Wisconsin Fruit News

Volume 1 Issue 13 – September 30, 2016

In This Issue:

Wrapping things up for the summer of 2016

By: Janet van Zoeren, Christelle Guédot, and Amaya Atucha

This is the last regular issue of the Wisconsin Fruit News for 2016; however, we will still produce a couple of special issues this fall, to summarize some of the research and extension we've been doing this season. In October and November, we will send out two special supplemental issues: one summarizing the work that we've been doing with cold climate grapes all summer, and another summarizing the work done in the Guédot lab on invasive insect pests, including spotted wing drosophila and brown marmorated stink bug.

Additionally, this fall we will be sending out a survey to assess the impact of the Wisconsin Fruit News and the UW Fruit website. We will send out an email with the survey in the next few weeks, and we would greatly appreciate if you would take about 5 minutes of your time to give us feedback on the newsletter and the website to help us improve them and tailor them to your needs.

Finally, we would like to thank everyone who has contributed to the newsletter, and thank you all for reading it! We look forward to a nice long winter break, and then to starting up again next spring. Happy harvest!

Events this Week

October 13, 2016 – Great Lakes Apple Crunch

Everyone can help celebrate National Farm to School Month by crunching into locally and regionally grown apples at NOON on Thursday, October 13.

To join in, you can visit the CIAS Apple Crunch website or the Apple Crunch Facebook page to get updates and share "Crunch" photos.

General Information

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 Sept 3, 2016 through Sept 23, 2016.

PLANT	DISEASE/ DISORDER	PATHOGEN	COUNTY
Apple (unspecified)	*Apple Scab*	*Venturia inaequalis*	*Portage*
	Bitter Pit	*None*	*Jefferson*
	Bitter Rot	*Colletotrichum gloeosporioides*	*Langlade, Fond du Lac*
	Black Rot (Canker)	*Sphaeropsis sp.*	*Lafayette*
	Elsinoe Fruit Spot	*Sphaceloma pirinum*	*Clark*
	Flyspeck	*Schizothyrium pomi*	*Green, Langlade*
	Phomopsis Fruit Rot	*Phomopsis sp.*	*Langlade*
	Phytophthora Root Rot	*Phytophthora sp.*	*Outagamie*
	Sooty Blotch	*Miscellaneous sooty blotch fungi*	*Green, Langlade*
Apple ('Gala')	*Necrotic Leaf Blotch*	*None*	*Outagamie*
Apple ('Honeycrisp')	*Honeycrisp Leaf Necrosis*	*None*	*Outagamie*
Cherry	*Cherry Leaf Spot*	*Blumeriella jaapii*	*Racine*
Grape	*Phomopsis Fruit Rot*	*Phomopsis viticola*	*Marinette*
Raspberry	*Spur Blight*	*Didymella applanata*	*Marathon*
Strawberry	*Root/Crown Rot*	*Phytophthora sp., Pythium sp., Fusarium sp.*	*Dane*

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

UW-Madison/Extension Insect Diagnostic Lab update

By: PJ Liesch

The following insects were reported to the Insect Diagnostic Lab (IDL) as being active in the state between Sept 15th and Sept 30th, and have the potential to impact fruit production in the region. If you would like more information about the UW Insect Diagnostic Lab, you can visit our website.

Fruit insect cases coming in to the UW Insect Diagnostic Lab over the last two weeks have consisted almost exclusively of three main types of situations:

-Active **spotted wing drosophila** damage in caneberries. With the relatively warm temperatures, reports of SWD continued to come into the UW Insect Diagnostic Lab over the past few weeks. Similar to the past few years, SWD seems to be active across much of the state.

-**Damage noted near time of harvest**. The majority of fruit insect cases in September have been related to damage noted on apples and other tree fruits at or just prior to the time of harvest; most of these cases have come in from homeowners. Damage from the most common tree fruit insects (plum curculio, apple maggot and codling moth) has been common in these samples. This damage occurred much earlier in the season and had likely been overlooked until now.

-Reports of secondary pests, such as **Asian lady beetles, picnic beetles, yellowjackets, ants, and other insects** have also been very common over the last two weeks. These insects scavenge on readily-available carbohydrates from compromised fruit.

