



Wisconsin Fruit News

Volume 2, Issue 5 – June 9, 2017

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General Information

First brown marmorated stink bug caught in trap

By: Christelle Guédot, UW-Madison Fruit Crop Entomologist

For the second year now, we have been monitoring for the presence and distribution of brown marmorated stink bug (BMSB) in several locations in the state. One of these locations is on the UW-Madison campus, at the Allen Centennial Garden, where we found a breeding population on a dogwood shrub in Mid-July last year. This season, we caught our first BMSB, likely an overwintering adult male, in a monitoring black pyramid trap on June 1st at Allen Centennial Garden. None of our other traps, in apple, pumpkin, woodland, or urban areas, have yet caught any BMSB. This year, we are using a different type of commercial lure, which seems to be more effective at attracting BMSB early in the season; thus, we suspect that we will be catching them in more traps earlier this season than last.

Please, stay tuned for more info as the season progresses and send suspected specimens to the UW-Insect Diagnostic Lab or send a picture of the suspect stink bug to guedot@wisc.edu.

Happy growing season!

Integrated Pest Management: Cultural Controls

By: Annie Deutsch, UW-Extension Door County Agriculture Agent

The concept of integrated pest management (IPM) is built on using a multi-faceted approach to deal with insects, plant diseases, weeds or any other pest you may encounter. One component of IPM is cultural controls: steps that can be taken to reduce the likelihood of needing to deal with a pest. This includes prevention as well as manipulating the environment to discourage pest development or impact.

The ideal situation for pest management is to keep the pest from even showing up. Preventing the introduction of a pest takes forethought and sometimes a higher initial investment, which may offset costs and headaches down the road. When purchasing fruit trees, bushes, plugs, seeds or even a single plant, it is important to look for ones that are certified disease- or virus-free. Additionally, when the shipment arrives, carefully inspect the above ground and below ground portions of the plants for any signs of insects or diseases, and return the plants if anything is discovered. Purchasing weed-free mulch, topsoil, or compost can minimize the potential for invasive weeds entering your property.

Site selection and variety selection are equally important cultural controls. If plants are grown in areas that are not well suited for their growth, even a farmer’s best effort will not be enough to avoid problems. Sites that have soils with good drainage can prevent many root rots. Orienting plant rows in a north-south direction can help to expose the plants to more sunlight, thus drying the leaves more quickly, which may prevent some foliar diseases. Additionally, selecting plant varieties that are adapted to your growing zone and, when at all possible, have disease resistance for common diseases in that area, can help prevent many other avoidable problems.

After the plant varieties and site have been determined, proper care of the plants can reduce the likelihood of some pests from attacking the plant. Additionally, it can help the plant to tolerate more damage before there is a yield reduction or significant plant damage. Proper spacing between plants and yearly pruning can increase air flow throughout the field and within the plant canopy. Rotating crops, like strawberries, to different sections of the property when new plantings are established may help reduce the possibility of soil-borne diseases or insects from building up in that area. Soil and foliar tests can determine nutrient deficiencies in the plants, which directs the ideal fertilizer rate to avoid over or under applying nutrients. The overuse of nitrogen, in particular, can lead to overgrowth of lush leafy material that favors insects and plant pathogens. Nutrient-stressed plants may lead to weaker plants that cannot tolerate damage without major consequences. Supplemental water, without overwatering, also reduces plant stress.

Lastly, in smaller plantings in particular, sanitation and removing alternative host plants can make a difference in reducing pest levels on your property. Many insects will develop inside fallen fruit, so destroying that fruit can remove some of the insects or plant pathogens from that area. Collecting damaged or overripe berries and destroying them, rather than letting them fall to the ground, may also reduce pest development. Placing rotten or fallen fruit directly in a nearby compost pile may not be enough to kill the pests unless the compost pile reaches high temperatures. Throwing the fruit away, burying it, or solarizing it (placing it in the sun under/inside plastic to heat it to levels where the pests are killed), may be more effective.

When these practices are followed, in the best case scenario, insects, plant pathogens, weeds, and vertebrates will not be a problem. While complete prevention may not always be possible, preventing pests from entering your property, and then manipulating the environment to discourage pest development and growth can have a substantial impact on reducing pest pressure. These practices along with mechanical controls, encouraging biological controls, and using chemical controls when necessary, form the basis of an integrated pest management program.

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

By: Brian Hudelson, Sean Toporek, 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 27, 2017 through June 9, 2017.

PLANT/ SAMPLE TYPE	DISEASE/ DISORDER	PATHOGEN	COUNTY
FRUIT CROPS			
Cherry	<i>Bacterial Canker</i>	<u><i>Pseudomonas syringae</i> pv. <i>syringae</i></u>	Dane
Peach	<i>Peach Leaf Curl</i>	<u><i>Taphrina deformans</i></u>	Sheboygan

For additional information on plant diseases and their control, visit the PDDC website at pddc.wisc.edu.

