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## General Information

### UW-Madison/Extension Insect Diagnostic Lab update

By: PJ Liesch

Insect activity has been high the last two weeks with Japanese beetle being one of the top fruit and landscape pests active at the moment. A summary of fruit-insect cases from the UW Insect Diagnostic Lab over the last two weeks can be found below:

The top insect being reported to the UW Insect Diagnostic Lab at the moment is the **Japanese beetle**. Other than the far northern part of the state, most locations in Wisconsin have been experiencing problems on both fruits and landscape trees/shrubs from this insect. A wide variety of fruit crops can be attacked, including pome and stone fruits, caneberries, grapes, and strawberries. Japanese beetles typically remain active into September, so growers will need to keep an eye on populations in their area for roughly two more months. Luckily, the **rose chafers** are quieting down for the year with reports of activity and damage starting to drop off at the UW Insect Diagnostic Lab.

Recent reports from the Wisconsin Pest Bulletin have suggested that **Spotted Wing Drosophila** populations are rising. SWD damage was recently noted on black raspberries in south central WI. While reports and samples of SWD coming into the UW Insect Diagnostic Lab have been low, growers should be on alert and should be actively monitoring for SWD activity in their area as populations tend to build up over the course of the summer months.

**Tarnished plant bug** activity and damage have been noted in south central Wisconsin and these insects are suspected to be the cause of distorted strawberries in Portage County as well. This insect can be common statewide and can attack a wide range of fruit crops.

Reports of the invasive **Brown marmorated stink bug** continue to trickle in to the UW Insect Diagnostic Lab. Both adults and nymphs have recently been observed in Dane county as well as some locations in SE Wisconsin. In the last two weeks, BMSB nymphs (juveniles) have been spotted in four different municipalities in Dane county alone. In situations where nymphs were spotted in areas without nearby fruit or vegetable crops, the juveniles were observed on ornamental landscape trees/shrubs. Reports of the "**brown**" (*Euschistus* sp.) and "**green**" (*Chinavia hilaris*) **stink bugs** have also recently been noted at various spots in the state in fruit-crop settings.

**Strawberry root weevil** larvae were confirmed in a sample from Bayfield County. The larvae were found in the soil of a damaged strawberry plant. You can find more information about strawberry root weevil in [WFN Volume 2, Issue 4 \(page 5\)](#).

Characteristic tip dieback of the **Raspberry Cane Borer** damage was reported in Dane County. This beetle typically causes minor damage and pruning out and destroying infested canes is a common course of action.

More of a curiosity than a threat to fruit crops, but caterpillars of the **polyphemus moth** were recently reported on apple in Sheboygan county.



**Green stink bug nymph.** Photo courtesy of Russ Ottens, University of Georgia, Bugwood.org.

### UW-Madison/Extension Plant Disease Diagnostic Clinic (PDDC) update

By: Brian Hudelson, Sue Lueloff, John Lake 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 June 30, 2018 through July 13, 2018.

<b>PLANT/ SAMPLE TYPE</b>	<b>DISEASE/ DISORDER</b>	<b>PATHOGEN</b>	<b>COUNTY</b>
<b>FRUIT CROPS</b>			
Apple	<i>Phomopsis Canker</i>	<u><i>Phomopsis</i> sp.</u>	Lafayette
Blueberry ('Draper')	<i>Phomopsis Canker</i>	<u><i>Phomopsis</i> sp.</u>	Eau Claire
Strawberry	<u><a href="#">Common Leaf Spot</a></u> <u><a href="#">Root/Crown Rot</a></u>	<u><i>Mycrosphaerella fragariae</i></u> <u><i>Rhizoctonia</i> sp.</u>	Green Green

For additional information on plant diseases and their control, visit the PDDC website at [pddc.wisc.edu](http://pddc.wisc.edu).

### White grubs: pests of strawberry roots and foliage

By: Janet van Zoeren and Christelle Guédot, UW-Extension

White grub refers to the larvae of scarab beetles, including the Japanese beetle (*Popillia japonica*), European chafer (*Amphimallon majalis*), and May and June beetles (*Phyllophaga spp.* and *Cotinis spp.*). They all have similar appearance and damage symptoms, which can include feeding on strawberry roots, causing wilting of the plant. Typically, white grubs cause significant damage in strawberries following planting in a field that had previously been planted in grasses, which is a preferred food-source. Many species of white grub adults also feed on the leaves of strawberry plants, although typically not extensively enough to cause economically significant damage.