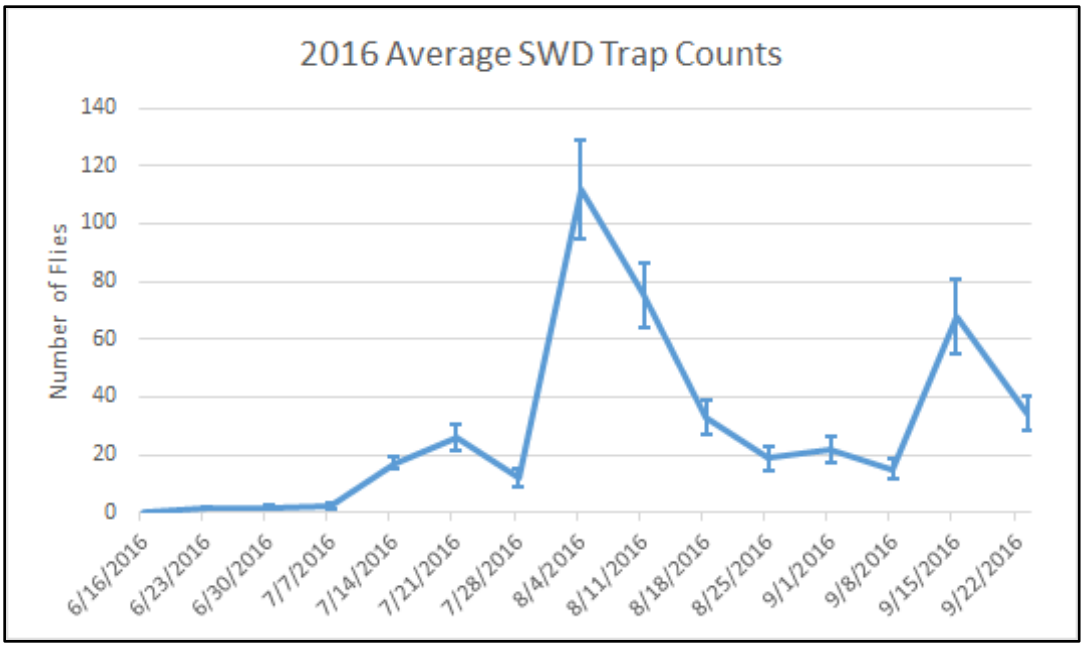
Adult male spotted wing drosophila on a raspberry. Photo by Janet van Zoeren.

Spotted Wing Drosophila: 2016 Monitoring Update

By: Daniel Hughes, Janet van Zoeren, and Christelle Guédot

Spotted-wing drosophila (SWD) continues to infest our state's late summer crops, especially raspberries and occasionally grapes. Its uniquely serrated egg laying ovipositor allows it to lay eggs in ripe fruit rather than the rotting, fallen fruit usually associated with drosophilid flies. In addition to damage caused by SWD larvae in the fruit, SWD oviposition can lead to secondary infections by fungi and other insects. The most at-risk fruits in our state have traditionally been raspberries and grapes: they ripen at the time of year when the temperature is just right for the fly's development, and indeed some raspberry growers in the Dane County area are reporting about half their crop rotting prematurely. This fruit-damaging potential makes monitoring a priority for Wisconsin growers.

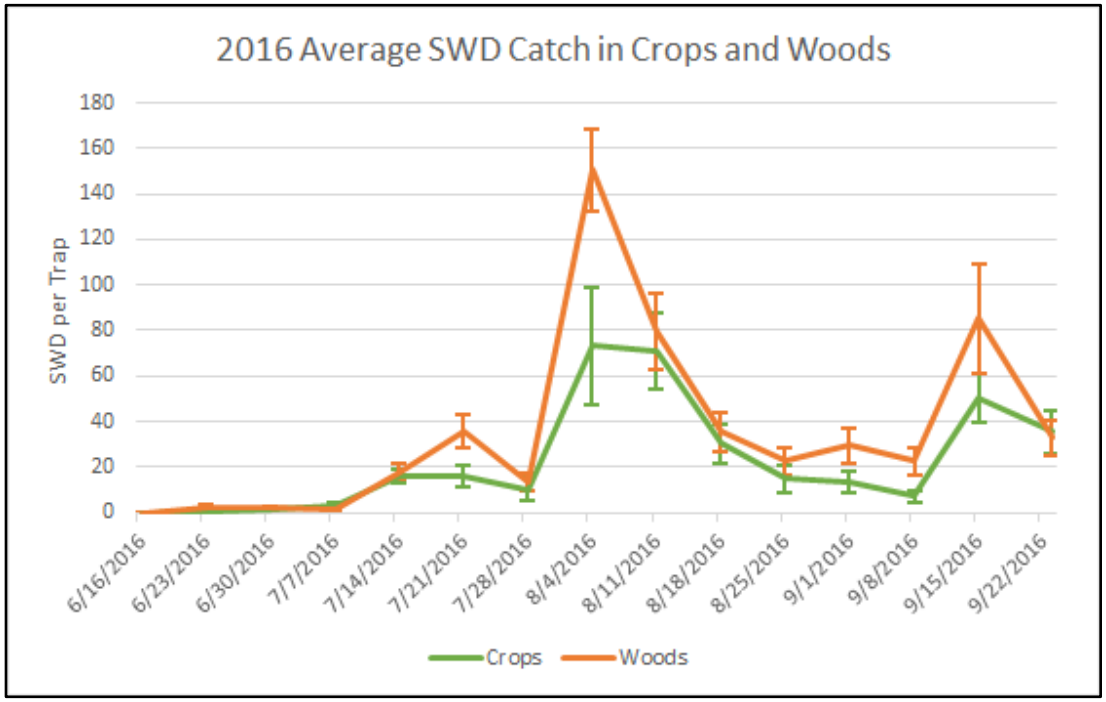
This is the fourth year we have monitored spotted-wing drosophila populations, paying special attention to when SWD is first seen in the area, when populations peak, and when populations die out. Below is a chart showing the phenology of SWD in 2016, since we started setting out traps at the start of June in raspberry and woodlands.