UW Insect Diagnostic Lab—Fruit Insect Report: June 8th, 2017

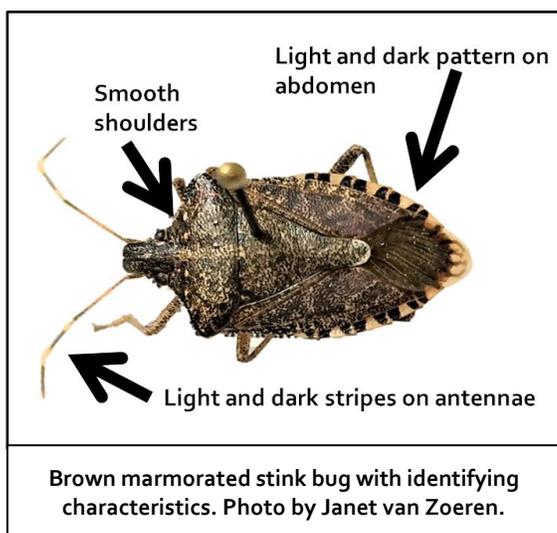
By: PJ Liesch

Reports of fruit insect activity coming in to the UW Insect Diagnostic Lab have increased over the last two weeks.

Early season reports of **codling moth** caterpillars and damage have come in from a homeowner in southern Wisconsin. Codling moth was discussed in the [previous issue of this newsletter](#).

Imported currantworm activity and feeding damage has been noted on gooseberries in southern Wisconsin.

Larvae of the **grape flea beetle** have been reported from Wood County in Central Wisconsin.



An adult **brown marmorated stink bug** was reported from the Stevens Point area. This marks the first confirmed detection of that invasive species in Portage county (and central Wisconsin in general). See the article on the first page of this issue for more information about brown marmorated stink bug monitoring in the state.

Woolly aphids have been noted recently in a number of home fruit tree situations in the southern half of the state. There is more information about woolly and other apple aphids on page 15 of this issue.

Gypsy moth has been quiet this spring, with only a single report of caterpillar activity from Dane county to date. While hardwood trees such as oaks are a favorite food, fruit trees (such as apple) can also be attacked. Growers with a history of gypsy moth activity in their area should make note that caterpillars are currently active in the state.

Looking ahead: Although, no reports have come in yet to the UW Insect Diagnostic Lab, **rose chafer** adults will be out and active in the coming days. Growers with a history of those insects in their area should be on the lookout for beetle activity and skeletonizing damage in the near future.



Rose chafer. Photo by Ben Bradford.

Phytophthora diseases of berry crops

By: Sara Thomas-Sharma and Patricia McManus

About the pathogen:

The pathogen, sometimes referred to as a “water mold,” is water-loving and can be found in irrigation ponds and channels. Some *Phytophthora* species are specific to a particular crop while others have many hosts. The pathogen produces oospores for long-term survival, and sporangia and zoospores for within-season spread and infection (Fig. 1). Contaminated soil on farm equipment and planting material introduce the pathogen to new areas.



Fig. 1. *Phytophthora* species produce sporangia (A) that spread disease during the cropping season and oospores (B) that are capable of long-term survival. In some species sporangia can release zoospores (C) that swim in water in search of a host. Photos by: (A) Mary Ann Hansen, Virginia Tech; (B) Fred Brooks, UH-Manoa; and (C) Paul Bachi, UK, Bugwood.org.

Red Stele Root Rot on strawberry

Specifically caused by *Phytophthora fragariae*, that has a narrow host range (strawberry, raspberry, loganberry), this pathogen is not naturally present in a field, but once introduced, persists for a long time (>15 years). The disease is common in low-lying areas of the field, where water accumulates.

Symptoms: Plants look stunted with few runners and small berries, new leaves are sometimes bluish-green, plants wilt prior to/during fruiting (Fig. 2A). Central core of the main root (stele) is brick red (Fig. 2B). Lateral roots are destroyed giving a ‘rattail’ appearance (Fig. 2C).

Management: Select sites with good drainage. Raised plantings (~10”) helps drying of soil. Scout for disease in low-lying areas of the field, during April-June, September-October. If disease is known to be present, plant resistant varieties such as Annapolis, Brunswick, Cavendish, Mesabi, Mira, Winona. Susceptible varieties such as Glooscap, Honeoye, Jewel, and Kent should be avoided. Avoid moving infected soil to healthy areas. Ridomil and phosphorus acid products are recommended (see [2017 Midwest Fruit Spray Guide](#) for spray timing and products). Applied as root dips or banded soil spray in spring after ground thaws but before bloom, and in fall after harvest, before ground freezes.

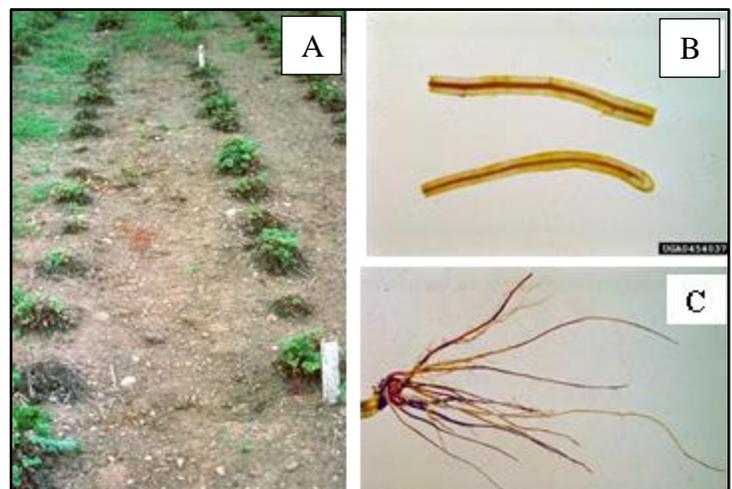


Fig. 2. Symptoms of red stele root rot of strawberry aboveground (A) and belowground, showing red core (B) and loss of lateral roots (C). Photos by SCRI-Dundee, SCRI, Bugwood.org.

