



# Wisconsin Fruit News

Volume 1 Issue 1– April 18, 2016

## In This Issue:

### **General Information:**

Introducing the Wisconsin Fruit  
Newsletter  
page 1

### **Berry Crops:**

Introduction to the Berry Crops  
Section  
page 2

SWD survey summary  
page 2

### **Cranberries:**

The Importance of Degree Day  
Modeling in Cranberry  
page 4

### **Grapes:**

Profile of Grape Pathology Work  
page 6

Grape Variety Developmental  
Stages  
page 7

WFFVC Grape Grower Survey  
Results  
page 8

### **Tree Fruits:**

Promalin, a frost rescue  
alternative for apples  
page 12

Update on BMSB  
page 13

### **Calendar of Events:**

page 15

## **Want this newsletter sent directly to your email?**

Simply visit our webpage ([www.fruit.wisc.edu](http://www.fruit.wisc.edu)) and enter your email on the right hand sidebar where it says “Sign up for the Wisconsin Fruit News!”

## **General Information**

### **Introducing the Wisconsin Fruit Newsletter**

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

Welcome to the first installment of the Wisconsin Fruit News! This bi-weekly installment will allow us to highlight research regarding our state’s fruit crops, inform you of worrisome new pest alerts, and discuss upcoming events and opportunities. Each issue will be divided into six main sections: General Information, Berry Crops, Cranberries, Grapes, Tree Fruits, and a Calendar of Upcoming Events. The General Information section will contain pest alerts and other information pertinent to all fruit crop growers. For example, in two weeks there will be an article reminding everyone how to calculate and use growing degree days on your farm. The sections pertaining to each of our key fruit crops in Wisconsin (Berry Crops, Cranberries, Grapes, and Tree Fruits) will report more in-depth on plant development, insect pests and diseases, recent research and other information relevant specifically to each of these fruit crop groups. The last section of each newsletter will be a Calendar of Events for the upcoming months. Be sure to check that out and stay informed of upcoming workshops, grower meetings, conferences, and other opportunities.

The newsletter will also be posted onto our Wisconsin Fruit website, available at [www.fruit.wisc.edu](http://www.fruit.wisc.edu). There you will also be able to search by category or tag, to find crops and/or subject material of interest to you on a particular day. Additionally, you will also be able to view our newsletter through the IPM Toolkit application, which was created through the University of Wisconsin’s Integrated Pest and Crop Management program (<http://ipcm.wisc.edu/apps/ipmtoolkit/>). Simply download the app, and enter our RSS newsfeed URL (<http://fruit.wisc.edu/feed>).

Enjoy!

# Berry Crops

## Introduction to the Berry Crops Section

Here we will discuss information of interest to Wisconsin berry growers, including updates on the status of spotted wing drosophila and other insect pests, irrigation and nutrient management information for berry crops, the most prevalent and virulent diseases present this summer, and plant development and harvest predictions.

To begin with, here is a summary of the findings from a survey regarding the impact of Spotted Wing Drosophila on Wisconsin berry growers, which was filled out by many of you online or at the Wisconsin Fresh Fruits and Vegetables Conference. We would especially like to thank everyone who took the time to participate in this survey!

### Survey Summary: Spotted wing drosophila survey for WI berry growers 2015 season

By: Janet van Zoeren, Christelle Guédot, and Katie Hietala-Henschell

We received 23 responses from growers in 16 different counties in Wisconsin and Illinois. The most frequently grown crops, with the greatest acreage, were **strawberries, fall raspberries, and summer raspberries**. Other crops grown by survey respondents include blueberries, aronia, currants and gooseberries, blackberries, black raspberries, and honeyberry.

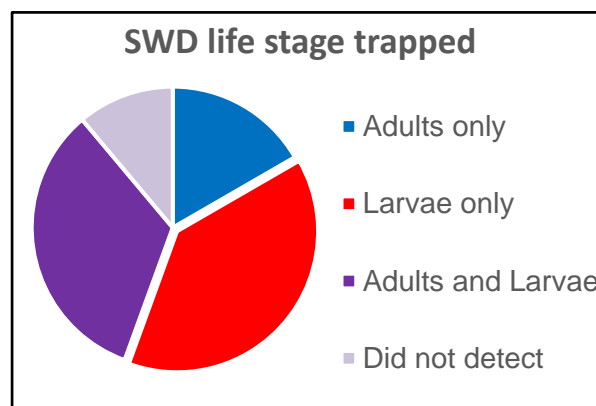
**Market and Acreage:** Most survey respondents market through retail (81% of growers) and pick-your-own (77%). Fewer respondents sell wholesale (23%) or at a market stand (5%). Only 10% of respondents are considering decreasing their berry acreage, while 42% would like to increase it and 47% plan to stay at more or less the same acreage.

**Pest Pressures:** The pests that growers reported as most concerning were Spotted Wing Drosophila and Tarnished Plant Bug. Thrips were considered the third most concerning. Crop loss due to SWD was estimated at between 1% to 50%, and **15 out of 21 growers (71%) indicated being “very concerned” about SWD in their berries. Only 1 grower (5%) was “not at all concerned”.**

About half of respondents can identify both male and female SWD, while 28% can only ID the males. Only 22% of respondents said they cannot identify male or female SWD. Most respondents (86%) are aware that there is a winter-morph of SWD in Wisconsin.