In 2015, our first detection in Dane county took place on July 8th, whereas in 2016, SWD were appearing in our traps as early as June 23rd, more than two weeks earlier than 2015. This applies to the timing of the peak population as well: last year the population was highest around August 12th, but this year the peak was around August 4th, over a week earlier. As with last year, there was a lull in the population before a second peak at the middle of August. Noteworthy for 2016, the first SWD detected in Wisconsin this year was on June 11th in Door county, more than 3 weeks earlier there than 2015!

Why are we seeing such differences from one year to the next? The answer to the first part of this question is likely due to warmer temperatures. As you know, plants and insects develop faster in warmer temperatures as they accumulate degree days. It is thus not surprising that SWD would follow this rule. As far as densities this year, the populations seemed lower than last year; however, we monitored using some of the commercially available lures as opposed to the yeast and sugar baits in previous years. Yeast and sugar baits consistently catch more SWD than the commercial lures so we can't draw the conclusion that populations were lower this year than last.

This year, we examined the relative abundance of flies in cultivated and uncultivated landscapes. To survey this, we placed two traps at each of our farms: one in the raspberry fields and one in the nearest adjacent woodlands. Our results are below:



As you probably already know, SWD is not dependent on cultivated crops to lay eggs. The important thing to note about SWD, and what makes it such a significant pest, is that it is a *generalist*, readily feeding and laying its eggs in many different kinds of fruit, from blueberries to peaches. This means they can thrive in the woods by feeding on alternate wild hosts, and due to the fly's lack of pickiness this includes resources such as dogwoods, buckthorn, and honeysuckle. You can check out this list of hosts identified for SWD to date from across the world. Since many Wisconsin farms have forests nearby, the woods often act as a source and refuge for SWD even if crops are regularly being treated with insecticides.

Because SWD is such a generalist feeder, the susceptible crops affected in Wisconsin are tied more to the phenology of the crops and of SWD than by the attractiveness of the fruit itself. This year, for the first time in Wisconsin, we recorded SWD emerging from picked ripe strawberries in late June. For most growers this was not a problem, as the strawberries were past harvest, but if trends in temperatures continue, monitoring SWD in strawberries may be important in 2017. Cherry growers have also noticed increased rates of infestation and had to implement management strategies against SWD due to the overlap between the tart cherry ripening and harvest and SWD population peaks.

The ultimate goal of our research is to help contribute to a comprehensive integrated pest management (IPM) program that applies to Wisconsin. With a species that feeds on so many different kinds of fruits and varies in its phenology yearly, more research needs to be done to fully understand how to manage this fly. Even the process by which SWD survives Wisconsin's cold winters is as of now poorly understood. Though the population has begun to decline for this year, we continue to monitor the populations in Dane county. Please visit our website at http://labs.russell.wisc.edu/swd/ to find out how you can submit samples if you need to confirm whether you have SWD flies.

Happy Fall!

Spotted Wing Drosophila Survey for Wisconsin Berry Growers

By: Christelle Guédot

Please fill out the following survey for Wisconsin DATCP, to help us understand how SWD is affecting berry production in the state. For your convenience, you can fill this out anonymously online, or you can print these pages, fill them out, and mail the completed survey to us at: Russell Labs room 546, 1630 Linden Drive, Madison WI 53706. Thank you for your time!

1. Are you?
   - o A commercial grower
   - o A homeowner

2. What type of berry(ies) do you grow?
   - o Fall raspberry
   - o Summer raspberry
   - o Strawberry
   - o Blueberry
   - o Blackberry
   - o Aronia
   - o Currant
   - o Grape
   - o Other, please specify:

3. How do you market your crop?
   - o Pick your own
   - o Retail
   - o Wholesale

4. Can you identify SWD?
   - o Yes, males and females
   - o Yes, males only
   - o No, neither males nor females

5. Did you monitor for SWD during the 2016 season?
   - o Yes
   - o No

6. Does SWD have the potential to overwinter in Wisconsin by changing to a more cold-tolerant winter morph?
   - o Yes
   - o No
   - o I don't know

7. Do you think you have a good understanding of the seasonal population patterns of SWD?
   - o Yes
   - o No
   - o Don't know

