Wisconsin Fruit News

Volume 3, Issue 11 – September 7, 2018

In This Issue:

General Information

Congratulations to UW CALS Honorary Recognition award winner Anna Maenner!

Anna Maenner has been presented the Honorary Recognition award by the University of Wisconsin College and Agricultural and Life Sciences (UW CALS), recognizing her incredible contributions to the University of Wisconsin and the Wisconsin agricultural community. Anna has filled a wide range of important roles in the fruit industry, including managing and organizing the Fresh Fruit and Vegetable Conference, the Wisconsin Apple Growers Association, the Wisconsin Grape Growers Association, and the Wisconsin Winery Association. Beyond her work with the fruit industry, Anna and her husband own a 100-ewe sheep farm, and Anna furthermore is active in local schools, her church and other community activities.

The section on Anna from the CALS news release is re-printed below, and you can read the full news release online at https://news.cals.wisc.edu/2018/08/23/cals-announces-2018-honorary-recognition-awardees/.

Congratulations to Anna Maenner!

"With connections to apples, berries, fresh vegetables, grapes and wineries, and a significant role in the execution of Wisconsin Farm Technology Days, Anna Maenner might have the one of the most diverse agricultural networks of anyone in the state of Wisconsin. As owner and president of ACM Administrative Services, Inc., Anna Maenner provides organizational support, public relations and management to the Wisconsin Apple Growers Association, Wisconsin Grape Growers Association, Wisconsin Winery Association, and the Fresh Fruit and Vegetable Conference and Trade Show. Under her strong leadership and professionalism, these small crop commodity groups have grown substantially in membership and have thrived from collaborations. With her excellent communication and organizational skills, the Wisconsin Fresh Fruit and Vegetable Conference and Trade Show doubled in size to more than 700 attendees in 2018, making it the largest specialty crops conference in the Midwest outside of Michigan. As the driving force behind ACM Inc., Anna Maenner helps make Wisconsin Farm Technology Days a success year after year. Active in her community, Anna Maenner volunteers with local schools and even authored the original editions of "The ABC's of Agriculture" and "This Business Called Agriculture," two educational activity books that teach children how food is produced and distributed through an engaging combination of facts, figures, puzzles and games. Anna Maenner and her husband are also farmers and owners of Country Haven Farm, a 100-ewe sheep farm that sells pureblood Scottish Blackface sheep."

UW-Madison/Extension Insect Diagnostic Lab update

By: PJ Liesch

Japanese beetle activity is finally starting to slow down across the state, bringing relief to commercial and home fruit growers alike. Reports suggest that Japanese beetle pressure had been quite variable this year depending on geographic location in Wisconsin.

Reports of **spotted wing drosophila** activity have been steady at the UW Insect Diagnostic Lab, coming mostly from home fruit growers with raspberries and blackberries. Reports over the past two weeks have come in fruit several locations in southern Wisconsin, although SWD can be found around the entire state.

Reports of **tarnished plant bugs** and **stink bugs** continue to come into the UW Insect Diagnostic Lab from around the state. Both insects can damage a wide range of fruit crops, ranging from strawberries to pome and stone fruits. Stink bug reports have increased slightly over the last two weeks, with **green stink bugs** (*Chinavia hilaris*) being the commonest species reported around the state. In parts of southern (and especially southeastern) Wisconsin, sightings of the invasive **brown marmorated stink bug** continue to come into the diagnostic lab. In some parts of Dane county, observers have noted hundreds of BMSB adults and nymphs in residential yards.

Reports of **secondary pests** such as the **multicolored Asian lady beetle**, **yellowjackets/paper wasps**, and **bumble flower beetles** have started to increase as harvest time approaches. Such pests aren't likely damaging sound/intact fruit, and instead they tend to scavenge on fruit that has been compromised by other insect activity, diseases, or physical damage.

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 Aug 25, 2018 through Aug 31, 2018.

PLANT/ SAMPLE TYPE	DISEASE/ DISORDER	PATHOGEN	COUNTY
FRUIT CROPS			
Cherry	*Cherry Leaf Spot*	*Blumeriella jaapii*	*Dane*
Grape	*Anthracnose* *Downy Mildew*	*Sphaceloma ampelinum* *Plasmopara viticola*	*Dane* *Dane*
Plum	*Phoma Leaf Spot*	*Phoma pomorum*	*Marathon*

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

That's the way the berry crumbles!

By: Patty McManus

A common disorder of raspberries is "crumbly berry" symptoms, where the druplets of berries fall apart upon picking (Figure 1). There are several distinct cause that can contribute to this problem; here are some of the more well-document possible causes.

Figure 1. Healthy red raspberries (left) and crumbly raspberries (right). Photo: I.E. **Tzanetakis, APS Features.**

Poor pollination. Each druplet in a raspberry is actually an individual fruit that developed from pollination of an individual flower. If conditions are poor for pollination, many flowers go unpollinated. When this happens, the raspberry that develops is misshapen with many "blank" spaces that should have been druplets. The few druplets that do develop have a hard time sticking together and are prone to drying up and falling off. Causes of poor pollination can be (i) inadequate numbers of pollinators, (ii) pollinators being killed or repelled by poorly time insecticide sprays, or (iii) cold, windy weather during bloom that deters pollinators. Extreme heat or extreme fluctuations in temperatures for several days after pollination have also been cited as cause of poor druplet development. However, Wisconsin summers are pretty mild compared to many places where raspberries are grown successfully, so I doubt that heat is a concern here. If crumbly berries are seen throughout a planting, then weather might be the problem, but if the problem is spotty, then it's probably something else.

Sunscald. Heat and exposure to sun can cause "white druplet disorder," characterized by a bleaching of druplets to white or tan (Figure 2). The affected druplets are prone to drying, which in turn makes berries crumble upon picking. Irrigating during dry, hot weather can help reduce the stress that leads to white druplets.