**Description and Damage:** White grub larvae are thick and fleshy. Their color ranges from grey to white, with a brown head capsule. Although the size depends on species and age, mature larvae tend to be around ¾” to 1½” long. The larvae of all white grub species form a distinctive, curled-up c-shape in the soil. Unlike strawberry root weevil, which also feeds on strawberry roots causing wilting and plant die-back, white grub larvae have obvious legs.

White grub larvae feed on strawberry roots. Typically damage symptoms of white grub feeding include sudden plant wilting and die-back. Often, this will take place in the year following strawberry planting, and will begin with a single plant and then spread to surrounding areas. Roots are typically fed on and then shorn off about an inch or two below the soil surface. In addition to leading directly to reduced plant vigor, white grub feeding can also provide an opening for pathogens.

Adult white grubs are beetles, ranging from ½” to 1½” long. Their coloration varies by species. Japanese beetle adults are a distinctive shiny green/bronze color, and can cause significant damage to the foliage of strawberries and other fruit crops (see article in the [previous issue of this newsletter](#)). Rose chafer adults are a sandy tan color with long legs (see WFN [Volume 2, Issue 6, page 7](#)). May and June beetles are typically dark brown, with thick-set bodies.

**Life Cycle:** Many white grub species, including May and June beetles, have a three-year life cycle, in which larvae feed for nearly three years before emerging as adults. Adults will fly for several months in May and June. In those species, larval feeding damage may occur any time during the summer, as there will always be some individuals in the larval stage in any year. Other species, such as Japanese beetle, complete their development in a single year, with larvae present from late summer to the following spring, and adults flying in the summer from approximately July through August. All white grub species overwinter as larvae.

**Monitoring and control:** Monitoring for white grubs is recommended if there are wilting symptoms, or if you are planting strawberries where grass used to grow. Check for white grubs by digging near the wilting plants’ roots and looking for the large, easy-to-spot grubs. Additionally, if a plant suddenly dies in the field, pull it up gently to check for roots – if there is a full set of roots it is likely to be a disease issue, but if the roots end after approximately 1”, it is likely caused by white grubs.

The most effective way to minimize root feeding by white grubs is to avoid planting strawberries for two years following any grasses, including livestock pastures, grass sod, or forage crops. Additionally, you can reduce both root and foliar feeding by these beetles by leaving a buffer between grassy fields and strawberry plantings. Chemical control is only recommended when three or more white grub larvae are found on average near wilting plants. Check the [2018 Midwest Fruit Pest Management Guide](#) for chemical control recommendations.



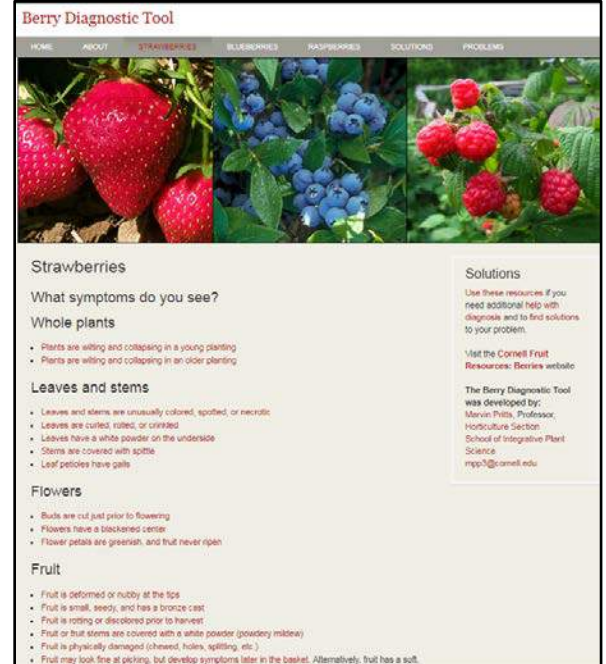
**White grubs:** from left to right, the larvae of the Japanese beetle, the European chafer, and the June beetle. Photo courtesy of David Cappaert, Bugwood.org.

