

In This Issue:

General Information:

Last issue this season – thanks for reading!

page 1

Fruit insect report

page 1

Plant Disease Diag. Clinic update

page 2

Berry Crops:

Fall treatment for Phytophthora root rot of raspberry

page 3

Grapes:

Post-harvest management in the vineyard

page 4

Wine and table grape developmental stages

page 7

Tree Fruits:

Brown marmorated stink bug update / late-season apple damage

page 7

General Information

Last issue this season – thanks for reading!

This is the last routine issue of the newsletter for the season. We will continue to publish supplementary issues through the fall as the need arises.

Thank you all for reading!



Fruit insect report

By: PJ Liesch, UW Insect Diagnostic Lab

Japanese beetle pressure finally subsided in the state as September arrived. While it's too early to tell, we may face high beetle pressure again next year in the southern two thirds of the state, if the state experiences another mild winter.

Spotted Wing Drosophila has been active across the state and will continue to affect late season berry crops this year.

Stink Bugs, including the **Brown Marmorated Stink Bug** and the **Green Stink Bug**, have been reported many times in the last month. Reports of the green stink bug nymphs (juveniles) have come in from across the state, but were most common in the southern counties. Brown Marmorated Stink Bug populations continue to build and many nuisance reports of stink bugs on structures have come in from southern and eastern Wisconsin. Multiple reports of large congregations of

these insects (100+) have been received in late September and early October in Dane County. While reports of BMSBs on fruits and vegetables have been limited, they have increased this growing season, including recent reports of BMSB on apples in Dane County and raspberries in Waukesha county. Interestingly, juveniles (nymphs) are being spotted with more regularity and nymphs continue to be spotted into October. To date, “hot spots” in the state for BMSB activity include Dane/Rock/Jefferson county area, Waukesha/Milwaukee area, and the Brown County/Fox River Valley area.

Late season nuisance scavengers are out in full force. Reports of **yellowjacket/paper wasp** scavenging on compromised fruits have been common throughout the state recently. Recent reports suggest that **Multicolored Asian lady beetle** numbers may be lower this, although they have also been seen feeding on compromised fruits at the time of harvest.

Nut leaf weevils (*Strophosoma melanogrammum*) were recently found in the state for the first time from hazelnuts in Bayfield County from a summer pest survey project. This European species was introduced to North America in the late 1800’s and is not expected to be a major concern for nut or fruit growers. Nut leaf weevils feed on a wide range of broadleaf trees and shrubs, although they have also been reported from strawberries, garden vegetables, and pine trees. The literature indicates that this insect causes minor leaf damage.



Nut leaf weevil. Photo by H Baas, Saxifraga.

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 16, 2017 through Sept 30, 2017.

PLANT/ SAMPLE TYPE	DISEASE/ DISORDER	PATHOGEN	COUNTY
Apple	Anthracnose	<i>Gloeosporium</i> sp.	Bayfield, Green
	Cedar-Apple Rust	<i>Gymnosporangium juniperi-virginianae</i>	Dane
	Coniothyrium Leaf Spot	<i>Coniothyrium</i> Sp.	Green
	Frogeye Leaf Spot	<i>Botryosphaeria obtusa</i>	Marathon
Currant	Septoria Leaf Spot/Blight	<i>Septoria</i> sp.	Portage
Raspberry	Root/Crown Rot	<i>Phytophthora</i> sp.	Dane

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

Fall treatment for *Phytophthora* root rot of raspberry

By: Patty McManus

Many parts of the state received significant rainfall during June and July, leading to *Phytophthora* root rot on red raspberry, especially in heavier soils and in low-lying areas of fields that were slow to dry. The above ground symptoms of root rot include sparse growth and leaf yellowing, followed by browning and collapse of canes. These symptoms can resemble symptoms of winter injury and cane borer, however, so it's important to closely examine plants as soon as



Figure 1: Species of the water mold *Phytophthora* cause crown and root tissues just below bark to turn orange to red. Photo from Ontario Ministry of Agriculture, Food and Rural Affairs.

symptoms are seen. Various species of *Phytophthora* damage roots and crowns, causing entire canes to collapse. The tissue just under the bark of main roots and crowns is orange/red rather than white/green (Fig. 1). By contrast, the raspberry borer chews distinctive rings that girdle canes, and only leaves above the rings wilt (Fig. 2). Winter injury is usually relatively even across a field, or concentrated in areas not protected by snow during cold spells, while *Phytophthora* root rot is patchy and concentrated in areas where water pools during the growing season.