Figure 2. Raspberry with white druplet syndrome. Photo: Forestry Images, forestryimages.org.

Tomato ringspot virus and other viruses. TRSV is common in red raspberry, especially in older plantings. The virus has a very wide host range, including many weeds, and is slowly spread by dagger nematodes. Crumbly berries are just one symptom of TRSV and other raspberry viruses. With TRSV, sometimes, but not always, there is a bronzing of leaves, or pale green ringspots on a dark green background. Often, entire plants are stunted. Other viruses that can cause poor berry quality are raspberry leaf curl virus (spread by the small raspberry aphid) and raspberry bushy dwarf virus (spread on pollen by pollinators). Virus disease symptoms do not generally come up "all of a sudden" in a single year, but rather start out in foci that enlarge from one year to the next.

Figure 3. Tarnished plant bug on raspberry. Photo: Cornell Univ. Berry Diagnostic Tool.

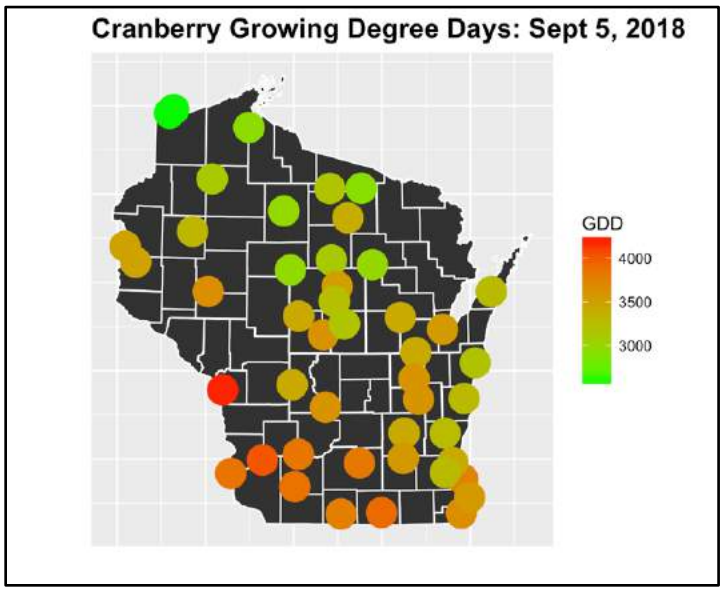
Boron deficiency. Boron is a micronutrient important for pollen tube growth. If pollen tubes don't grow well, then druplets do not develop, and you get small, misshapen, crumbly berries. Boron deficiencies are more common on sandy soil. Leaf nutrient analysis can tell you if there is a deficiency. Too much boron is toxic, so this nutrient should not be applied if not needed.

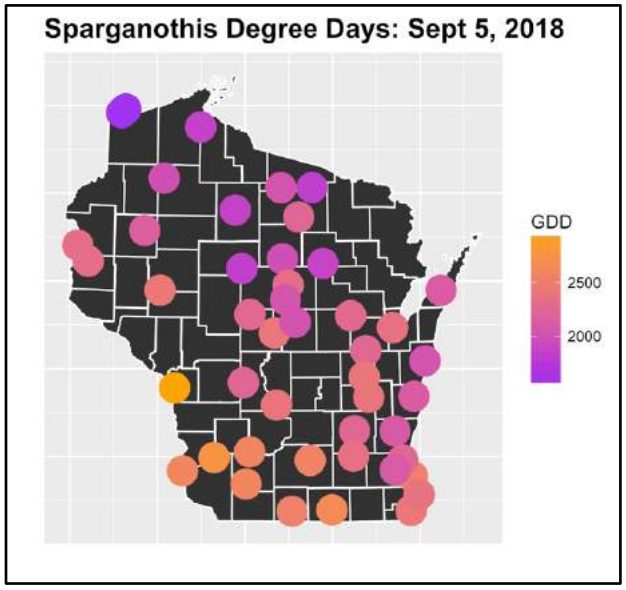
Tarnished plant bug. This insect feeds on flowers and developing druplets (Figure 3), causing berries to develop poorly and not hold together. It is a common pest on some other fruit crops, including strawberries. Tarnished plant bug can be managed through cultural practices (such as weed control) and with insecticides.

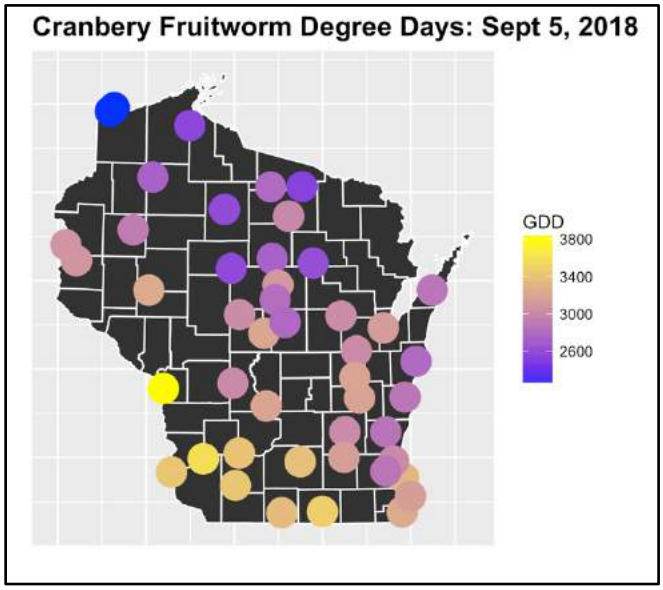
Cranberry plant and pest degree-days: September 5, 2018

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.[1]







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.