## Cornell's online diagnostic tool helps determine what's wrong with your berry crops

By: Janet van Zoeren and Amaya Atucha, UW-Madison Horticulture

Determining what's wrong with your berry plant is the first step in fixing any problem, and in continuing to keep plants healthy and producing lots of berries. Cornell University has developed a "berry diagnostic tool" to help raspberry, strawberry and blueberry growers across the Northern US to figure out what is the cause of any problems in their crops. Potential concerns are divided into categories depending on where on the plant you see damage, and what sort of damage you see. Then there is a wealth of links and information about potential diseases, insect pests, nutrient deficiencies, and other possible areas of concern.

You can access the Cornell berry diagnostic tool directly on their website (<https://blogs.cornell.edu/berrytool/>), or you can link to it from our Wisconsin Fruit website ([fruit.wisc.edu](http://fruit.wisc.edu)) on the [raspberry](#), [strawberry](#), or [other berry crop](#) pages.

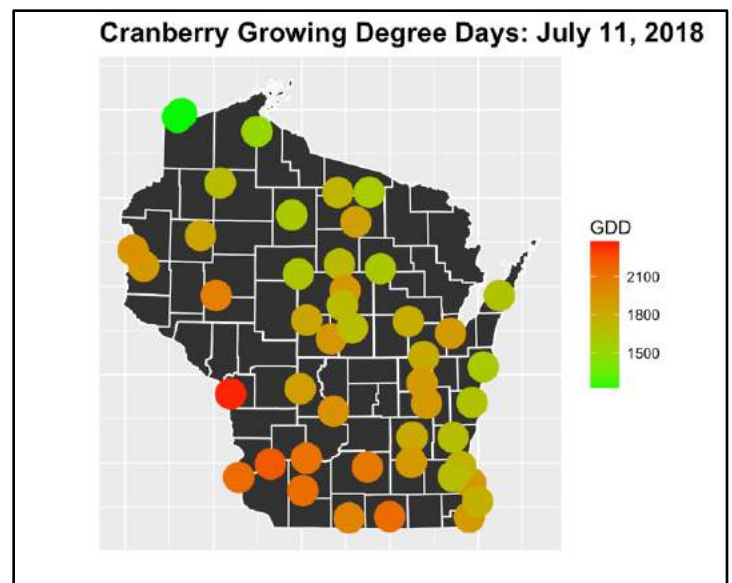


## Cranberries

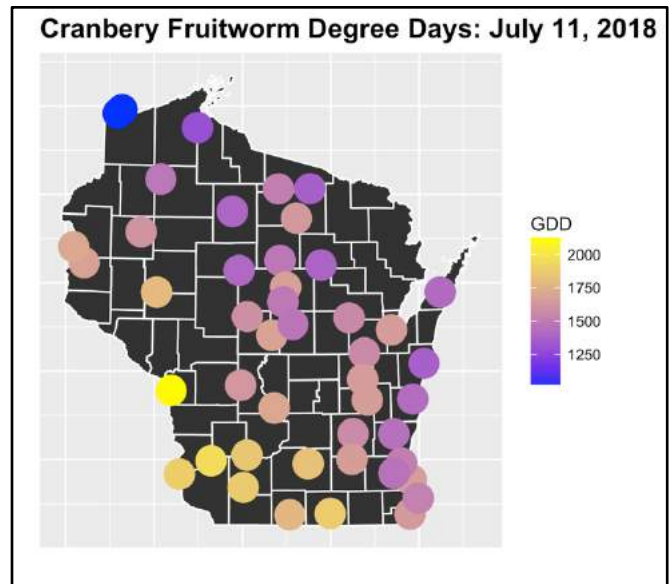
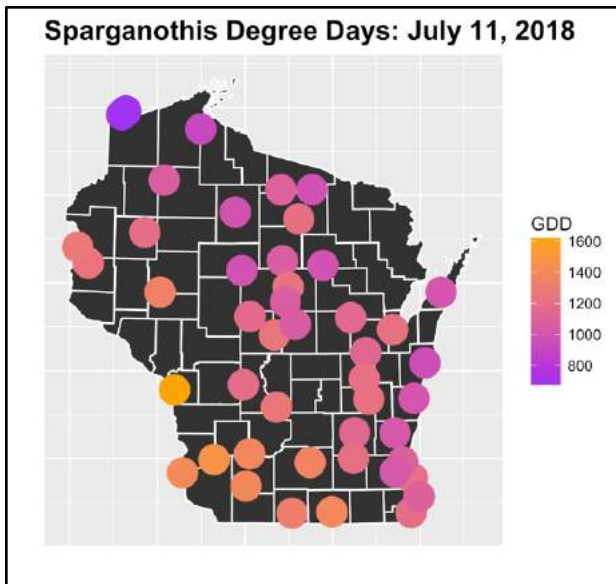
### Cranberry plant and pest degree-days: July 11, 2018