**SWD Monitoring:** 80% of respondents monitored for SWD in 2015. Of those who monitored, only two (12%) did not catch any SWD. Three (18%) trapped adults only, seven (41%) trapped larvae only, and six (35%) trapped both adults and larvae.

Of those who monitored, 47% monitored while their crop was fruiting, 35% monitored throughout the season, and 25% monitored only until first detection.



**First detection occurred sometime between June 30<sup>th</sup> until July 27<sup>th</sup>, depending on the farm.**

**SWD Management:** Of those who found SWD on their farm, only 1 grower (7%) did not subsequently manage in some way for SWD.

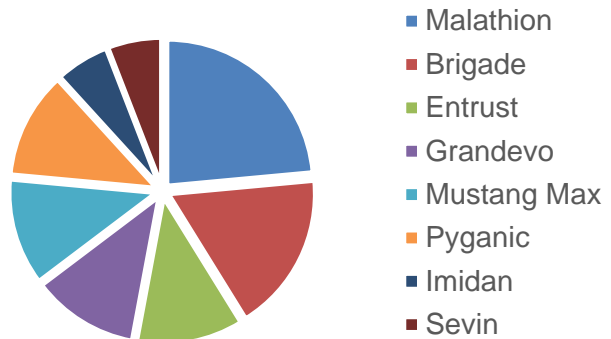
71% of growers used an insecticide to manage SWD. The most frequently used insecticides in 2015 were Malathion (4 growers), Brigade (3 growers), Mustang Max, Entrust, Grandevo, and Pyganic (2 growers each), and Sevin and Imidan (1 grower each).

**Conventional growers sprayed between 0 to 4 times in 2015, while organic growers had to spray over 5 times in 2015.**

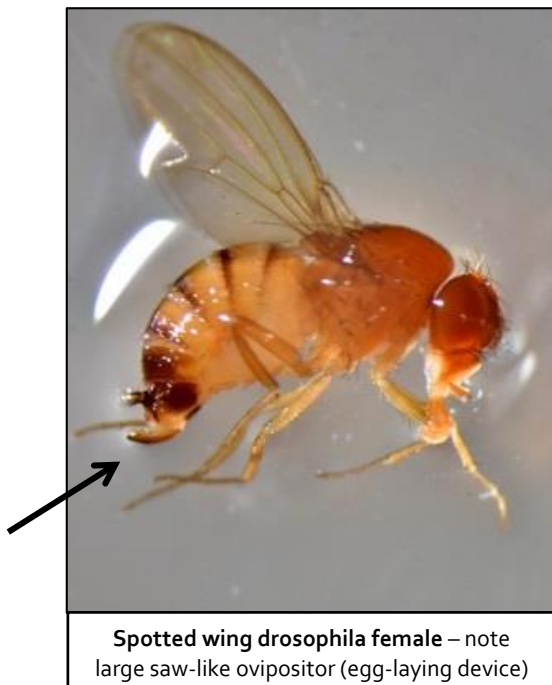
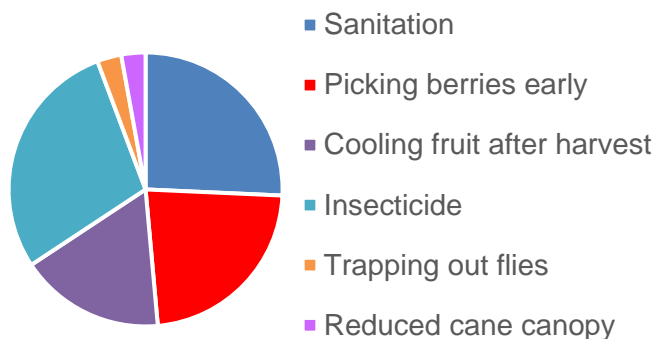
Other management practices used include **sanitation (picking off damaged and/or fallen berries; 64% of respondents), picking berries early (57%), and cooling fruit after harvest (47%)**. Only one grower (7%) used trapping out flies as a management technique, one (7%) used reduced cane canopy, and no growers used screen exclusion or floating row cover.

55% of respondents have visited the UW SWD website, and of those that had visited 57% found it “very useful”.

