, 2019 Vineyard Walk

Peninsular Ag Research Station
4312 Hwy 42 North
Sturgeon Bay, WI 54235

August 14, 2019 – Cranberry Summer Field Day

Dubey Cranberry
Junction City, WI

August 19-21, 2019 – NACREW conference

Vancouver, BC, Canada



Useful Links:

Wisconsin Fruit Website: <https://fruit.wisc.edu/>

You can purchase (\$10) the 2019 Midwest Fruit Pest Management Guide:
<https://ag.purdue.edu/hla/hort/documents/id-465.pdf>

Insect Diagnostics Lab: <http://labs.russell.wisc.edu/insectlab/>

Plant Disease Clinic: <http://labs.russell.wisc.edu/pddc/>

Soil and Forage Analysis Lab: <https://uwlabs.soils.wisc.edu/>

Weed Identification Tool: <http://weedid.wisc.edu/weedid.php>

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If you have any questions or comments about the Wisconsin Fruit News issues, please contact Elizabeth DiNovella at edinovella@wisc.edu.