By: Elissa Chasen and Shawn Steffan, USDA-ARS and UW Entomology

Check out the maps below for the degree-days of the cranberry plant and associated pests.<sup>1</sup>









<sup>1</sup> Recall that degree-days are calculated based on the daily high and low temperature accumulations and that they vary by species according to species specific temperature thresholds. Developmental thresholds for each species are: cranberry plant - 41 and 85°F; sparganothis fruitworm - 50 and 86°F; and cranberry fruitworm - 44 and 87°F.



Use the table below to compare degree-day accumulations for all three organisms across the last couple of years and between Northern and Central WI.

	Cranberry DDs			Sparg DDs			CFW DDs		
	2016	2017	2018	2016	2017	2018	2016	2017	2018
<i>Northern WI (Minocqua)</i>	1578.7	1478.5	1784.9	891.8	805.8	1130.8	1329.9	1232.6	1556.7
<i>Central WI (Wisconsin Rapids)</i>	1990.8	1895.6	1985.6	1208.5	1123.9	1290.2	1706.6	1618	1742

Based on the predicted life-cycle of sparganthis fruitworm (below), we are nearly half-way through the egg-hatch period.

Event	DDs from March 1 (approximate)
 Flight initiation	595.7
 First eggs laid	681.0
 Peak flight	884.12
 First egg hatched*	895.4
 End of egg laying	1,634
 Last egg hatched*	1,890

\* Egg hatch window: 895 – 1,890 DDs

## Tissue analysis to determine nutrient status of cold-hardy wine grapes

By: Amaya Atucha, UW Extension Fruit Crop Specialist

In Wisconsin, mature leaf petiole is the most common tissue used to assess the vines nutritional status. There are two recommended timing for petiole sampling, at bloom, or during veraison. Some people prefer to sample at bloom time because that allows for enough time to apply any nutrient that might be deficient (especially nitrogen and boron), while others advocate for the veraison period because nutrient concentration is more stable and results more reliable during this period. Regardless of the timing in which you decide to sample the most critical thing is to be consistent and sample at the same time every year, so that you can compare across growing seasons how your vines are responding to your fertility program, as well as to diagnose problems or anomalies in nutrient concentrations within years.

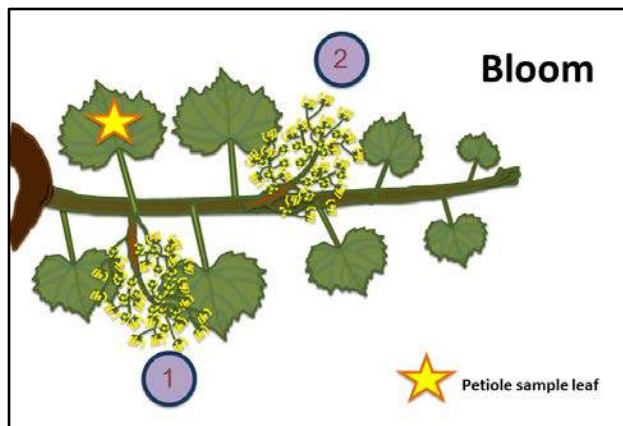


Figure 1. At bloom time collect the leaves opposite to the first cluster from the base of the shoot. Illustration by Madeline Kay Wimmer.