8. Did you detect SWD in 2016 in your berries?
   - o Yes, I found adults in trap
   - o Yes, I found larvae in fruit
   - o Yes, I found both adults in trap AND larvae in fruit
   - o No, I monitored but did not detect any SWD
   - o N/A, I did not monitor for SWD

9. What sources do you rely on for information about monitoring and managing SWD (check all that apply)?
   - o UW SWD website http://labs.russell.wisc.edu/swd/
   - o Another fruit grower
   - o County Extension Agent
   - o UW Wisconsin Fruit News
   - o Presentation at a grower meeting
   - o Newspaper articles
   - o Another state's extension website
   - o Another website
   - o DATCP pest bulletin
   - o Other pest bulletin
   - o Other _____
   - o N/A

10. Did you manage for SWD in your berries in 2016?
    - o Yes, I found SWD and applied management strategies against SWD
    - o No, I found SWD, but didn't apply any management strategies against SWD
    - o Yes, I didn't find SWD, but I applied management strategies as a preventative measure
    - o No, I didn't find SWD and didn't apply management strategies

11. How did you manage for SWD in your berries in 2016 (check all that apply)?
    - o Sanitation – picked off damaged and/or fallen berries
    - o Screen exclusion or floating row cover
    - o Picking berries early
    - o Cooling fruit after harvest
    - o Applied insecticide
    - o Trapping out flies
    - o Other _____
    - o No management

12. How many times did you apply insecticides to your berries to control SWD in 2016?
    - o 0
    - o 1
    - o 2
    - o 3
    - o 4
    - o 5
    - o >5

13. What would you estimate as your percent loss of crop due to SWD in 2016?

    _____

14. How concerned are you about SWD in your berries?
    - o Not at all concerned
    - o Slightly concerned
    - o Moderately concerned
    - o Very concerned
    - o Additional comments _____

15. Are you considering an increase, decrease or maintaining your current berry plantings?
    - o Increase
    - o Decrease
    - o Stay the same
    - o Varies between crops, specify: _____

Thank you for your participation in this survey!