The best time to get a positive diagnosis of root rot is spring, when the various pathogenic species of *Phytophthora* are infecting plants and secondary opportunistic fungi have not yet invaded. But, **the pathogen is also active in fall**, if soils are wet. Thus far, many parts of the state have had a dry late summer/early fall. However, if we get enough rain to saturate soils and temperatures remain above freezing, you might consider fungicides to minimize additional infections.

There are **two main groups of fungicides** used to control *Phytophthora* root and crown rot of woody plants. Neither fungicide type will bring back dying roots and wilting canes, but they can protect new roots and keep crowns healthy enough to put out new canes in future years. Fungicides will not help in low-lying areas with heavy soil that gets flooded every year. In those cases, drainage should be rectified by installing drainage tile and/or soil amendments.

Ridomil Gold (SL and GR formulations) contains mefanoxam as the active ingredient. Mefanoxam applied to soil probably kills some *Phytophthora* on contact, but it also get taken up by roots and prevents new infections. The SL formulation is a soluble concentrate liquid, and the label describes application to soil at the time of planting and in established plantings. In established plantings, the label recommends a spring application (before plants leaf out) and one more application “to coincide with the period most favorable for root rot development.” Thus, two applications per season are permitted, and because *Phytophthora* is favored by cool, wet conditions, one spring and one fall application is the usual pattern. The GR formulation is granular, and similar to SL, spring and fall applications are recommended. With both SL and GR forms, the fall application should be after harvest.

Phosphorous acid (PA) fungicides are sold under several different brand names, (e.g., Aliette, Phostrol, ProPhyt, Rampart) so check labels to be sure that use on raspberries is permitted. PA fungicides are not applied



Figure 2: Distinctive rings on raspberry cane caused by cane borer. Leaves above the rings wilt and die.

to soil. Label instructions vary, but generally, they are applied as a foliar spray in the spring when raspberry plants show about 1-3 inches of new growth, and again in 3-4 weeks. The fungicide gets taken up by leaves and transported downward to crowns and roots. Two additional applications are permitted, but these would be justified only if conditions are cool and wet, AND there are still green, metabolically active leaves that are capable of taking up fungicide. In cases where leaves are turning color or dropping after harvest, Ridomil applied to soil according to the label would be a better choice.

Grapes

Wine and Table Grape Developmental Stages – end of season summary

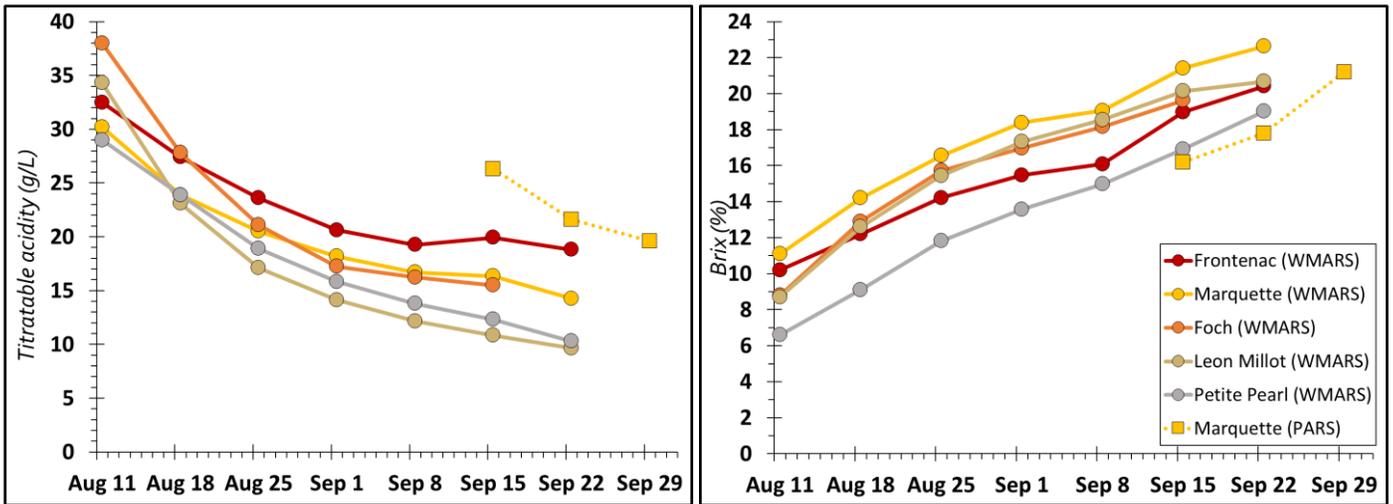
By: Janet van Zoeren, Annie Deutsch, Jean Riesterer-loper, Jacob Scharfetter and Amaya Atucha