Sept 5	Cranberry DDs			Sparg DDs			CFW DDs		
	2016	2017	2018	2016	2017	2018	2016	2017	2018
Northern WI (Minocqua)	3083.2	2734.5	3225.9	1895.8	1570.7	2071.2	2666.6	2321.7	2829.7
Central WI (Wisconsin Rapids)	3686.3	3366.6	3679.1	2400.4	2095.9	2479.7	3234.1	2921.3	3267.5

[1] 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.

Pheromone loading in cranberry insect lures and trapping data

By: Elissa Chasen & Shawn Steffan (USDA-ARS)

There has been repeated questioning in recent years of whether certain lures provide valid, reliable trap-counts. To provide some answers for the key moth pests being tracked by Wisconsin growers and consultants, we examined the pheromone loads within lures purchased from the four primary suppliers and compared them to trap-catches in the field. We examined lures for the sparganothis fruitworm (SFW), blackheaded fireworm (BHFW), and cranberry fruitworm (CFW). The lures included in our study were manufactured by ISCA Technologies, Scentry, and Trécé and AgBio.

Sparganothis fruitworm lures: The SFW lures have the most straightforward comparison between pheromone loading and trap-catches. While the necessary attractive component (E-11:14Ac) is present in each of the lures we examined, the amount varied significantly depending on the manufacturer (fig. 1a): Trécé lures had significantly more pheromone, followed by Scentry, AgBio and then ISCA. These differences translated readily to differences in trap-catch data from the field (fig. 1b). Traps baited with Trécé lures caught more SFW moths in most weeks. However, there are no clear trends that emerge between trap-catches from the other 3 companies.

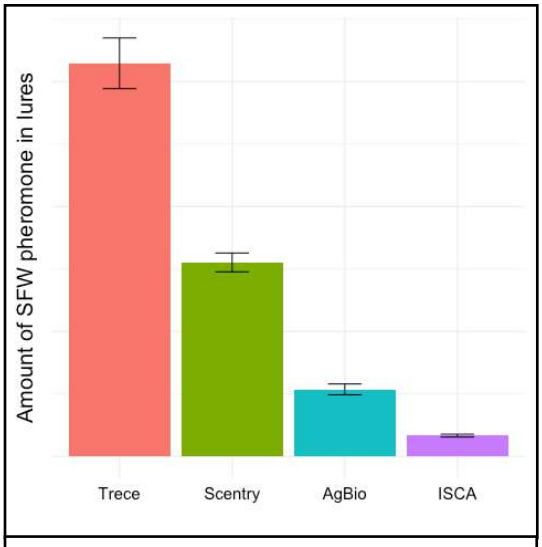


Figure 1a. Relative amounts of SFW pheromone found in lures made from four different manufacturers.

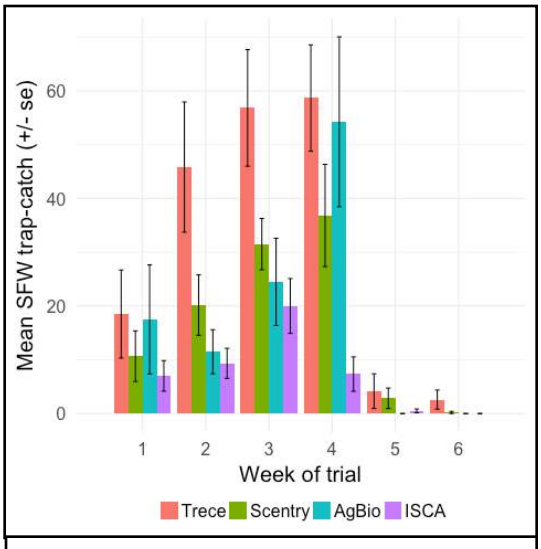


Figure 1b. Mean number of sparganothis fruitworm moths found in traps baited with lures from each of the four compa

Cranberry fruitworm lures: This summer, the only consistent manufacturer of CFW lures was ISCA technologies. Great Lakes IPM briefly manufactured and sold them, but quickly decided not to continue selling them because they noted that their pheromone was not produced correctly. Our trap-catch data clearly shows this discrepancy (fig. 2), and the lab work confirms this as well: we didn't find any of the necessary CFW pheromone components in the GLIPM lures that were analyzed. Fortunately, the ISCA lures have been loaded appropriately this year.

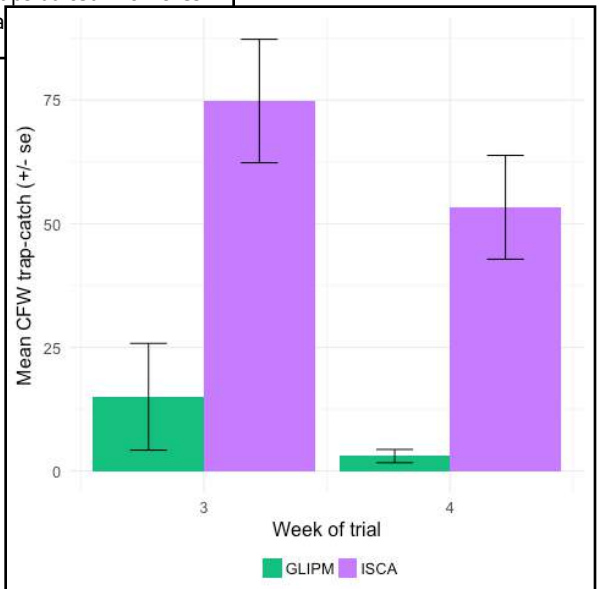


Figure 2. Mean number of cranberry fruitworm moths found in traps baited with lures from two companies, over two weeks.

Blackheaded fireworm lures: Blackheaded fireworm lures are loaded with either a 2- or 3-compound blend. While there is not yet a definitive answer as to which combination of pheromones makes for the most attractive lure, there is evidence to show that the 3-component blend is more attractive, particularly when the populations are low (Fitzpatrick and Troubridge 1992). The 2-component blend consists of (Z)-11:14OH and (Z)-9:12Ac, and the 3-component blend includes the addition of (E)-11:14Ac. Regardless of whether a 2- or 3-compenent blend is used in the lure, the ratio of the components is just as important as which blend is used (fig. 3).