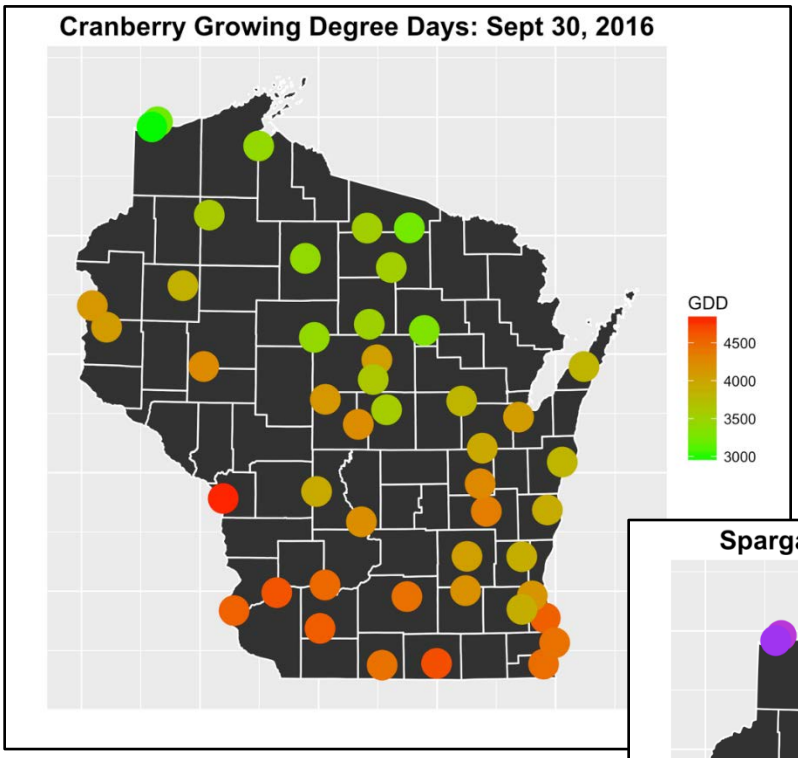
Cranberries

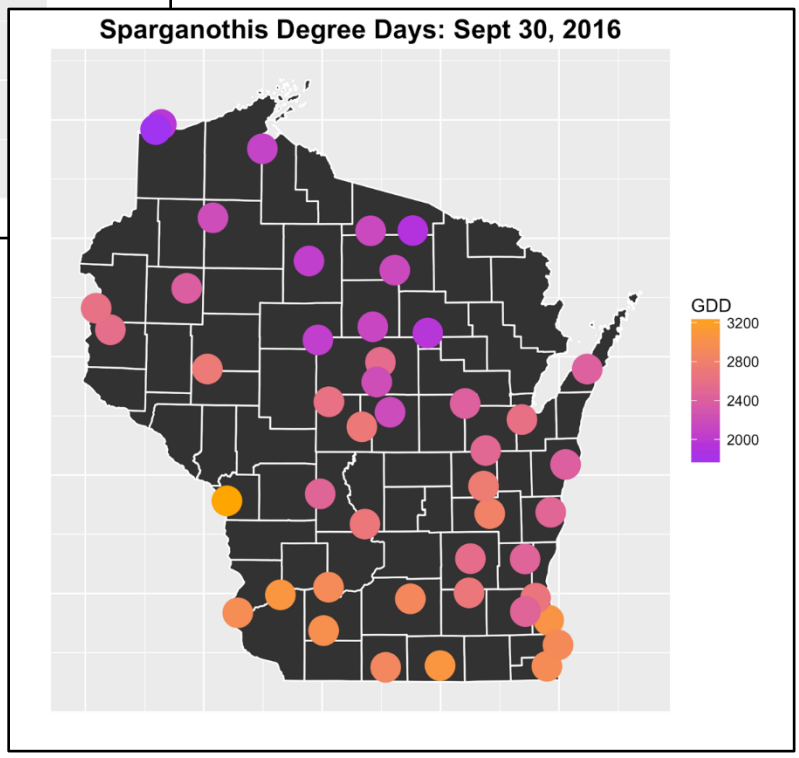
Cranberry Degree-Day Map and Update: as of September 30, 2016

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

Here we are, after the first week of fall, and the last of the cranberry degree-day updates for 2016. I hope everyone has had a good growing season.

The maps below show degree-day accumulations for cranberry plants and Sparganothis fruitworm across Wisconsin up through September 30, 2016. Temperature thresholds used for these calculations are 41 and 85 °F for the plant, and 50 and 86 °F for Sparganothis.





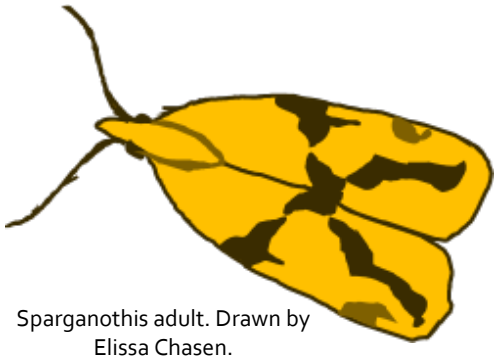
Plant DDs throughout WI range from 2,977-4,872. The central WI growing region has accumulated near 4,200 DDs, while the northern WI growing region has accumulated around 3,500 DDs.

Throughout WI, Sparganothis degree-days range from 1,743-3,278 DD.

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

Sept 30	Cranberry Growing Degree Days			Sparganothis Degree Days		
	2014	2015	2016	2014	2015	2016
Central WI (Wisconsin Rapids)	3,770	4,183	4,210	2,380	2,674	2,711
Northern WI (Minocqua)	3,242	3,474	3,538	1,955	2,079	2,143

Deutsch, A. E., C. R. Rodriguez-Saona, V. Kyryczenko-Roth, J. Sojka, J. E. Zalapa, and S. A. Steffan. 2014. Degree-Day Benchmarks for *Sparganothis sulfureana* Development in Cranberries. Journal of Economic Entomology 107 (6): 2130-2136.



Sparganothis adult. Drawn by Elissa Chasen.

If you would like to read more articles and find more information specific to cranberry production in Wisconsin, be sure to read the most recent Cranberry Crop Management Journal, also published by the University of Wisconsin-Extension. In the September 9th, 2016 issue of the Cranberry Crop Management Journal you will find information about: atmospheric nitrogen fixation update, flea beetle management, building next year's reserves, observations from the field, and grower updates.

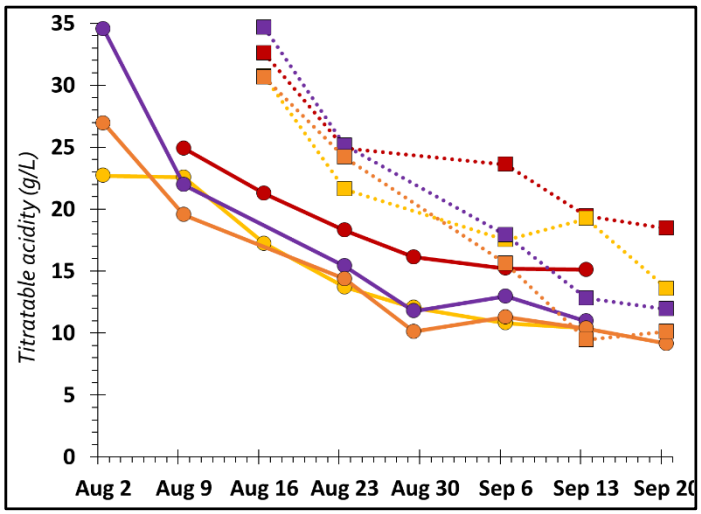
Wine and Table Grape Developmental Stages