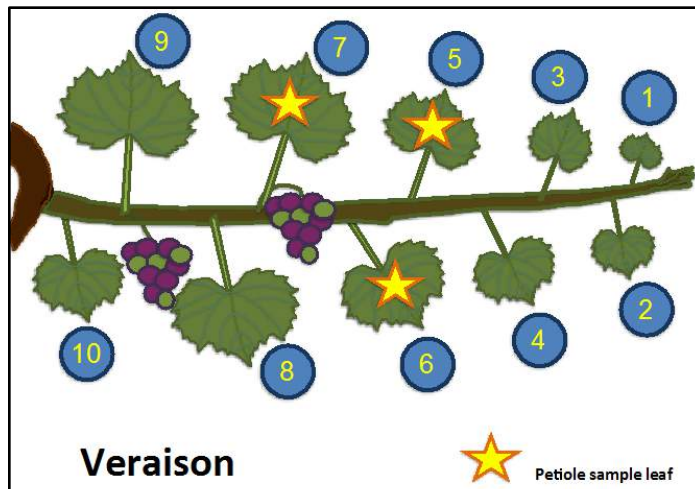


Figure 2. At veraison collect 5<sup>th</sup> to 7<sup>th</sup> fully mature leaf from the tip to the base of the shoot. Illustration by Madeline Kay Wimmer.

### Instructions to collect Petiole samples:

1. Divide the vineyard into sampling areas based on the type of soil, cropping history, and variety. In addition, separate sampling areas by variety and age (e.g. one sample should be taken for a 3 year old Marquette block, and a separate sample for an 8 year old Marquette block). If you have an area in you vineyard that shows symptoms you should collect a separate sample for it.
2. Collect 50-100 leaves/petioles (use the higher end of the range for varieties with smaller leaves such as Foch and Marquette). Leaves/petioles should be collected randomly from 20-30 vines within a sampling unit, by collecting 2 leaves per vine from both sides of the rows and canopy. Select leaves/petioles from shoots that are well exposed to sunlight, healthy, free of insects, diseases or physical injury.
3. If sampling at full bloom, collect leaves located opposite the first or second flower cluster of a shoot (Figure 1). If sampling at veraison, collect the 5<sup>th</sup> to 7<sup>th</sup> fully mature leaf from the tip to the base of the shoot (make sure the shoot has not been pruned, Figure 2).
4. Separate the petioles from the leaf blades (if rinsing is required, do not leave the leaves soaking in water as they will leach nutrients) and place the petioles in a **labeled** clean **paper bag** or bag provided by the tissue analysis lab (Figure 3.). It is critical to label each sample to be able to keep records of each sampling area.
5. Let the petioles dry at room temperature or send them immediately to the laboratory. Do not use plastic bags.
6. Contact the tissue analysis laboratory before collecting/submitting your samples to clarify specific requirements.
7. You should request the following nutrients for testing: Total nitrogen (N), phosphorus (P), potassium (K), magnesium (Mg), calcium (Ca), manganese (Mn), zinc (Zn), boron (B), iron (Fe), and copper (Cu).

**Sufficiency range for nutrients in Cold-Hardy Grape petioles** (Based on Domoto and Rosen)

Nutrient	Full bloom (mid to late June)	Veraison (mid July to mid August)
Nitrogen (%)	1.20 - 2.20	0.90 - 1.30
Phosphorus (%)	0.15 - 0.60	0.12 - 0.40
Potassium (%)	1.50 - 4.00	1.50 - 2.50
Calcium (%)	0.70 - 2.00	1.00 - 2.00
Magnesium (%)	0.20 - 0.50	0.25 - 0.45
Sulfur (%)	> 0.12	> 0.12
Manganese (ppm)	20 - 150	30 - 150
Boron (ppm)	25 - 50	25 - 50
Copper (ppm)	5 - 10	5 - 15
Zinc (ppm)	20 - 100	30 - 50
Iron (ppm)	40 - 180	30 - 100

**List of Plant and Soil Analysis Laboratories:**

*(The provided list of laboratories is not an endorsement to any particular laboratory and does not exclude other facilities that provide similar services)*