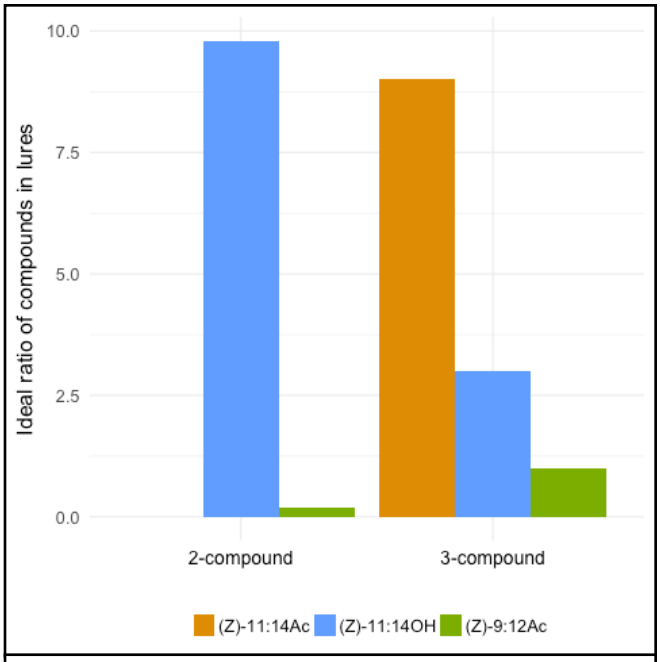


Figure 3. Blackheaded fireworm lures can be loaded with either a 2- or 3 component blend effectively. However, in order for either blend to be effective, the compounds must be loaded in particular ratios. In the 2-compound blend, the ratio is 98:2 [(Z)-11:14OH: (Z)-9:12Ac] and in the 3-component blend, the ratio is 9:3:1 [(Z)-11:14Ac: (Z)-11:14OH: (Z)-9:12Ac] (McDonough et al. 1987, Slessor et al. 1987).

The manufacturers from which we purchased BHFW lures differ in which pheromone blend they load. AgBio and Scentry use the 3-component blend while Trécé uses the 2-component blend. ISCA intends to load the 3-component blend but most of the time their lures miss the additive compound (fig. 4a).

Regardless, for BHFW there is no consistent difference in trap-catch in the field based on manufacturer (fig. 4b). While in most weeks, Scentry traps tend to catch more moths, there is no statistical difference in trap-catch based on lure brand. This apparent lack of difference in trap-catch may be why there are conflicting results in the literature.

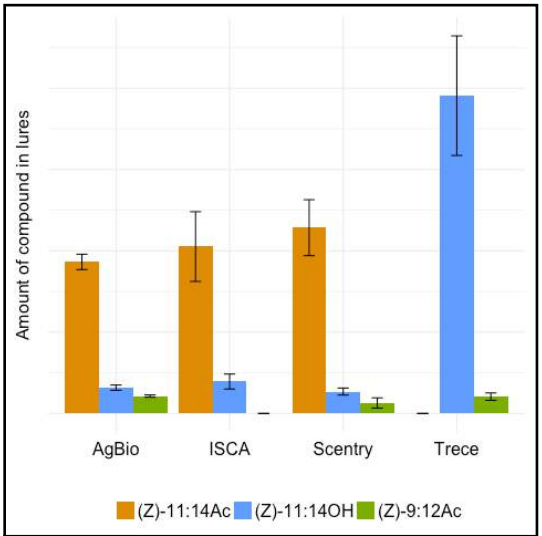


Figure 4a. Relative amounts of BHFW pheromone and components found in lures made from four different manufacturers.

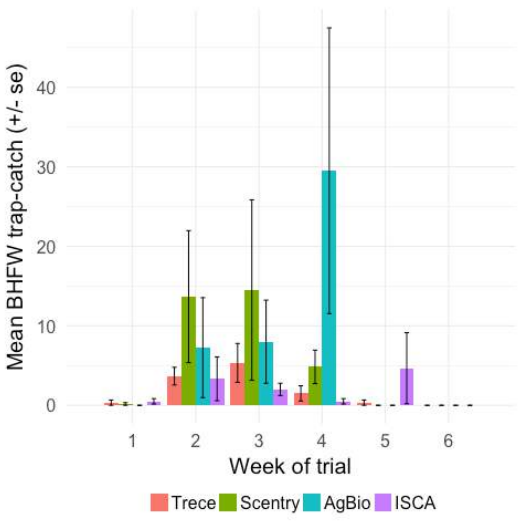


Figure 4b. Mean number of blackheaded fireworm moths found in traps baited with lures from each of the four companies, over six weeks.

We will be testing lure loading again this winter for each of these moth species and manufacturers. We hope that by doing so, and comparing them to the loading and trap-catches from the 2018 season, growers and consultants will be able to make educated decisions about which lures to buy.

Many thanks are due to Jayne Sojka (LadyBug IPM), Dani Faber (Cutler Cranberries), Lindsay Wells-Hansen and Ben Tillberg (OceanSpray) for assistance with the field trapping trial. Funding for this work was provided by the Wisconsin Cranberry Board and Cranberry Institute.

Works cited

Fitzpatrick, Sheila M., and James T. Troubridge. 1992. Relative efficacies of two commerical pheromone belnds for monitoring the blackheaded fireworm (Lepidoptera: Tortricidae) of cranberries. *Journal of Economic Entomology* 85(3): 947-949.