We have finished grape harvest both at the West Madison Agricultural Research Station (WMARS) and at the Peninsular Agricultural Research Station (PARS). Sugar (Brix) and TA (titratable acidity) concentrations at time of harvest are shown in the chart and graphs below.

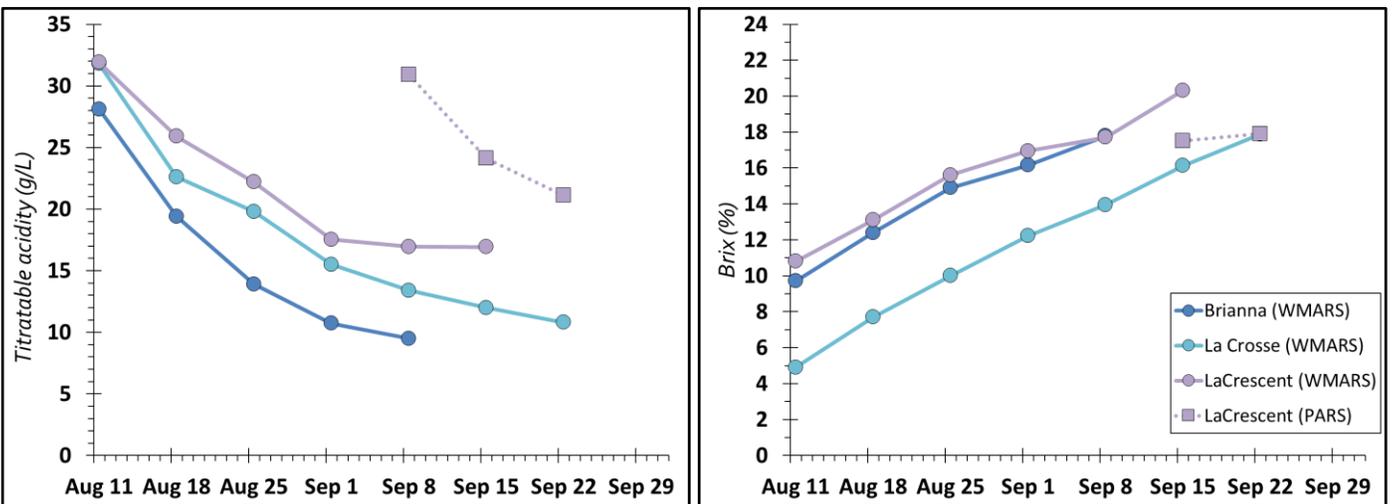
<u>At Harvest</u>				
<u>Grape Brix and Titratable Acidity (TA)</u>				

WMARS			PARS	

Grape Variety (Reds)	Brix (%)	TA (g/L)	Brix (%)	TA (g/L)
Frontenac	20.4	18.8		
Marquette	22.6	14.3	21.2	19.6
Foch	19.6	15.5		
Leon Millot	20.7	9.6		
Petite Pearl	19.0	10.3		
Grape Variety (Whites)	Brix (%)	TA (g/L)		
Brianna	17.8	9.5		
La Crosse	17.9	10.8		
La Crescent	20.3	16.9		