**University of Wisconsin Soil and Forage Analysis Lab**

2611 Yellowstone Drive  
Marshfield, WI 54449  
Ph: 715-387-2523

<https://uwlab.soils.wisc.edu/plant-tissue/>

**AgSource Laboratories-Bonduel**

106 N. Cecil Street  
Bonduel, WI 54107  
Ph: 715-758-2178

<http://agsource.crinet.com/page5714/PlantTissue>

**Dairyland Laboratories, Arcadia WI**

217 E. Main Street  
Arcadia, WI 54612  
Ph: 608-323-2123

<https://www.dairylandlabs.net/agronomy-services/plant-tissues>

**U of MN Research Analytical Lab**

135 Crops Research Building 1902 Dudley Avenue  
St. Paul, MN 55108  
Ph: 612-625-3101

<http://ral.cfans.umn.edu/>

**AGVISE Laboratories**

902 13th Street  
P.O. Box 187  
Benson, MN 56215  
Ph: 302-843-4109

<http://www.agvise.com/>

**Minnesota Valley Testing Laboratories**

1126 N. Front Street  
New Ulm, MN 56073  
Ph: 507-8517 or (800) 782-3557

<http://www.mvtl.com/>

**A & L Heartland Laboratories**

P.O. Box 455  
111 Linn Street  
Atlantic, IA 50022

Ph: 712-243-6933

<http://www.allabs.com/>

**AgSource Laboratories-Belmond**

1245 Hwy 69  
Belmond, IA 50421

Ph: 515-444-3384

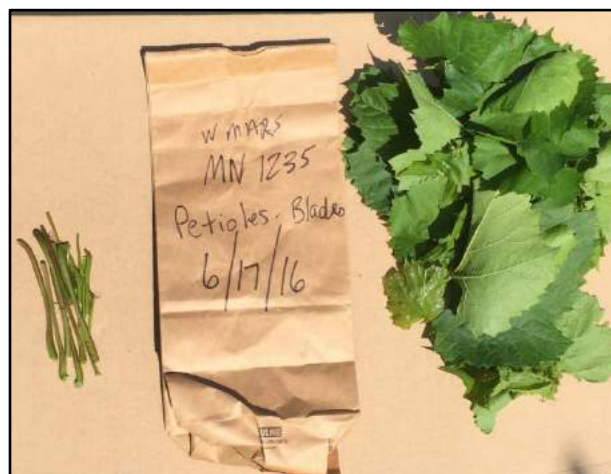
<http://agsource.crinet.com/page2284/BelmondLabs>

**Minnesota Valley Testing Laboratories**

35 L Avenue  
Nevada, IA 50201

Ph: 515-382-5486 or (800) 362-0855

<http://www.mvtl.com/>



**Figure 3. Separate petioles from leaf blades, and placed the petioles in a clean labeled paper bag. Photo credit Jean Riester-Loper.**

## Grape Variety Developmental Stages: July 12, 2018

By: Janet van Zoeren, Annie Deutsch, Jacob Scharfetter, and Amaya Atucha

At the West Madison Agricultural Research Station (WMARS), berries are in the second stage of development referred to as the lag phase, in which berries continue to develop but there is minimal change in berry size. This phase will be over once we hit veraison, probably by the end of this month. Some of the slower-to-develop cultivars have caught up, but overall most clusters have progressed only minimally toward veraison. At WMARS all cultivars are at developmental stage E-L 33 (“bunch closure, berries still hard and green”).

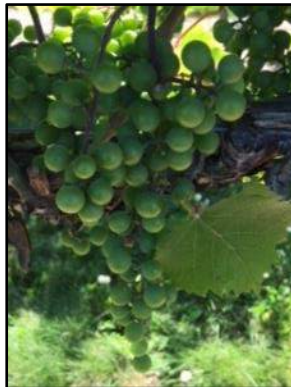
At the Peninsular Agricultural Research Station (PARS), fruit is nearly caught up with WMARS at the moment, with all cultivars ranging from E-L 32 (“beginning of bunch closure”) to 33 (“bunch closure, berries still hard and green”).