McDonough, L. M., H. G. Davis, and S. Voerman. 1987. Blackheaded fireworm: laboratory and field studies of its sex pheromone. *Journal of Chemical Ecology* 13(5): 1235-42.

Slessor, K. N. et al. 1987. Sex pheromone of blackheaded fireworm, *Rhopobota naevana* (Lepidoptera: Tortricidae), a pest of cranberry. *Journal of Chemical Ecology* 13(5): 1163-70.

Grapes

Grape Variety Developmental Stages: Sep 6, 2018

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

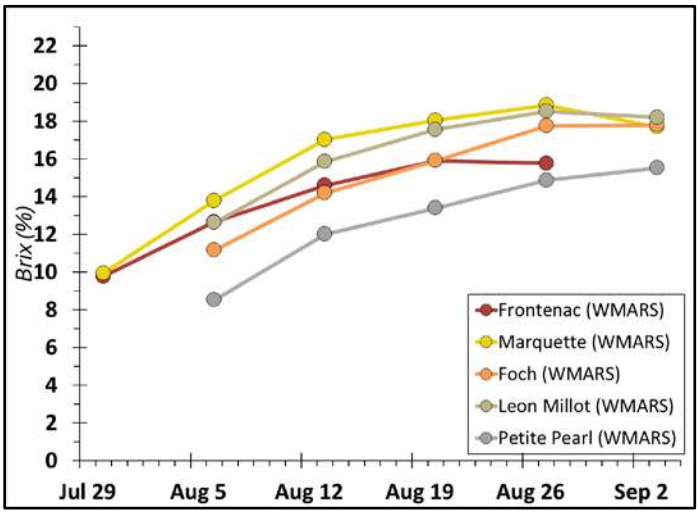
Dane County:

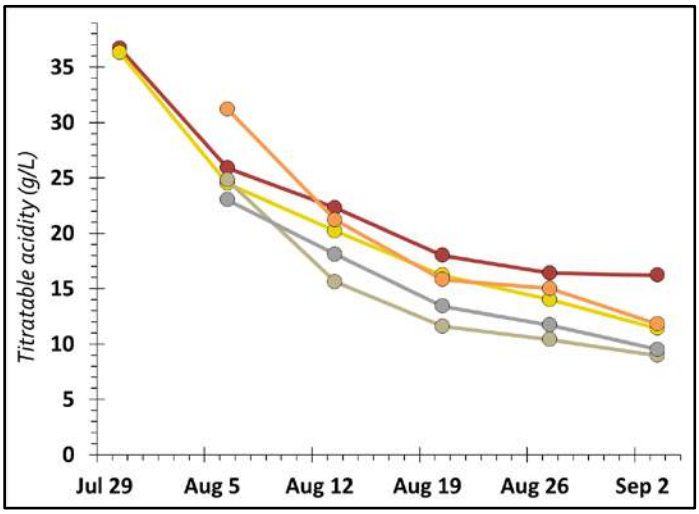
At the West Madison Agricultural Research Station (WMARS) many cultivars have been harvested already, and the rest are at developmental stage E-L 37 ("berries not quite ripe"). Sugar (Brix) and TA (titratable acidity) concentrations as of September 3rd are shown in the chart below, along with graphs below to track their progress throughout the ripening period. Brix has decreased in several cultivars due to the above-average rainfall in recent weeks.

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

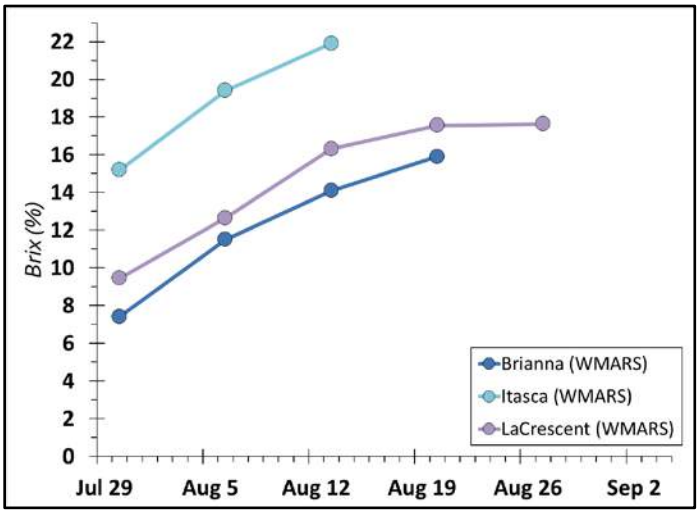
Sept 3, 2018 **Grape Brix and Titratable Acidity (TA)**

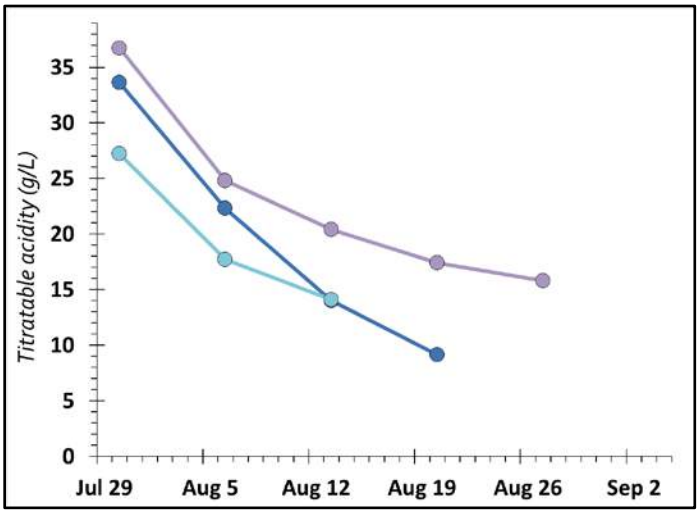
	WMARS	
Grape Variety (Reds)	**Brix (%)**	**TA (g/L)**
Frontenac	16.3	16.2
Marquette	17.7	11.4
Foch	17.8	11.8
Leon Millot	15.5	9.5
Petite Pearl	18.2	9.0
Grape Variety (Whites)	**Brix (%)**	**TA (g/L)**
Brianna	HARVESTED at 15.9	HARVESTED at 9.1
Itasca	HARVESTED at 21.9	HARVESTED at 14.1
La Crescent	HARVESTED at 17.6	HARVESTED at 15.8





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





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

Following photos taken on Sept 6th at West Madison Agricultural Research Station.