Leather Rot on strawberry

Caused by *Phytophthora cactorum*, a species with a wide host range. The pathogen can infect berries at any stage. Disease usually occurs in patches in the field.

Symptoms: Affected tissue is tough, brown colored on green fruit and lavender to brown colored on mature fruit (Fig. 3). Diseased berries are softer than healthy berries and are bitter to taste.

Management: Good soil drainage and exposure to direct sunlight helps drying of soil and berries. Straw mulch can reduce the contact of berries with soil. Ridomil and phosphorus acid products may be applied as foliar spray. Phosphorus acid products and certain QoI (strobilurin) fungicides are effective as protectants. See [2017 Midwest Fruit Spray Guide](#) for spray timing and products.



Fig. 3. Leather rot on strawberry. Photo from the BioIPM strawberry workbook.



Fig. 4. *Phytophthora* root rot on raspberry. Photo by André Bolay, St. Fédér, Bugwood.org.

Phytophthora Root Rot on raspberry

Caused by many species of *Phytophthora*, this disease affects black, red, and purple raspberries. It is common in heavy soils where drainage is poor.

Symptoms: Yellowing of leaves and wilting observed with sparse plant stands (Fig. 4). Reddish brown discoloration can be observed below the surface of the root/crown.

Management recommendations: Improve soil drainage. Some resistance observed in the cultivars Bristol, Dundee, Jewel, Newburgh, Latham, Boyne, Killarney, and Nordic. Ridomil and phosphorus acid products are effective, but do not substitute for good soil drainage. See [2017 Midwest Fruit Spray Guide](#) for spray timing and products.

Water management in strawberries

By: Amaya Atucha UW-Extension Fruit Crop Specialist

Last week at the Berry Field Day, organized by the Wisconsin Berry Growers Association and hosted at Arnold's strawberries, I presented some information regarding strawberry water needs, critical periods for water stress, as well as soil water monitoring sensors and a brief review of irrigation systems. Therefore, for this article, I decided to present a short summary of the most important points of the presentation:

- Plant establishment and transplant are the most sensitive periods to water stress. During these times, plants are vulnerable to water deficit because their root system is not fully developed.
- Water deficit can reduce yield by reducing the number of flowers produced and the number of flowers that set fruit. Fruit size is also reduced when plants experience water deficit, as is the establishment of daughter plants, the number of runners produced, and next season's crop.



Strawberry patch at Arnold's Strawberry in Rudolph, WI during spring field day organized by WBGA.



Strawberry irrigation system at Arnold's Strawberry.

- Several studies have shown that water deficit can significantly reduce root growth, as well as leaf number and size, and crown development.
- Excess of water can also have detrimental effects to the plants by reducing root growth and promoting root rot, and potentially leaching nutrients out of the root zone. Too much irrigation, especially overhead sprinkles can increase fruit rot.
- In general, is estimated that strawberries need around 1 inch of water daily.
- To determine if irrigation is needed, monitoring soil water content in the top 16 inches of soil (where most of the roots are) using tensiometers, dielectric sensors, or electrical resistant blocks can help define when supplemental irrigation is needed.
- Maintaining soil moisture content over 50% of soil field capacity (which refers to the maximum amount of water that can be held by the soil after the excess water has drained) has been shown to maximize yield.
- Strawberry plants are very sensitive to water-borne pathogens that can produce root rot. That is why furrow and flood irrigation are not recommend for strawberries.
- Drip irrigation has the advantages of saving water, due to its efficiency and more uniform water application. It also can improve disease and weed control, and allows field work to continue while you are irrigating. However, it does not provide frost control, the emitters plug easily, and tube and drip tape can be damaged by rodents.
- Micro-sprinkler irrigation deliver a lower rate of water compared to traditional sprinklers (~40 gallons/hour) and can be used as part of IPM plan to control mites.

Here are links to two very good publication with more information on strawberry water use and irrigation:

<https://blogs.cornell.edu/newfruit/files/2016/12/strwaterreqstress-1fwvdet.pdf>

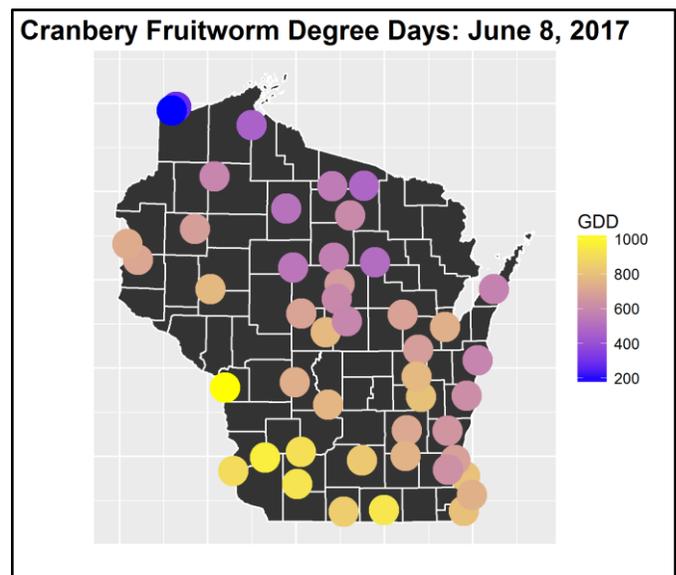
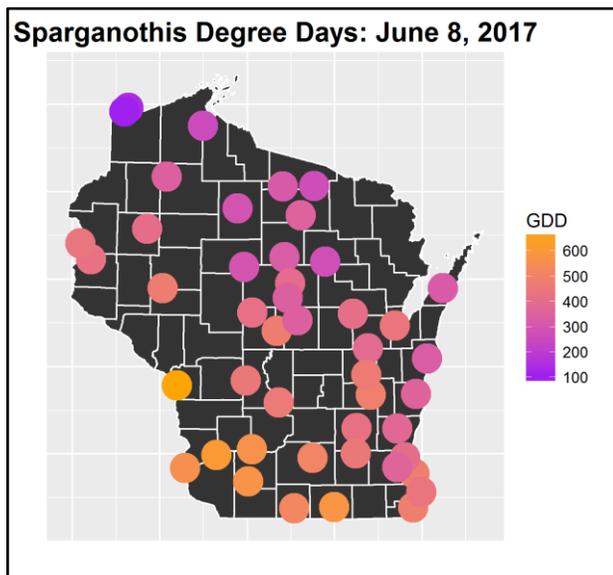
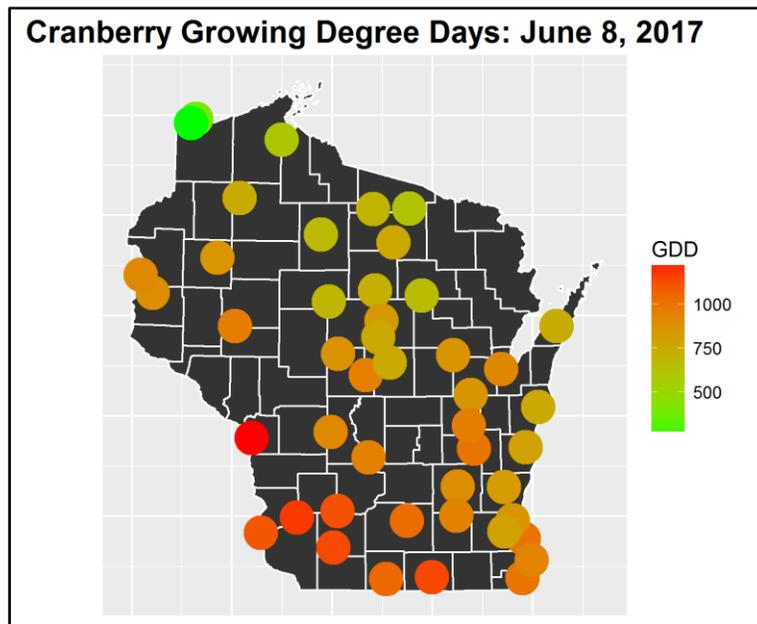
http://extension.usu.edu/files/publications/publication/Horticulture_Fruit_2008_05pr.pdf

Cranberries

Cranberry plant and pest degree-days: June 8, 2017

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

The maps below show how spring is progressing across Wisconsin (and rapidly becoming summer!). Developmental thresholds for each are: cranberry plant - 41 and 85°F; sparganothis fruitworm - 50 and 86°F; and cranberry fruitworm - 44 and 87°F. Interactive maps are posted online. The interactive feature allows you to click on the map locations, prompting a pop-up that names the location and gives exact degree-days. These are available through the Steffan lab website (<http://labs.russell.wisc.edu/steffan/cranberry-growing-degree-days/>). Once on the website, follow the link to the interactive maps.



The table below allows for comparison of degree-days over the last three years.

June 8	Cranberry DDs			Sparg DDs			CFW DDs		
	2015	2016	2017	2015	2016	2017	2015	2016	2017
<i>Northern WI (Minocqua)</i>	820.9	813.2	703	407.9	402.3	323.5	665.4	657.4	556.1
<i>Central WI (Wisconsin Rapids)</i>	1093.3	1047.3	967.1	595.4	562	490.7	910.1	862.1	788.5

We have seen the first CFW moths in traps this week in Wood County, which is earlier than we would have predicted, based on our 2016 observations correlating CFW DDs with CFW flight (last year we observed flight initiation at ~960 CFW DDs). Since this is just the second year of observation, it is premature to assess which year represents the real ‘signal’ versus the ‘noise.’

It won’t be long before Sparganothis flight begins now. The table below shows the predicted life benchmarks and their associated Sparg DDs.