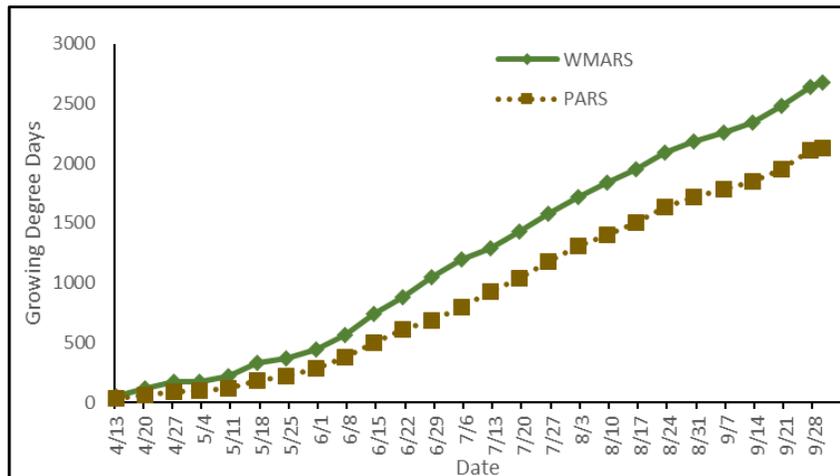


Titratable acidity (left) and Brix (right) of red wine grape varieties in Dane County (WMARS) and Door County (PARS).



Titratable acidity (left) and Brix (right) of white wine grape varieties in Dane County (WMARS) and Door County (PARS) 2017.

The growing degree-day accumulations as of September 30th (end of harvest) for this year are: 2,672 GDD at WMARS and 2,128 GDD at PARS. In Dane County, this is the lowest GDD accumulation we've experienced at harvest-time in the past four years, whereas in Door County we accumulated fewer GDD during the 2014 season than we did this year. Degree-days are calculated using a base of 50°F, starting on April 1st.



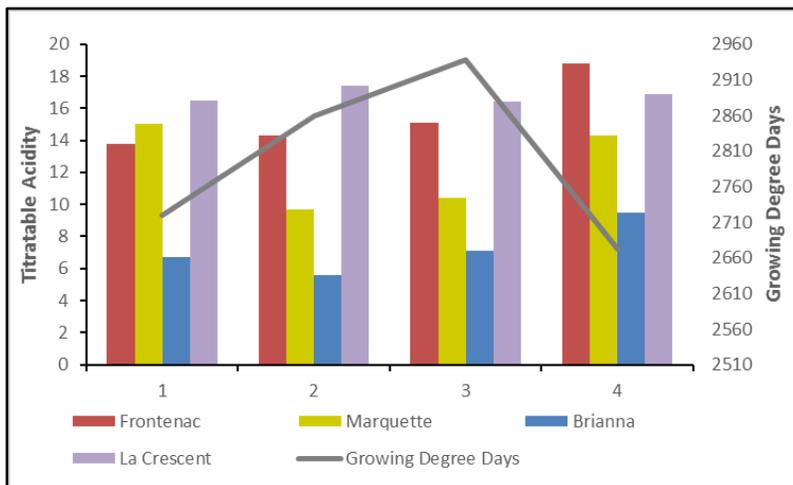
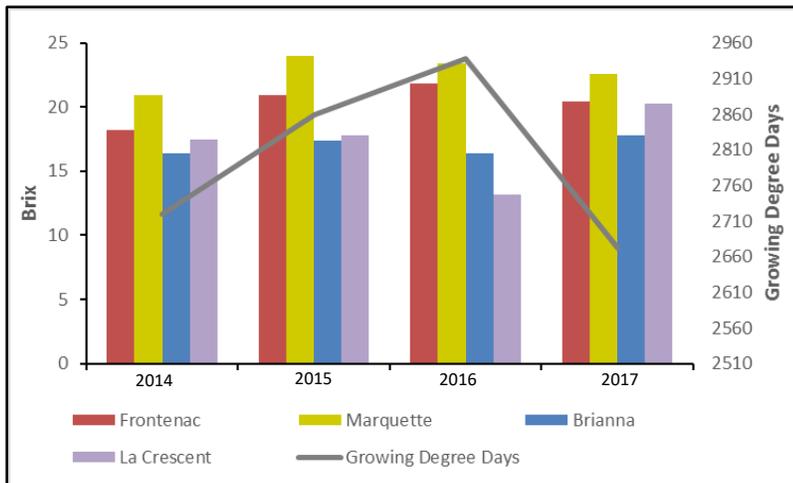
Fruit quality and growing degree-day accumulation Summary

Over the past four years, we have been collecting Brix and TA for multiple cultivars at our two experimental station locations. We have summarized the data in a table that shows GDD for the growing seasons of 2014 to 2017, as well as fruit Brix and TA levels at harvest time for ‘Brianna’, ‘Frontenac’, ‘La Crescent’, and ‘Marquette’ at the West Madison Agricultural Research Station.