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

**Following photos taken on July 9<sup>th</sup> at West Madison Agricultural Research Station.**



Brianna at WMARS;  
“bunch closure, berries  
still hard and green”  
E-L number = 33



La Crescent at WMARS;  
“beginning of bunch  
closure”  
E-L number = 32



La Crosse at WMARS;  
“bunch closure, berries  
still hard and green”  
E-L number = 33



Itasca at WMARS;  
“bunch closure, berries  
still hard and green”  
E-L number = 33



Marquette at WMARS;  
“bunch closure, berries  
still hard and green”  
E-L number = 33



Frontenac at WMARS;  
“bunch closure, berries  
still hard and green”  
E-L number = 33



Foch at WMARS;  
“bunch closure, berries  
still hard and green”  
E-L number = 33



Petite Pearl at WMARS;  
“bunch closure, berries  
still hard and green”  
E-L number = 33



Following photos taken on July 12<sup>th</sup> at Peninsular Agricultural Research Station (PARS)



Brianna at PARS;  
"bunch closure, berries  
still hard and green"  
E-L number = 33



La Crescent at PARS;  
"bunch closure, berries  
still hard and green"  
E-L number = 33



La Crosse at PARS;  
"beginning of bunch  
closure"  
E-L number = 32



Marquette at PARS;  
"beginning of bunch  
closure"  
E-L number = 32



Frontenac at PARS;  
"beginning of bunch  
closure"  
E-L number = 32



St Croix at PARS;  
"beginning of bunch  
closure"  
E-L number = 32

	<b>Grape Growing Degree Days (Base 50, BE)</b>	
April 1 - July 12	<b>2018</b>	2107
<b>WMARS</b>	<b>1371</b>	1188
<b>PARS</b>	<b>983</b>	819

The growing degree-day accumulations as of July 12<sup>th</sup> for this year are: 1,371 GDD at WMARS and 983 GDD at PARS. We continue to be "ahead" of where we were on this date in 2017 at both locations in terms of degree day accumulations. We calculated degree-days using a base of 50°F, starting on April 1<sup>st</sup> as a biofix. "BE" (Baskerville-Emin) refers to a specific way in which to calculate degree days, using a sine wave instead of a simple average temperature calculation – this gives a somewhat more accurate estimation of degree days. We calculated degree days using the NEWA website, and you can visit their "About degree days" page to learn more about the formulas they use for their calculations (<http://newa.cornell.edu/index.php?page=about-degree-days>).

## Grape insect scouting report – Japanese beetle and phylloxera picking up

By: Janet van Zoeren and Christelle Guédot, UW-Madison Department of Entomology

In the past few days, both Japanese beetle and phylloxera densities have increased at the West Madison Agricultural Research Station (WMARS).

Japanese beetle was first seen during weekly scouting sessions in the WMARS vineyards on June 21<sup>st</sup>. The following week activity averaged four beetles per vine inspected. Following an insecticide application, numbers have returned to more reasonable numbers of zero to two beetles per vine. Similar to previous years, we've seen higher Japanese beetle density on Marquette variety vines. We've published information about Japanese beetles previously in this newsletter (i.e. [identification](#), [seasonal and spatial distribution](#) and [controlling beetles](#)).

Phylloxera has been present at WMARS for most of the summer, but has previously been found at very low densities, affecting fewer than 5% of the leaves on a vine. This week, on July 12<sup>th</sup>, phylloxera began to increase, and is found on up to 20% of leaves on some varieties. Interestingly, there has been a trend toward Marquette showing the lowest phylloxera levels in this and previous years. Be aware that the insects are protected within the galls, so it is important to time sprays for when the nymphs, or 'crawlers', climb up the vine looking to infest new leaves. There is some excellent information about phylloxera provided in the 2014 Grape IPM Scouting Reports from Door County, including about [monitoring](#) and [managing](#) this pest.



Phylloxera on St Croix variety grape at WMARS.

## Tree Fruits

### High temperatures and mites in apple

By: Christelle Guédot, UW-Madison Department of Entomology

Several mite species can be found in apple, including European red mite, two-spotted spider mite, brown mite, and apple rust mite. Mites are not insects and are closely related to ticks and spiders. While mites can barely be seen with the naked eye, they can become significant pests of fruit crops.

The recent hot spells, especially when associated with dry weather, are favorable to a buildup of mite populations. In addition, if you are using pyrethroids in your spray program, these can also exacerbate mite outbreaks. It is recommended to inspect areas with previous mite populations and to check sensitive cultivars such as Delicious, Braeburn, and Gala. To estimate the number of European red mite densities and calculate action thresholds, refer to a [nice article](#) by Greg Krawczyk from Penn State. Please remember that action thresholds for mites take into account time of the season and crop loads, and how to calculate the threshold is described in Greg's article.