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

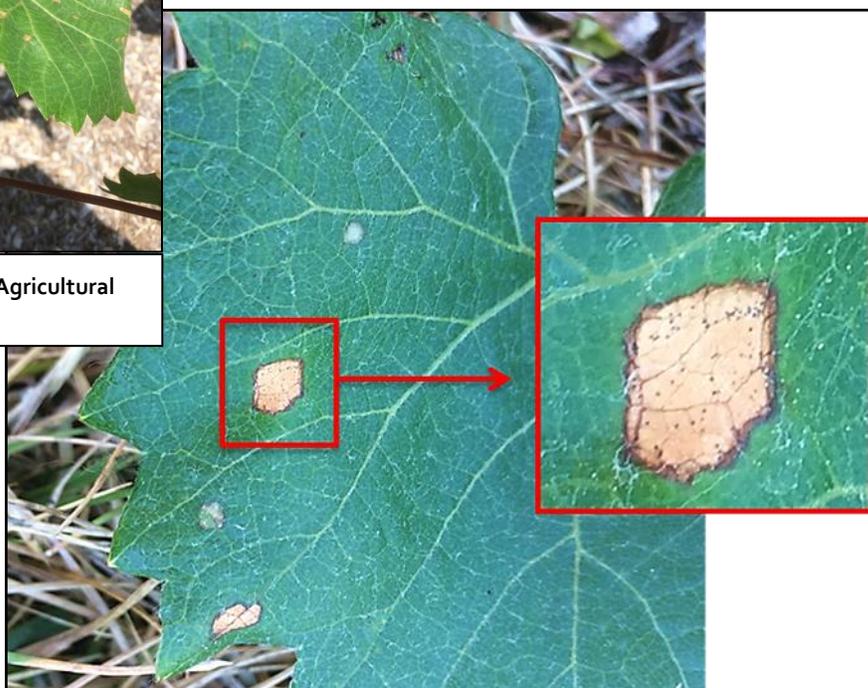
Black rot is here

By: Patty McManus

Despite relatively cool temperatures in mid- to late May, we are now seeing black rot lesions at the West Madison Agricultural Research Station (WMARS). While not rampant, the disease is easy to find on Marquette and Valiant, the two varieties that were affected worst in 2016 at WMARS. As of June 4, I did not see black rot on other varieties in the pathology block (Brianna, Frontenac, Frontenac gris, La Crescent, La Crosse, and St. Croix). This is a sign that as we approach bloom (actually, Valiant was already blooming on June 4), black rot spores are present and likely to infect fruit, during bloom through about the next 4 weeks (the main window for black rot infection of fruit). We are not controlling black rot in the pathology block, because we want to monitor disease on different varieties. However, if this were a commercial vineyard, I would spray fungicides to protect berries from black rot during the peak time of susceptibility—immediately pre-bloom, at bloom, and up to 4 weeks after bloom. For conventional growers, there are several effective fungicides. See the [2017 Midwest Fruit Pest Management Guide](#) for details, and try to choose a fungicide(s) that will also control downy mildew (e.g., Abound, mancozeb, Pristine, others). Note that captan is NOT very effective for black rot control. Organic growers have no great options for black rot management, although copper-based fungicides might provide some protection.



Marquette with black rot lesions, West Madison Agricultural Research Station, June 4, 2017.



Marquette leaf with black rot lesions, West Madison Agricultural Research Station. June 4, 2017. Closer view of lesion marked by the red box shows the characteristic dark margin and pycnidia (fungal fruiting bodies) that develop in mature lesions.

Wine and Table Grape Developmental Stages

By: Janet van Zoeren, Annie Deutsch, Jean Riesterer-Ioper and Amaya Atucha, UW-Extension

At the West Madison Agricultural Research Station (WMARS) inflorescences on the grape plants are open and fully expanded, with some flowers beginning to open. The vines range from stage E-L* developmental number 18 (“14 leaves separated, flower caps still in place but cap color fading from green”) to 23 (“50% of flower caps off (flowering)”) depending on the cultivars. At the Peninsular Agricultural Research Station (PARS), inflorescences are still tight and flowers have not yet begun to develop. The vines at PARS are between E-L* developmental number 11 (“four leaves separated”) to 14 (“seven leaves separated”).

** Eichhorn-Lorenz Phenological stages to describe grapevine development*

Following photos taken on June 5th at West Madison Agricultural Research Station.



Brianna at WMARS; “10%
flower caps off”
E-L number = 20



La Crescent at WMARS; “50%
flower caps off (flowering)”
E-L number = 23



La Crosse at WMARS; “10%
flower caps off” E-L number = 20



Marquette at WMARS; “flower
caps still in place”
E-L number = 18



Frontenac at WMARS; “50%
flower caps off (flowering)”
E-L number = 23



St. Croix at WMARS;
“flower caps still in place”
E-L number = 18



Somerset at WMARS; "flower caps still in place"
E-L number = 18



Einset at WMARS; "inflorescence well developed"
E-L number = 17

Following photos taken on June 7th at the Peninsular Agricultural Research Station.



Brianna at PARS; "five leaves separated"
E-L number = 12



La Crescent at PARS; "four leaves separated"
E-L number = 11



La Crosse at PARS; "four leaves separated"
E-L number = 11



Marquette at PARS; "five leaves separated"
E-L number = 12



Frontenac at PARS; "six leaves separated"
E-L number = 13



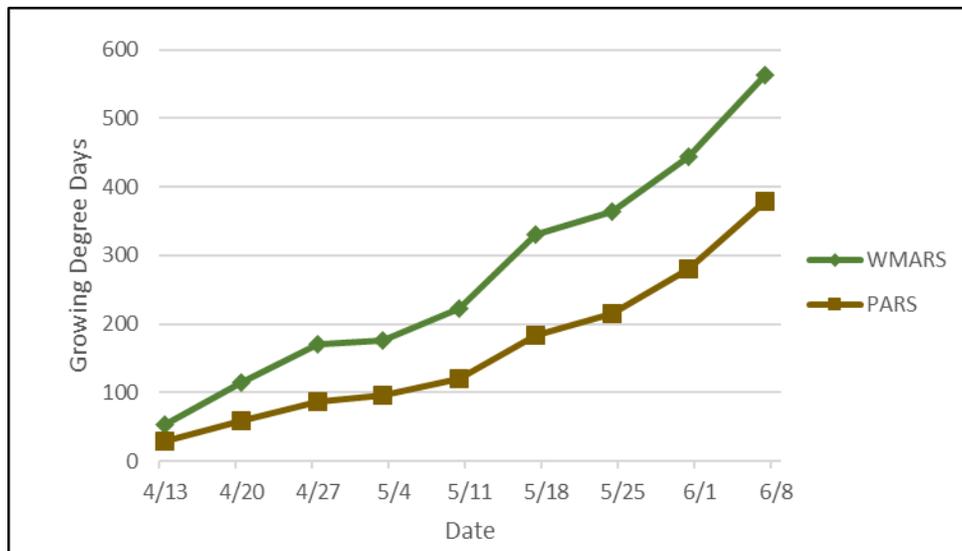
St Croix at PARS; "four leaves separated"
E-L number = 11