Brianna at WMARS; "Berries harvest-ripe" E-L number = 38

La Crescent at WMARS; "Berries harvest-ripe" E-L number = 38

La Crosse at WMARS; "Berries harvest-ripe" E-L number = 38

Itasca at WMARS; "Berries harvest-ripe" E-L number = 38

Marquette at WMARS;
"berries harvest-ripe"
E-L number = 38

Frontenac at WMARS;
"berries harvest-ripe"
E-L number = 38

Foch at WMARS;
"berries not quite ripe"
E-L number = 37

Petite Pearl at WMARS;
"berries not quite ripe"
E-L number = 37

Door County:

At the Peninsular Agricultural Research Station (PARS), sugar levels are increasing and acidity decreasing. All cultivars are now at developmental stage E-L 36 ("berries with intermediate sugar") to 37 ("berries not quite ripe").

Following photos taken on Sept 6th at Peninsular Agricultural Research Station (PARS)

Brianna at PARS;
"berries not quite ripe"
E-L number = 37

La Crescent at PARS;
"berries with
intermediate sugar"
E-L number = 36

La Crosse at PARS;
"berries with
intermediate sugar"
E-L number = 36

Marquette at PARS; "berries with intermediate sugar" E-L number = 36

Frontenac at PARS; "berries with intermediate sugar" E-L number = 36

St Croix at PARS; "berries with intermediate sugar" E-L number = 36

Growing degree days:

April 1 - Sept 6	Grape Growing Degree Days (Base 50, BE)	
	2018	2107
WMARS	**2549**	2130
PARS	**2046**	1643

The growing degree-day accumulations as of Sept 6th for this year are: 2,549 GDD at WMARS and 2,046 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, and correspondingly, all cultivars have higher Brix and lower acidity than at this time last year. We calculated degree-days using a base of 50°F, starting on April 1st 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).

Multicolored Asian Lady Beetle: a harvest-time grape pest

By: Janet van Zoeren and Christelle Guédot

As grape berries near harvest, the main insect pests found in the vineyard are wasps and Multicolored Asian Lady Beetles (MALB). While scouting the vineyards at the West Madison Agricultural Research Station (WMARS), I have seen occasional MALB throughout the summer. Early in the season, they are considered a beneficial insect, because they consume a number of pest species. However, as berries are nearing harvest, MALB becomes a vineyard pest. The following article about MALB was first published in this newsletter in 2016 (WFN season 1, issue 11).

MALB come to the vineyard looking for sugar and energy, and both feed mainly on areas of the berry previously damaged due to other insects or diseases. However, the main damage caused by MALB is from tainting the flavor of the wine – if beetles are aggregated on a cluster of berries, and are not dislodged during harvest, they may be harvested with the clusters and will emit a bitter chemical compound as a defensive mechanism, which affects the taste of the wine made from those berries.

MALB adult. Photo curtesy of Robert M. McPherson, University of Georgia, Bugwood.org.

***Identification and Life Cycle*:** Multicolored Asian lady beetles overwinter as adults, often in homes or other sheltered locations. The adults are variable in appearance, and look similar to many species of native, beneficial species of lady beetle. They can have between 0 to 19 black spots on orange or red wings. The most distinguishing thing about the MALB is a more-or-less distinct black "M" shape on the white "pronotum" behind their head (see yellow circle on image at right).

In the spring, females lay bright yellow eggs, which hatch into spiny alligator-like mobile predatory larvae (see image at left). The larvae are very effective biocontrol agents, eating aphids and other soft-bodied pest insects. There are two generations of MALB in Wisconsin, and this first generation does no damage to our fruit crops. The second generation larvae hatch in mid-summer, and continue to feed on pest insects. However, following pupation, those adults search out sugar-rich food to build up their reserves for overwintering. Because grapes and other fruit crops are nearing harvest at this time, the second generation MALB adults can become a pest if they move into orchards and aggregate on berry clusters. They will mainly aggregate where diseases, birds, or other insects have already opened the berries up. As mentioned above, the MALB do not cause significant feeding damage, but when accidentally harvested with the grapes will taint and spoil an entire batch of wine, possibly causing significant economic loss.

MALB larva. Photo curtesy of Gerald J. Lenhard, Louisiana State University, Bugwood.org.

Monitoring and Control: Because the larval stage is beneficial, it is best to begin monitoring for MALB when the second generation adults hatch and begin to move into the vineyards. Controlling at an earlier time may decrease the beneficial capacity of the larvae. Monitoring can be done using yellow sticky cards placed in the vineyard, although a more accurate, but also more time consuming method of monitoring is to examine clusters for MALB adults. There is no hard-and-fast economic threshold for how many lady beetles is too many, because it depends on grape variety and what style of wine is being produced. However, as a general recommendation, if on average three or more beetles are found per ten clusters, measures should be taken to control them.