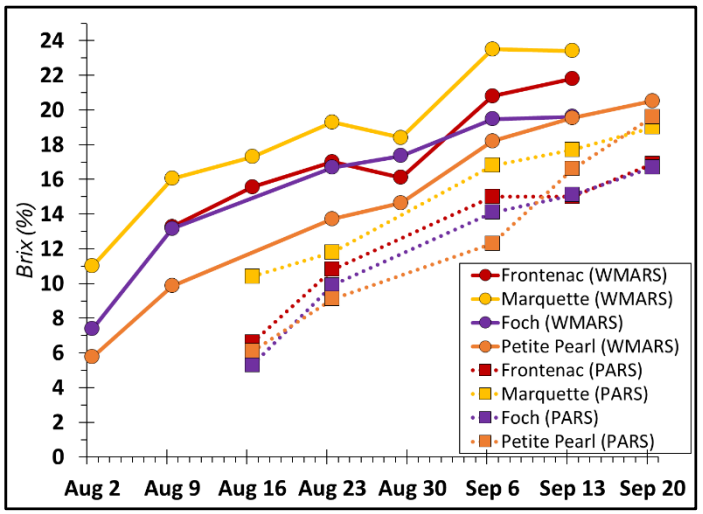
By: Janet van Zoeren, Annie Deutsch, Madeline Wimmer, and Amaya Atucha – UW-Extension

Grapes at the West Madison Agricultural Research Station (WMARS) have all been harvested, while at the Peninsular Agricultural Research Station (PARS) grapes are nearing harvest as well. Sugar (Brix) and TA (titratable acidity) concentrations from both WMARS and PARS are shown in the chart and graphs below. WMARS brix and TA concentrations represent the levels at time of harvest.

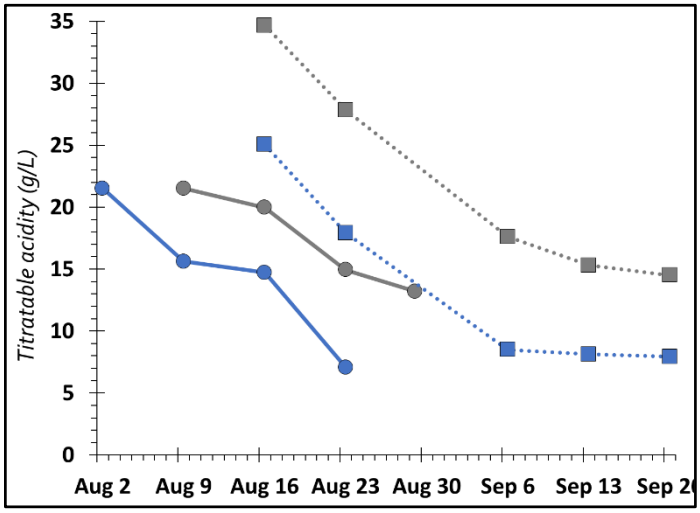
Sept 28, 2016 **Grape Brix and Titratable Acidity (TA)**

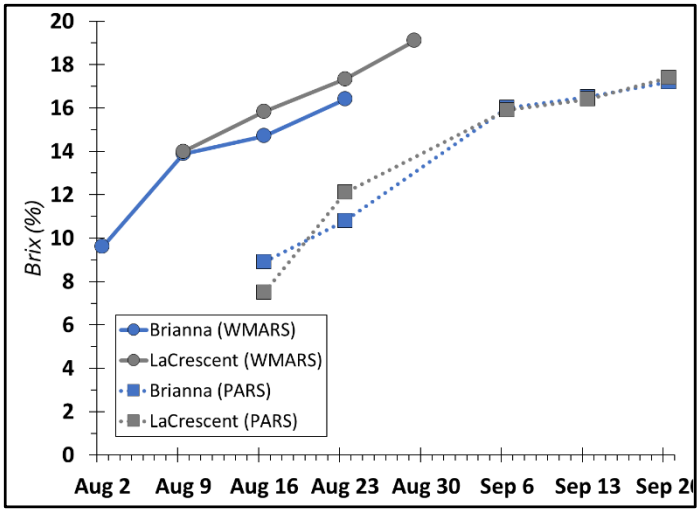
	WMARS		PARS	
Grape Variety (Reds)	**Brix (%)**	**TA (g/L)**	**Brix (%)**	**TA (g/L)**
Frontenac	Harvested at: 21.8	Harvested at: 15.1	16.9	18.4
Marquette	Harvested at: 23.4	Harvested at: 10.4	19.0	13.6
Foch	Harvested at: 19.6	Harvested at: 10.9	16.7	11.9
Petite Pearl	Harvested at: 20.5	Harvested at: 9.1	19.6	10.1
Grape Variety (Whites)				
	Brix (%)	**TA (g/L)**	**Brix (%)**	**TA (g/L)**
Brianna	Harvested at: 16.4	Harvested at: 7.1	17.2	7.92
La Crescent	Harvested at: 19.1	Harvested at: 13.2	17.4	14.5





Titratable acidity (above left) and Brix (above right) of red wine grape varieties as WMARS (solid lines) and PARS (dotted lines).