Grape Growing Degree Days

April 1 - June 7, 2017

	2107	2016
WMARS	564	612
PARS	379	398

The growing degree-day accumulations as of June 7th for this year are: 564 GDD at WMARS and 379 GDD at PARS. We are still behind the degree-day accumulation from last year, and PARS is still approximately two weeks behind WMARS. Degree-days are calculated using a base of 50°F, starting on April 1st as a biofix.



Grape insect scouting report – leafrollers

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

In the previous issue of this newsletter, we mentioned seeing up to 18% shoots damaged by grape plume moth caterpillars at the West Madison Agricultural Research Station (WMARS). These have all pupated by now and, since there is only one generation per year in Wisconsin, will no longer be found in the vineyard this year. More information about grape plume moth can be found in [issue 5 of the newsletter last year](#).

However, in addition to grape plume moth, there are other species of leaf rollers in Wisconsin vineyards, which continue to feed throughout the summer. These species all pose very little economic threat, aside from occasional localized damage, and can be present at relatively high levels (up to 20% of shoots affected) before an insecticide application is recommended. Although these grape leaf rollers are rarely present at economically damaging levels, it can be helpful to learn to identify them, and to monitor for them and predict their life cycle in your vineyard.

At WMARS in early June, we found a single shoot with two **Grape Epimenis** caterpillars. Grape epimenis leaf-rolls are similar to those of the grape plume moth, but,



Grape epimenis caterpillars inside a rolled up grape leaf at WMARS.

after opening up the leaf, the caterpillars are black and white striped with distinctive red/brown head capsules. Grape epimenis can generally be found at low densities in most Wisconsin vineyards, but does not reach economically concerning levels.



Eight-spotted forester caterpillar.
Photo by: Johnny N. Dell,
Bugwood.org.

The **Eight-spotted forester** caterpillar is related to, and somewhat similar in appearance to, the grape epimenis. However, eight-spotted forester has more distinct coloration, with yellow, white and black stripes. These caterpillars are not leaf-rollers, but feed on and skeletonize the foliage, and may show some leaf webbing as they feed. The first generation appears around bloom and pupates in mid-summer; another generation may feed on grape leaves in the late summer and fall. These show population fluctuations, and in some locations may reach high numbers some years, but are rarely problematic for consecutive years and very rarely require control measures.

The **grape leaf folder** folds the grape leaf so that upper surface of the leaf is enclosed, and feeds on the edges of the leaf within the protected fold. The caterpillar is a light green in color, and each will fold and damage two or more leaves during its development. This insect also has two generations per year, with the second generation causing the most foliar damage.



Adult grape leaf folder moth. Photo by
Mark Dreiling, Bugwood.org.

Another foliar feeder you may see in the vineyard this time of year are **larvae of the grape flea beetle**. These small, dark larvae make uneven holes between the veins of the grape leaves. Similarly to the leaf-roller caterpillars, grape flea beetle larvae rarely cause economically significant damage. However, the adults of this species can be quite damaging to grape buds in the spring, so a large number of flea beetle larvae can indicate a potential problem with the adults the following spring. More information about grape flea beetle adults and control was provided in the [WI Fruit News, volume 2 issue 2](#).

A great resource to learn more about grape foliar feeders is the Ohio State University extension bulletin: [Insect and mite pests of grapes in Ohio](#) by Williams, Roger, Pavuk, Daniel, and Rings, Roy (1986).

Insecticide: Surround

- Available as WP (Wettable Powder)
- Restricted re-entry interval (REI): 4hrs
- Pre-harvest interval (PHI) on all crops: 0 day
- Apply as needed (see label for specific recommendations for different crops and insects)
- For tree fruit, apply 100 to 200 gallons per acre
- Rate of use per acre: 25 to 50 lbs per 100 gallons (see label for more specific info)
- Intervals between applications vary but are around 5-10 days for pome and stone fruits and may be influenced by rainfall.

Reduced risk insecticide: Surround

By: Christelle Guédot, University of Wisconsin, Entomology

Surround is registered for use in Wisconsin on pome fruits, including apple, crabapple, pear, loquat, and quince as well as stone fruits, including apricot, sweet and tart cherry, nectarine, peach, plum, pluot, plumcot, and prune. It was first registered around 1999, and you may already have some experience with it. Surround WP is OMRI approved and can be applied in organic as well as conventional production systems. It is marketed by NovaSource under the formulation 95WP (95% of active ingredient as a Wettable Powder). The active ingredient in Surround is kaolin clay which forms a mineral-based particle film that protects agricultural crops from heat stress, sunburn, insects, and diseases, and enhances plant growth. Surround acts as an insecticide by irritating insects, deterring them from egg-laying or feeding on the crop surfaces, and by visually making the host plant less attractive by coating it with a ghostly white film. For information on heat stress, sunburn, plant growth and disease management, refer to the label.