Grape Growing Degree Days

April 1 - Sept 30

	2107	2016	2015	2014
WMARS	2672	2938	2859	2719
PARS	2128	2323	2168	1902



Brix (above) and Titratable acidity (below) of grapes at harvest in Dane County (WMARS), compared to growing degree day accumulation at harvest, across 2014 through 2017. Grape varieties being compared include Frontenac and Marquette (red grape varieties) and Brianna and La Crescent (white grape varieties).

Post-harvest management in the vineyard

By: Amaya Atucha, UW-Extension Fruit Crop State Specialist

Harvest time is always a very exciting and hectic time of the year, and after harvest is completed most of us would like to take a break and forget about the vineyard until pruning time. However, post-harvest period is extremely important as it sets the foundation for next year's harvest. Here is a list of things to consider during this fall:

1) Weed control. During fall when vine are going dormant is a great opportunity to apply pre-emergence herbicides that will prevent the germination of weed seedling during spring. Pre-emergence herbicides provide little to no effect on germinated weeds, but will prevent the germination of weed seeds that are in the soil. Pre-emergence herbicides need to be incorporated into the soil by rainfall, or irrigation, and in general they pose no threat to the vines, unless the herbicide is leached into the vine's root zone by excessive precipitation. Here's a list of links related to fall weed control:

[Now is a Good Time to Assess Your Vineyard Weed Control Program-PennState](#)

[Integrated weed Management UC Davis](#)

[Grape Weed Control-Northern Grape Project](#)

[Midwest Fruit Pest Management Guide 2017](#)

2) Post-harvest disease control is extremely important to ensure adequate reserves for the vines to survive winter. After the fruit has been harvested, all carbohydrates produce by the leaves will be store as reserves in the roots, trunks and cordons of the vines, and will help vines acclimate to colder temperatures as the winter progresses. It is also important to bear in mind that from bud break until bloom, grapevines growth is mostly supported by those reserves stored in the vine's permanent structures. Leaves should be retained as long as possible to ensure good accumulation of reserves.

[Photo Guide to Diseases of Cold Climate Grapes-UW-Madison](#)

3) Review soil and petiole analysis results and plan for next season's fertilization program. Where there any nutrition issues during the growing season? Are they reflected in the results of the petiole analysis? This is an excellent time to put all the information together to look at the general picture of the vineyard, including the things that worked and did not work. You should pay special attention to your insect pest and disease management, and what could you have done better this past season.

[Grapevine Nutrition-Northern Grape Project](#)

[Petiole Analysis as a Guide to Grape Vineyard Fertilization-University Minnesota](#)

Tree Fruits

Brown marmorated stink bug update / 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 again in Wisconsin, especially in Dane county. We are monitoring for BMSB in and around apple orchards in Dane and Door counties again this year, similarly to last year. However, this summer we've made a few changes to our trapping methods. For one thing, this year we've been using two lures – a BMSB lure along with a green stink bug lure. Using both lures has been shown to be more effective for catching early-season as well as late-season BMSB. Additionally, this summer we are comparing two types of traps – the black pyramid traps that we used last year, as well as clear sticky traps, as part of a nationwide research collaboration.

Because our trapping methods differed, we cannot truly compare trap catch numbers from this year to those from last year, as any changes observed in trap catch numbers may not necessarily reflect actual changes in BMSB densities. Thus we expect to catch more BMSB this year in part due to changes in our methods, but also because we noticed that populations (at least in Madison) have drastically increased this year and thus are likely to be reflected in traps.

Figure 1 below shows the seasonal trap catch numbers for BMSB in 2016, showing the season-long trends observed last year. Figure 2 shows trap catch numbers so far this year, with numbers divided into traps set in the apple orchard (including pyramid traps and sticky traps), and traps set in a corn patch, a nearby woodlot, and in an urban area (all three sites only using pyramid traps). We expect that, similarly to last year, BMSB numbers will continue to increase through September and October.