Titratable acidity (above left) and Brix (above right) of white wine grape varieties as WMARS (solid lines) and PARS (dotted lines).

Following photos taken on September 29th at the Peninsular Agricultural Research Station.

Brianna at PARS

La Crescent at PARS

La Crosse at PARS

Marquette at PARS

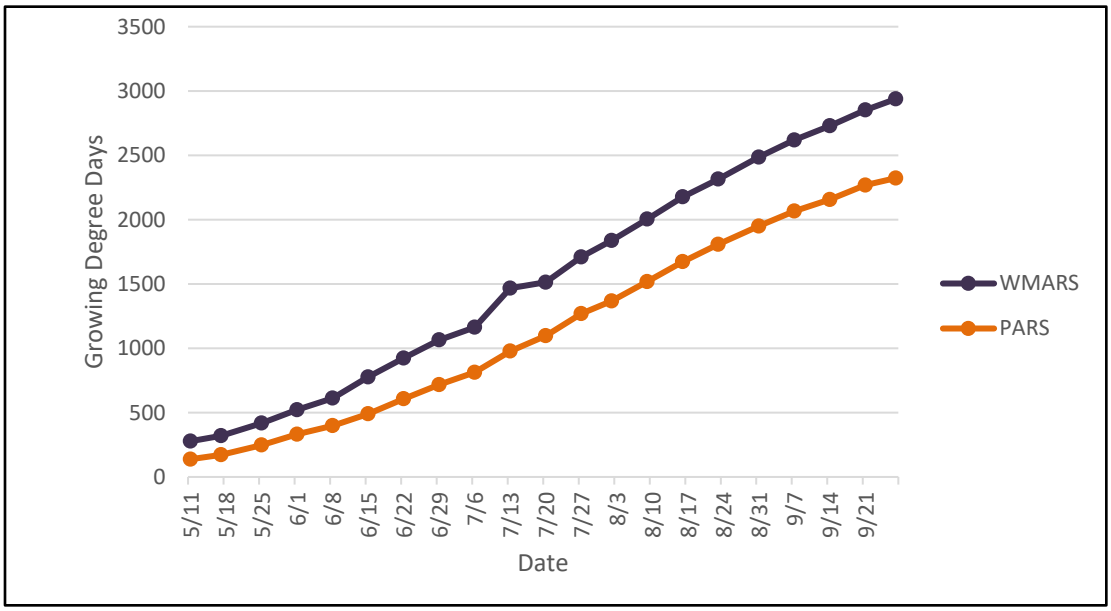
Frontenac at PARS

The growing degree day accumulations as of September 27th for this year are: 2,938 GDD at WMARS and 2,323 GDD at PARS. We have accumulated more degree days this summer than at the same time last summer. All growing degree days are calculated using a base of 50°F.

Grape Growing Degree Days

April 1 - Sept 27, 2016

	2106	2015
WMARS	2938	2827
PARS	2323	2139



It's Never Too Late to Think about Scab

By: Patty McManus

Many apple growers are rightfully obsessed with scab that shows up during spring and early summer. Mistakes made early in the season can lead to an unmarketable crop. Leaves are most susceptible to scab during their first 2-3 weeks, but after that, they are practically resistant to new infections. Fruit are most susceptible up to 3 weeks past petal fall and then become less susceptible. The heat of summer, especially in a dry year (which most of Wisconsin did not have in 2016), slows down the scab fungus. However, as leaves age in late August through October, they once again become susceptible to scab. If mild, wet weather prevails during late summer and early fall (as is happening this year in many parts of the state), scab symptoms on leaves, especially the bottom sides, can build up. Late-season scab shows up as dull, rusty-brown patches with indistinct margins on the bottom sides of leaves, which is very different from the olive-colored fuzzy lesions seen in early season. Sometimes the fungus grows along veins, making them look brown or black. Sometimes the lesions grow together giving the lower leaf surface a brown to black stained appearance.

Late-season apple scab can develop on leaves that appeared healthy all season long and still appear healthy when upper-sides are viewed. However, on the undersides of leaves, scab appears as diffuse spots that can be distinct (upper part of photo) or coalesced (lower part of photo). Photo by P. McManus.