Cultural controls to deter MALB from affecting your wine include: maintaining healthy grapes, without any disease or other pest openings which would provide access for the MALB, as well as vigorously shaking the clusters during harvest to dislodge the beetles. On larger vineyards those are unlikely to be commercially viable options. One remedy is that some of the flavor contamination can be counteracted by adding oak chips or activated charcoal to wine (Pickering et al. 2006). However, when chemical controls are necessary, the following have shown good efficacy against multicolored Asian lady

beetles. It is especially important to take into consideration the pre-harvest interval when considering a spray program for MALB, since this is a pest that moves into the vineyard only shortly before harvest. **As always, make sure to read the label before using any pesticide.**

Class (IRAC code*)	Tradename	Active ingredient(s)	REI (hrs)	PHI (days)
Pyrethroids (3A)	Baythroid XL **	Beta-Cyfluthrin	12	3
	Mustang Maxx **	Zeta-Cypermethrin	12	1
Neonicitinoids (4A)	Scorpion 35 SL	Dinotefuran	12	1
	Venom 70 SG	Dinotefuran	12	1
	Belay 2.13 SC	Clothianidin	12	0

***IRAC Code** = Insecticide Resistance Action Committee Mode of Action group

** Although these insecticides do not contain multicolored Asian lady beetle on the label, they are registered for use on grape in Wisconsin, and have shown efficacy against MALB in insecticide trials.

Pickering, G. J., Y. Lin, and K. Ker. 2006. "Origin and remediation of Asian lady beetle (*Harmonia axyridis*) taint in wine." *In:* Crops: growth, quality and biotechnology. III. Quality management of food crops for processing technology. R. Dris (Editor). WFL Publisher, Helsinki: 785-794.

Heavy rains at harvest- Berry splitting and fruit quality

By: Amaya Atucha- UW Extension Fruit Crop Specialist

In the last weeks we have had a lot of rain in the southern part of the state, and we have observed some berry splitting in our research vineyard at WMARS in Verona. Our weather station recorded a 10.35 inches of rain in August 20, and a couple of days after berries started showing splitting in almost all varieties. Although we always assumed that water is taken up by the roots and then translocate into the berries, research done by Dr. Markus Keller at Washington State University has shown that water diffusion across the berry skin is a major pathway of water uptake in berries. German researchers Becker, Grimm, and Knoche found a significant amount of water uptake occurs in the berry and the stem and berry junction zone. During heavy rains, berries uptake large amount

Figure 1. Berry splitting followed by disease development in Petite Pearl after 10-inch rain in August 20 at West Madison Ag Research Station in Verona WI.

of water resulting in a rapid berry enlargement that can induce splitting, and high temperature following the heavy rain events may increase the incidence of berry splitting. After the heavy rains the last week of August, we have seen and increased in disease incidence, especially in Marquette, some Botrytis or bunch rot on those clusters with split berries, but also sour rot, and phomopsis (Figure 1).

In addition to berry splitting and higher disease pressure, because of the high uptake of water by the berries there is a dilution effect of sugars and acids, so it is not uncommon to see no change or even a decrease in Brix readings after a heavy rain event. The weather forecast looks promise for the next week with no rain and temperatures in the mid-70s, which will help continue ripening the fruit.

Social wasps showing up in vineyards

By: Christelle Guédot and Abby Lois, UW-Madison Department of Entomology

Social wasps, particularly yellow jackets, can become serious pests in fruit crops at the time of harvest. Wasp nests build up throughout the season and, around fruit harvest, wasps are actively looking for sugar sources to feed on. This year we have received reports of damaging wasp populations primarily coming from East Central Wisconsin, in Kewaunee and Calumet Counties, and southern Wisconsin. Our traps in Dane county are not catching a lot of wasps so far this year. There are still a lot of unanswered questions as to why populations fluctuate from year to year and from vineyard to vineyard.

Bald faced hornet on a grape cluster. Photo curtesy of Mark Lefebvre.

Observations and trapping in the affected vineyards have revealed high populations of bald-faced hornet (Fig 1) along with some yellow jackets. We have observed bald-faced hornet in most of the grape cultivars present, but have noticed some differences in the field, with Marquette being particularly damaged, that we will be addressing in the lab this Fall.

At this point, there is no insecticide specifically labeled for wasps in grapes. If you use an insecticide labeled on grape, make sure to check the pre-harvest interval as we are at the time of harvest. If you have wasp problems, please let us know, as we are conducting studies with attractants and repellents for wasps this season and are interested in new research sites.

Happy harvest!

Brown marmorated stink bug and late-season apple damage

By: Janet van Zoeren and Christelle Guédot, UW – Madison Fruit Crop Entomology and Extension

Brown marmorated stink bug (BMSB) numbers are on the increase in Dane county (as mentioned in the previous issue of this newsletter), and so we are re-publishing this article on differentiating late season apple damage symptoms, such as those caused by BMSB, hail damage, apple maggot stings, and bitter pit. This article was first published in the WFN season 2, issue 13.

Comparing BMSB to other late-season apple damage

A common question when discussing BMSB in apple orchards is, "how is BSMB damage different from other late-season apple damage?" Figure 1 provides a flow-chart to distinguish between some common late-season discoloration symptoms, and we will discuss in more detail some common look-alike damage symptoms in the following paragraphs.