Surround is registered for control of *Lacanobia*, apple maggot, apple sucker, climbing cutworm, eastern tent caterpillar, European apple sawfly, Gypsy moth, Japanese beetle, June beetle, green fruitworm, leafrollers, Lygus bug, Mormon cricket, periodical cicada, stink bug, tarnished plant bug, rose chafer, and thrips. Codling moth (first generation only), oriental fruit moth, cherry fruit flies, oriental fruit moth, and plum curculio are listed for suppression only. See specific recommendations for some pests, such as codling moth, plum curculio, apple maggot and others.

Key consideration for the effectiveness of Surround is thorough, uniform, and consistent coverage, which is essential throughout the infestation. Optimal coverage with airblast sprayers is achieved at a tractor speed of less than 3 mph.

The label cautions that Surround keeps plant surfaces cooler and may delay maturity in pome and stone fruits by 3 to 7 days, especially in cool regions. To reduce white residue at harvest on smooth skin crops, such as apples, stop spraying when the fruit is at about ¼ of its expected size.

Surround may be applied by ground equipment with air blast, handgun or boom sprayer, by air and may NOT be applied by chemigation (see label for specific application regulations). Aerial applications may reduce heat stress and sunburn damage but are not effective for controlling insects and disease.

Surround is nontoxic to bees and the risk to avian or aquatic organisms is considered minimal to nonexistent.

As always, make sure to read and follow the label before using any pesticide. You can find the label of Surround WP by clicking [here](https://s3-us-west-1.amazonaws.com/www.agrian.com/pdfs/Surround_WP_Crop_Protectant_Label2t.pdf) or by copying this address in your browser: https://s3-us-west-1.amazonaws.com/www.agrian.com/pdfs/Surround_WP_Crop_Protectant_Label2t.pdf.

Focus on apple aphids

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

Woolly apple aphids have begun to appear in Wisconsin's orchards, and now is a good time to remind yourself of the different species of aphid that can be found in our apple orchards. There are five species of aphid that are most often seen on apples in Wisconsin. The **Rosy Apple Aphid**, *Dysaphis plantaginea* and **Woolly Apple Aphid**, *Eriosoma lanigerum* were both discussed last year in the [WI Fruit News, Season 1 Issue 8](#). Rosy apple aphids are most prevalent from tight cluster to pre-pink, and feed on both leaves and the developing flower buds. They may still be present in your orchard, and you can scout for them by looking for curled leaves, then looking on the underside of the leaves for the pinkish-red aphids. Woolly apple aphids become increasingly prevalent as the season goes along, and feed on leaf axils and terminal shoots. A chart comparing how to identify, monitor for, and control these two species is provided in the table below.



Rosy apple aphids on the underside of a leaf.



Curled leaf characteristic of aphid damage. Ants or ladybeetles are also often seen on aphid leaf curls.

The other species of aphid you may see in apple orchards this summer are unlikely to cause significant damage to the trees. The **Green Apple Aphid**, *Aphis pomi*, and the **Spirea Apple Aphid**, *Aphis spiraecola*, are indistinguishable from each other in the field. While rosy apple aphids are a pink-red color, these other species are yellowish-green. All three species feed on the underside of leaves, and cause leaf curling similarly to the rosy apple aphid. To scout for green and Spirea apple aphids, randomly select 10 shoots (not watersprouts) on each of five trees per block to examine for curled leaves (check to see if leaf curling is caused by these or rosy apple aphid, as the economic threshold for rosy apple aphid is much lower). If, on average, more than four leaves per shoot have aphids, a chemical spray may be warranted.

Another apple aphid, the **Apple Grain Aphid**, *Rhopalosiphum fitchii*, appears earlier in the spring than our other aphids, but rarely causes economically significant damage in Wisconsin orchards. Apple grain aphids can be distinguished from other species because their antennae are much shorter than their body-length, and they have a dark stripe running down their back.



Green apple aphids. Photo by: Kansas Department of Agriculture, Bugwood.org.

For all species of aphids, there are a number of predators and parasitoids present in Wisconsin orchards, which are able to do a pretty good job of keeping their populations under check. However, some broad-spectrum insecticides, in particular pyrethroids, have been shown to reduce populations of these natural enemies, and so may cause an upsurge in aphid numbers. It is recommended to avoid unnecessary broad-spectrum insecticide applications for this reason. If an insecticide spray is required for aphid control, you can refer to the [2017 Midwest Fruit Pest Management Guide](#) for recommendations.