BMSB nymph feeding on an apple. Photo by Matt Kamiyama.

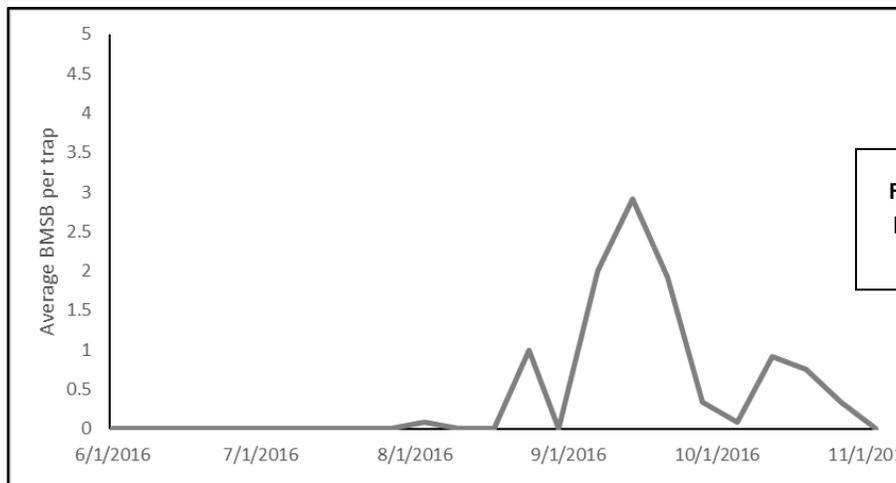


Figure 1: Average BMSB per trap across all traps locations in 2016.