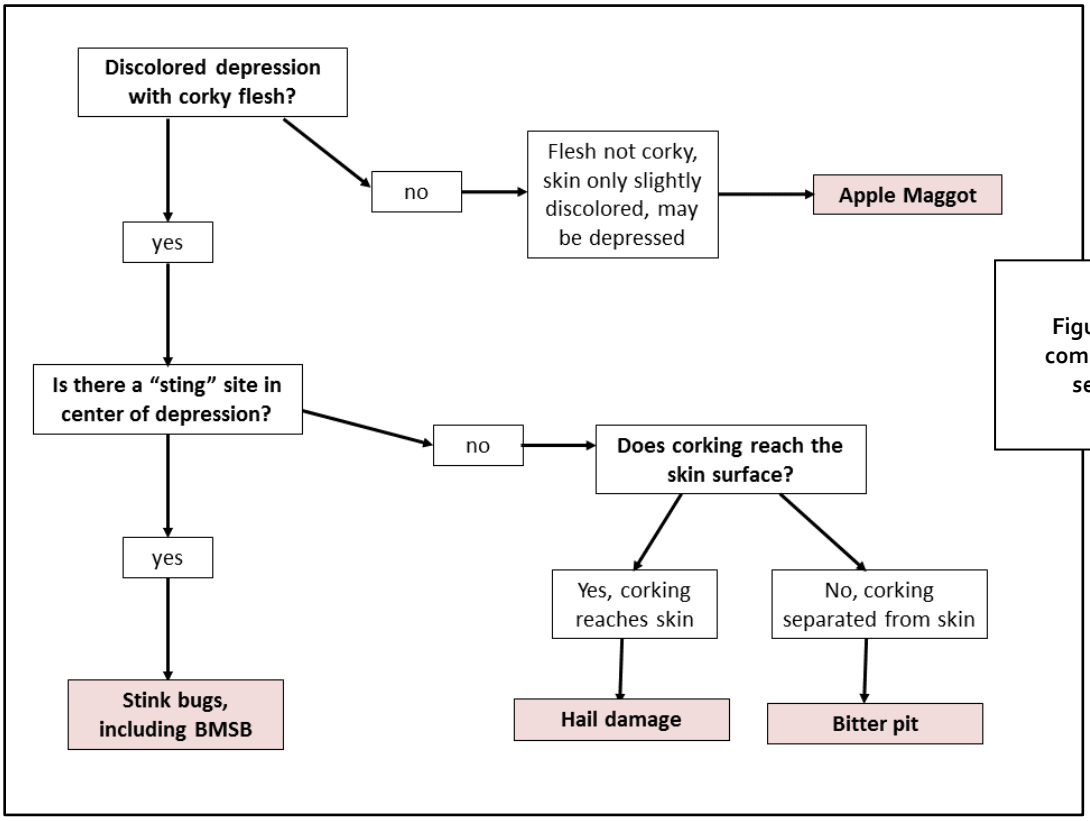


Figure 1: Comparing some common symptoms of late-season apple damage.

BMSB feeding damage. Photo by G. Krawczyk Pennsylvania State University.

BMSB vs. other stink bug damage

Unfortunately, BMSB damage is indistinguishable from other stink bug damage, so the only way you can be certain of the culprit is if you are able to see the actual insect doing the feeding. All stink bug damage manifests in a discolored depression, with a stylet hole visible (although very small) in the middle of the discoloration. If you cut into the fruit, the flesh will be corky and brown along where the stylet of the bug was in the fruit, so the corky flesh will come all the way up **touching** the fruit skin.

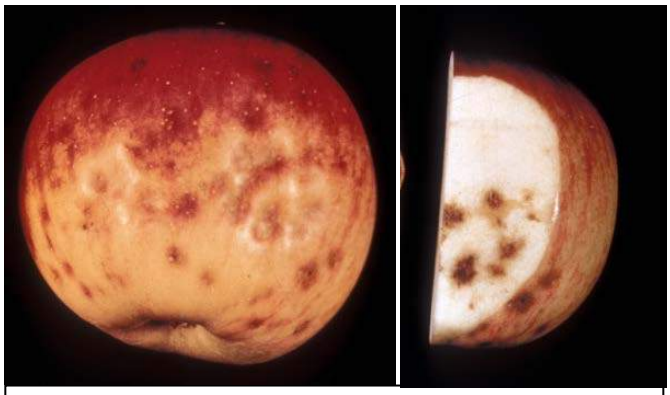
Hail damage vs. BMSB

Hail damage is generally localized, follows a known hail event, and may be worse on one side of the orchard block or of the trees affected. Similarly to stink bug damage, hail damage shows a discolored depression where, if the fruit is cut into, flesh is corky all the way up to **touching** the fruit skin. Hail can be differentiated because the hail damage has **no** stylet hole visible in the depression on the skin. Thus, close inspection of the fruit is necessary and a magnifying glass may help in determining the presence of stylet holes, in particular if no hail events have been reported in the area.

Hail damage.

Bitter pit vs. BMSB

Bitter pit is associated with nutrient imbalance. Similarly to hail damage, bitter pit also shows a discolored depression with **no** stylet hole visible. In general, most damage is seen on the calyx (bottom) half of the apple. Unlike stink bug damage, the corky flesh in bitter pit is deeper in the apple and **does not touch** the fruit skin (see image at right). Bitter pit is most likely to be found in highly susceptible cultivars (including Honeycrisp), and appears as often in the center as the edges of the orchard (unlikely insect damage, which is found more often on the orchard edges).



Bitter pit. Photos by University of Georgia Plant Pathology , University of Georgia, Bugwood.org.

Apple maggot stings vs. BMSB

Apple maggot stings occur when the fly tries to oviposit into an apple, but does not lay an egg, or the larva fails to develop. There may be a slight depression with some discoloration, but generally less distinctive than in the other cases. There is always oviposition hole visible, which is generally larger and more obvious than the stylet hole found following stink bug damage. Flesh is not corky, but flesh may be soft and mealy.

Apple maggot damage. Photos by H.J. Larsen, Bugwood.org.

Calendar of Events

September 12, 2018 – Women Caring for the Land Workshop
8:30 am – 3 pm, Bossie Cow Farm, W6178 County Rd SS, Random Lake, WI

September 18, 2018 – Women Caring for the Land Workshop
8:30 am – 3 pm, Fenn's Folly, 12041 Severson Rd, Ferryville, WI

September 27, 2018 – Women Caring for the Land Workshop
8:30 am – 3 pm, Long Winter Farm, W1446 Lawlor Rd, East Troy, WI

November 14, 2018 – Two Apple Farm Organic Apple Field Day
1 pm – 3:30 pm, Two Onion Farm, 19638 Cottage Inn Road, Belmont, 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: 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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