Cooler weather, decreasing fungicide residues, and increasing susceptibility of aging leaves contribute to the late-season resurgence of scab. How much of this late season scab is the result of new infections versus resurrection of early-season infections is not known. But there is evidence in favor of the latter option. Spring sprays of sterol inhibitor (SI) (e.g., Rally) and strobilurin (e.g., Flint, Sovran) fungicides slow down the scab fungus but don't kill it completely. This is especially true where one or more of the following applies:

1. The SI fungicides have been used for several years, and the scab fungus population is becoming more resistant.
2. Low rates of SI fungicide were applied.
3. Strobilurins or SI fungicides were used in "kickback" or post-infection mode more than two days after the start of an infection period.
4. SI fungicides were not tank-mixed with a protectant (e.g., captan, mancozeb).

It's important to monitor leaf scab in the fall, as these leaves will be the source of next year's scab (see below). If you have scabby fruit and leaves this year, then obviously you'll need to be diligent next year. However, even relatively "clean" orchards can accumulate late-season scab, so be sure to flip leaves over, dig deep into the canopy, and see if the orchard is as clean as you had hoped.

Will a post-harvest spray burn out scab? Probably not. The fungus is not in an actively growing state in which it is easily killed by fungicides. Also, you don't want to use an SI or strobilurin fungicide if you have a visibly high population of scab, because this promotes fungicide resistance. Finally, you want the leaves, and the scab fungus within them, to decompose either this fall or early next spring, and using fungicides now would inhibit decomposition this fall. So, give yourself and the sprayer a rest until next spring.

Pin-point scab on fruit. Apple fruit are most susceptible to scab from petal fall through early summer. As fruit mature they become much more resistant, but alas, not immune to scab. Fruit can become infected during the summer, but lesions develop slowly. Scab that develops in storage, also known as pin-point scab because of the small lesion size, originates from infections that occurred in the field. Pin-point scab, which doesn't always wait for storage but sometimes shows up just before harvest, appears as small black, sunken spots that usually do not have the olive-green velvety look of early-season scab lesions. Pin-point scab is superficial; if the flesh below the spot is brown or corky, you may be looking at a calcium-deficiency disorder rather than scab.

Overwintering of scab. The predominant overwintering site for the apple scab fungus is apple leaves that fall to the ground by about early December. Fruit are not a good overwintering substrate, and leaves that fall in midwinter or early spring do not have enough time for the fungus to mate and produce ascospores. Removing or destroying fallen leaves (e.g., by shredding and/or urea treatment to enhance decomposition) will greatly reduce disease pressure. This in turn will reduce the intensity of the spray program needed to control scab in 2017. There is some research showing that the scab fungus can overwinter in buds during mild winters if the orchard had very severe scab. I have seen evidence of this in an unmanaged orchard in Wisconsin, but I think it would be very rare in managed orchards. Cultivated apple trees, wild/abandoned apple trees, and crabapple trees are all reservoirs for the scab fungus, but most of the fungus that causes scab in an orchard originates in that orchard rather than blows in from distance sources. Pears get scab, but it's a different fungus that does not infect apple trees.

Brown marmorated stink bug is preparing for winter

By: Christelle Guédot, UW-Madison

The brown marmorated stink bug (BMSB) monitoring project will continue until the end of October. We are seeing more and more BMSB adults and nymphs in and around urban traps in the Madison area. We have also noticed this past week that adults are starting to aggregate on window screens of houses in an attempt to enter buildings for overwintering.

At this time, BMSBs will be actively moving around in search for food as their nutritional needs increase before they enter diapause. In a recent article, Grzegorz Krawczyk, extension tree fruit entomologist at Pennsylvania State University mentioned that they observed a very sharp increase in BMSB adults in traps around orchards in the last five weeks, which contrasts with the low levels of infestations previously reported for the last two growing seasons. Dr. Krawczyk stated: "Adult stink bugs in search of food can easily move long distances and colonize orchards which did not observe any problems earlier in the season… It is important to remember the absence of stink bugs earlier during the season does not guarantee BMSB and native stink bug species will not become abundant in the orchard around the harvest time."

BMSB will also be actively looking for overwintering sites. You are advised to scout and monitor for the presence of BMSB by visually inspecting fruit and neighboring vegetation around orchards and looking near doors, windows, and other entry points to buildings. To prevent insects from entering houses, make sure to seal any cracks or holes you may find around your house. At this point, we are not expecting high numbers to aggregate around houses in Wisconsin, but keep in mind that on the EPA.gov website where they discuss BMSB, they mention that where BMSB is well established (in and around the Mid-Atlantic region), they can enter buildings by the hundreds or thousands…! Please, let us know if you suspect any BMSB in or around your orchard as well as if you are having issues with stink bugs in general this season.

Brown marmorated stink bug adult. Photo by J Joutras.

Happy harvest!

Useful Links:

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

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

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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