Several miticide products work well for mite management, including Envidor, Kanemite, Portal, and Savey among others, and can be found in the [2018 Midwest Fruit Pest Management Guide](#). You can also find their efficacy along with the toxicity to predatory mites who control pest mites in the table on P. 34 of the [2018 Midwest Fruit Pest Management Guide](#).

Happy growing season!

## First apple maggot adult emergence reported

By: Christelle Guédot, UW-Madison Department of Entomology

Apple maggot adults (Fig. 1) began emerging from the soil in the last two weeks in Wisconsin. Captures are reported by Krista Hamilton at DATCP to be around 1-2 flies per trap in Brown, Dane, and Fond du Lac counties. If you have not done so yet, hang apple maggot chemical-baited red spheres (Fig. 2) at the edge of your orchards, especially in susceptible plantings, including Ginger Gold and Honeycrisp.



**Figure 1. Apple maggot adult.**  
Photo by Dan Mahr, UW-Madison.

The action threshold for apple maggot on baited spheres is 5 flies per week. If the trap is not baited with a chemical attractant, the threshold drops down to 1 fly per trap per week. Check traps at least weekly for apple maggots, remove non-target insects, and recoat with sticky materials as needed.

Options for management include the use of kaolin clay (Surround) as a physical and visual deterrent. Surround is organically approved and will need to be reapplied regularly

as the fruit grows and in case of rain events. Coverage is really important as the clay needs to cover the fruit completely to be most effective.



**Figure 2. Apple maggot trap.** Photo by Dan Mahr, UW-Madison.

Once you reach the action threshold for apple maggot chemical controls are advised. A list of available insecticides to control apple maggot in apple is provided in the following table. There are many other tradenames available, and we do not recommend these that are listed above other options. All product recommendations can be found in the [2018 Midwest Fruit Pest Management Guide](#). Additionally, you should always fully read and follow the label before spraying any pesticide.

Class (IRAC code)	Trade name	Active ingredient	PHI (days)	Effectiveness
Physical deterrent	Surround	Kaolin clay	0	Excellent
Spinosyns	Entrust	Spinosad	7	Fair
Diamides (28)	Exirel (RR*)	Cyantraniliprole	3	Good
	Altacor (RR)	Chlorantranilipr	5	Fair
Spinosyns (5)	Delegate	Spinetoram	7	Fair
Neonicotinoids	Assail	Acetamiprid	7	Excellent
Organophosphate	Imidan	Phosmet	7	Excellent
	Diazinon	Diazinon	21	Good
Pyrethroids (3A)	Asana	Esfenvalerate	21	Good
	Baythroid	b-cyfluthrin	7	Good

\*RR: Reduced Risk insecticide

## Calendar of Events

**July 18, 2018** – [Summer Apple Growers Field Day](#)

8 am – 5 pm, Oakwood Fruit Farm, 31128 Apple Ridge Rd, Richland Center, WI

**July 19, 2018** – [WMARS Vineyard Walk](#)

1 pm – 4:30 pm, West Madison Agricultural Research Station, 8502 Mineral Point Rd, Verona, WI

**July 20, 2018** – [Women Caring for the Land Workshop](#)

10 am – 2 pm, Bouressa Family Farm, N3775 Ritchie Rd, New London, WI

**August 13, 2018** – [PARS Vineyard Walk](#)

1 pm – 4 pm, Peninsular Agricultural Research Station, 4312 Hwy 42 N., Sturgeon Bay, WI

**August 14, 2018** – [Women Caring for the Land Workshop](#)

8:30 am – 3 pm, Buser Cattle Company, 6440 Wiesner Rd, Omro, WI

**August 23, 2018** – [WBGA Fall Field Day](#)

8 am – 5 pm, Nature's Finest Foods, 4902 County Rd S, Oshkosh, WI

**There are more “Women Caring for the Land” Workshop dates and locations.** Please see the [events section](#) of our website for more information about this series.

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### Useful Links:

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

You can purchase (\$10) the 2016 Midwest Fruit Pest Management Guide from the UW Learning Store:

<http://learningstore.uwex.edu/Midwest-Fruit-Pest-Management-Guide-2016-P1785.aspx>

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

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

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

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

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