Comparing Rosy vs. Wooly Apple Aphids

	Rosy Apple Aphid	Wooly Apple Aphid																														
How to Identify:	<p>1/50th – 1/10th inch long, reddish-pink with abdominal cornicles and antennae more than ½ as long as body.</p> 	<p>1/16th -1/20th inch long, generally covered in woolly waxy covering, no cornicles and antennae less than ½ as long as body.</p> 																														
Damage Symptoms:	<ul style="list-style-type: none"> • Leaf curling • Misshapen fruit • Stunted fruit development • Sooty and other fungal growth 	<ul style="list-style-type: none"> • Nodules/cankers on roots and woody parts of the tree • Yellowing leaves • Sooty and other fungal growth 																														
Timing of Damage:	Tight-cluster through pre-pink, less common in late summer	Throughout summer																														
Monitoring:	Monitor for eggs during the dormant period. Monitor for curled up leaves during spring.	Monitor for nymph and adult aphids throughout the summer.																														
Cultural Control:	<ul style="list-style-type: none"> • Eliminate plantain and dock • Avoid Cortland, Ida Red, Golden Delicious, Rome, York and Stayman • Keep trees pruned 	<ul style="list-style-type: none"> • Plant MM 106, MM 111, G11, G41, G213, G214, G222, G202, G969, G210, or G890 rootstocks, and/or Northern Spy cultivar • Keep trees pruned 																														
Biological Control:	Lady beetles, lacewings, syrphid_fly larvae, and Braconid wasps	<i>Aphelinus mali</i> wasps, lady beetles, lacewings, and syrphid fly larvae																														
Chemical Control:	<p>Spray during dormant period OR during tight-cluster to pre-pink.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #4F81BD; color: white;">Product</th> <th style="background-color: #4F81BD; color: white;">Mode of Action</th> </tr> </thead> <tbody> <tr><td>Superior Oil</td><td>Mineral Oil</td></tr> <tr><td>Lorsban</td><td>Chlorpyrifos (1B)</td></tr> <tr><td>Assail</td><td>Acetamiprid (4A, RR)</td></tr> <tr><td>Actara</td><td>Thiamethoxam (4A)</td></tr> <tr><td>Calypso</td><td>Thiacloprid (4A)</td></tr> <tr><td>Closer</td><td>Sulfoxaflor (4C)</td></tr> <tr><td>Sivanto</td><td>Flupyradifurone (4D,</td></tr> <tr><td>Abamectin</td><td>Abamectin (6)</td></tr> <tr><td>Exirel</td><td>Cyantraniliprole (28, RR)</td></tr> </tbody> </table>	Product	Mode of Action	Superior Oil	Mineral Oil	Lorsban	Chlorpyrifos (1B)	Assail	Acetamiprid (4A, RR)	Actara	Thiamethoxam (4A)	Calypso	Thiacloprid (4A)	Closer	Sulfoxaflor (4C)	Sivanto	Flupyradifurone (4D,	Abamectin	Abamectin (6)	Exirel	Cyantraniliprole (28, RR)	<p>Spray during pink to petal-fall. Adding a horticultural oil to the spray can help penetrate the aphids' "wooly" wax covering.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #4F81BD; color: white;">Product</th> <th style="background-color: #4F81BD; color: white;">Mode of Action (IRAC)</th> </tr> </thead> <tbody> <tr><td>Diazinon</td><td>Diazinon (1B)</td></tr> <tr><td>Lorsban</td><td>Chlorpyrifos (1B)</td></tr> <tr><td>Closer</td><td>Sulfoxaflor (4C)</td></tr> <tr><td>Movento</td><td>Spirotetramat (23, RR)</td></tr> </tbody> </table>	Product	Mode of Action (IRAC)	Diazinon	Diazinon (1B)	Lorsban	Chlorpyrifos (1B)	Closer	Sulfoxaflor (4C)	Movento	Spirotetramat (23, RR)
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IRAC Code = Insecticide Resistance Action Committee Mode of Action group **RR** = reduced risk

Rescue me!!! Late thinning options for apples

By: Amaya Atucha UW-Extension Fruit Specialist

We are approaching the last window to adjust apple trees fruit load through chemical thinning in apples. Once the fruit reaches the stage of 18-20 mm diameter it is very difficult to thin them, and products like NAA (Fruitone L, PoMaxa) and 6BA (MaxCel, RiteWay) are not very effective. By the time fruit has reached 22 mm, none of these products will work.

There are two products that can still work: carbaryl and ethephon. Dr. James Schupp from Penn State recommends an application of carbaryl at 1 pint to 1 quart per 100 gallons of water, if only a mild thinning is needed to adjust the final crop load of the trees. However, if a more aggressive thinning is needed, then the best option at this stage would be using ethephon (Ethrel). This treatment can be risky; it can potentially remove the entire crop, so special consideration needs to be taken into account when applying this product. Here are some recommendations from Dr. Wes Autio and Dr. Win Cowgill from Rutgers University regarding the use of ethephon as a rescue thinning treatments:

- Temperature is very important during the day of application and the two following days, and ideally temperature in the 70s are recommended. Higher temperatures will result in over thinning.
- Fruit will be receptive to this treatment when they are between 15 to 25 mm.
- A tank mix with half-pound of Sevin (carbaryl) and a surfactant is recommended.
- The concentration of the application will depend on the variety, here's a table with recommendations:

Variety	Concentration ethephon (Ethrel) per 100 gallons of spray
Spur-type Delicious and Fuji	1.0 to 1.5 pint
Golden Delicious, Rome Beauty (very sensitive varieties)	0.4 pint
Gala, Cameo and GoldRush	0.75 pint
Jonagold	0.5 to 0.75 pint



Calendar of Events

July 11-13, 2017 – [Wisconsin Farm Technology Days](#)

Ebert Enterprises, E5083 Co Rd K, Algoma, WI

July 18, 2017 – WAGA Summer Apple Field Days

Green's Pleasant Springs Orchard, 2722 Williams Dr, Stoughton, WI

Aug 3, 2017 – [PARS Vineyard Walk](#)

Peninsular Agricultural Research Station, 4312 Hwy 42 North, Sturgeon Bay, WI

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: <https://pddc.wisc.edu/>

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

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

Edited by: Christelle Guédot, Entomology Specialist, UW-Madison and Amaya Atucha, Horticulture Specialist, UW-Madison. *Formatting by:* Janet van Zoeren, Fruit Crops Extension Intern, UW-Extension. Articles provided by other sources as attributed. Funding provided by the University of Wisconsin-Extension. *Email Questions to:* vanzoeren@wisc.edu.

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If you have any questions or comments about the Wisconsin Fruit News issues, please contact Janet van Zoeren: vanzoeren@wisc.edu.