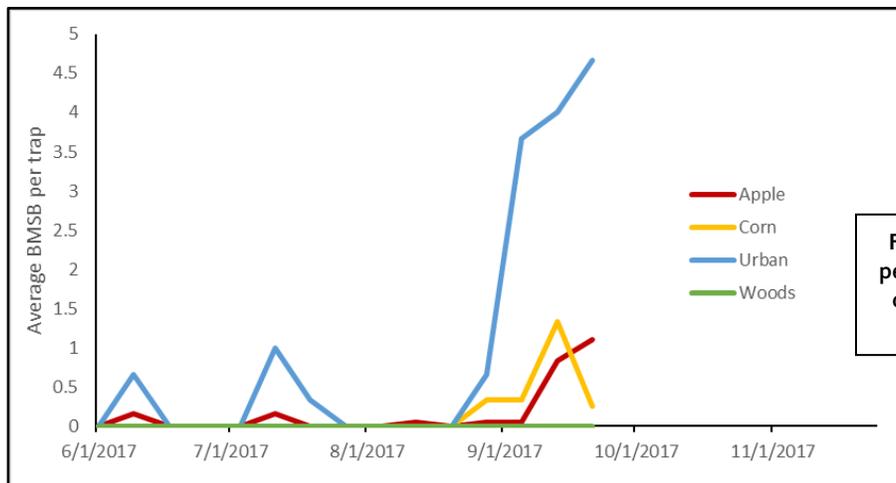
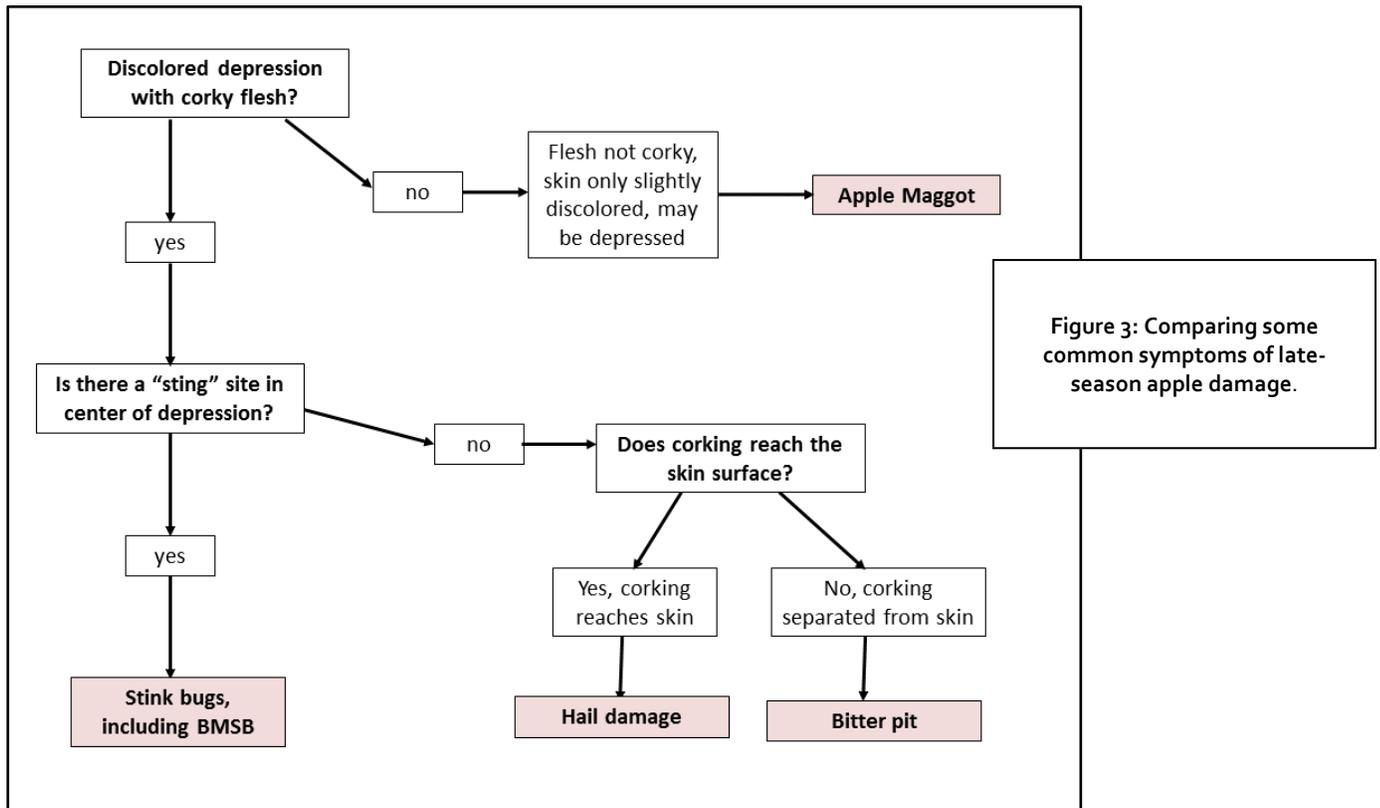


Figure 2: Average BMSB per trap (in apple orchard, cornfield, woodlot, and urban area) in 2017.

Comparing BMSB to other late-season apple damage

A common question when discussing BMSB in apple orchards is, “how is BMSB damage different from other late-season apple damage?” Figure 3 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.



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.



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

Hail damage vs. BMSB

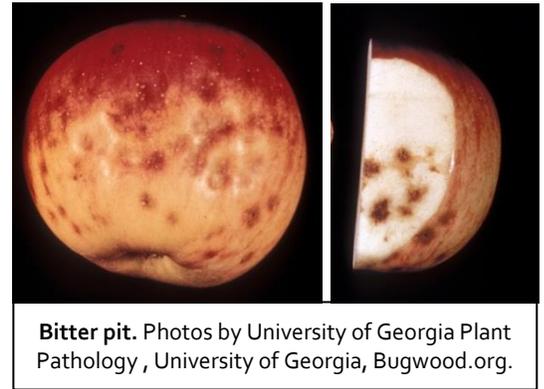
Hail damage is generally localized, follows a known hail event, and may be worse on one side of the orchard block



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.

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).



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.

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.

The Wisconsin Fruit News is a publication of the University of Wisconsin-Extension Program, which provides statewide access to university resources and research so the people of Wisconsin can learn, grow and succeed at all stages of life. UW-Extension carries out this tradition of the Wisconsin Idea – extending the boundaries of the university to the boundaries of the state. No endorsement of products mentioned in this newsletter is intended or implied. The University of Wisconsin is an equal opportunity provider and employer.

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