### Most frequently used Insecticides



### Management practices



# Cranberries

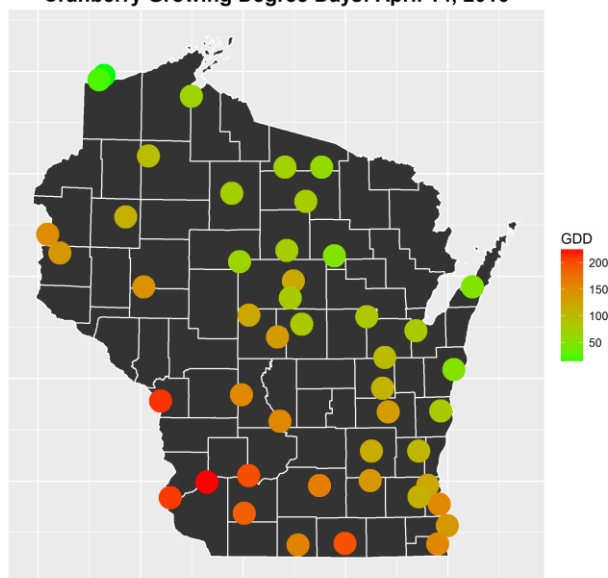
## The Importance of Degree Day Modeling in Cranberry

By: Elissa Chasen - Steffan Lab, UW-Entomology

In this section we will include information relevant to cranberry production. In particular, in each issue we will include information about the degree day accumulation for the cranberry plant and for *Sparganothis* fruitworm. In case you would like a refresher on growing degree days, in our next issue (on May 2<sup>nd</sup>), in the “General Information” section, we’ll include a summary of how degree days are calculated, and how using degree day models can improve production on your marsh.

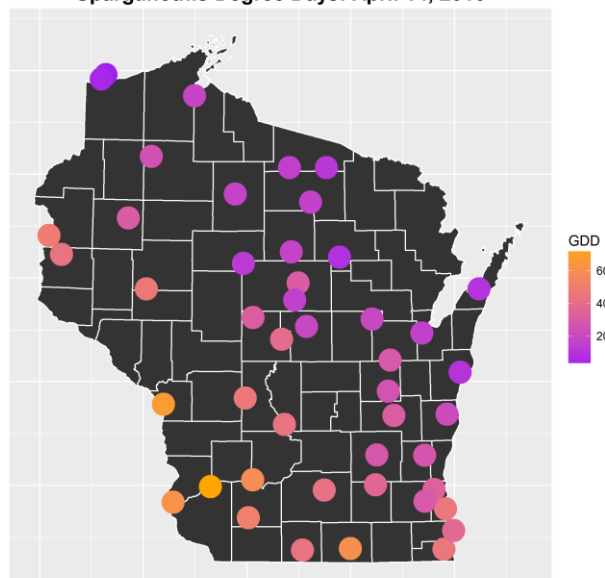
Degree days accumulate differently depending on your individual microclimate, so the best prediction will come from monitoring your own marsh temperatures and calculating degree days accordingly. However, this is of course often unrealistic, and the next best thing is to use weather data from nearby weather stations. For this reason, we’ve included average degree day accumulations from across the state of Wisconsin. The maps below show the range of cumulative cranberry growing degree-days (GDD) and *Sparganothis* fruitworm degree-days (DD) throughout the state of Wisconsin so far this year:

**Cranberry Growing Degree Days: April 14, 2016**



**Cranberry Growing Degree Days** are calculated using a base temperature of 41° F, and range from less than 50 DD in the northern counties, to over 200 DD in the southern counties.

**Sparganothis Degree Days: April 14, 2016**



**Sparganothis Degree Days** are calculated using a base temperature of 50° F, and range from less than 10 DD in the northern counties, to around 75 DD in the southern counties.

The table below will give you a more precise DD accumulation, and allow comparisons over the last couple of years of both plant and insect development. At this point in the year, both the plants and insects are silently accumulating DD. The plants are still in tight bud and Sparganothis fruitworm larvae are still overwintering.

April 14	Cranberry Growing Degree Days			Sparganothis Degree Days		
	2014	2015	2016	2014	2015	2016
Central WI (Wisconsin Rapids)	83	185	140	28	74	44
Northern WI (Minocqua)	37	98	80	5	29	20

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 April 6, 2016 issue of the Cranberry Crop Management Journal you will find information about:

- Dew Point for Cranberry
- Early Season Grower Workshops on April 28th
- Grower Updates



### **Profile of Current Grape Pathology Work: 2016 Growing Season**

*By: David S. Jones and Dr. Patty McManus*

Downy Mildew, Powdery Mildew, Black Rot, and other diseases pose an annual threat to grape production in Wisconsin. The yearly battle to control these diseases, combined with a lack of extension material addressing the disease susceptibility among cultivars, has led to several important questions within the industry in recent years: Are there any cultivars that should be avoided in our climate? Are there any cultivars that should be avoided in low-spray or organic systems? Can we trust the susceptibility ratings found in existing extension material?

As part of the Northern Grapes Project viticulture team, we are entering the second season of a two- year project directed toward gaining new insight on disease susceptibility in these cold-climate grape cultivars. During the 2015 growing season, two identical vineyards were studied, one in Sturgeon Bay, WI at the Peninsular Agricultural Research Station (PARS) and the other in Madison WI, at the West Madison Agricultural Research Station (WMARS), USDA zones 5a and 5b respectively. No fungicides were applied at either site, and weekly disease ratings and photos of each vine were taken from bud break through harvest.

Not surprisingly, our work from 2015 indicates that there is a significant difference between cultivars in disease susceptibility throughout a growing season. We also found evidence of a difference between foliar and fruit disease susceptibility, a distinction that is not made in most existing extension literature. While the first season of data indicates cultivar selection may be useful as a tool for combating disease, a second year of data will provide further information, as well as useful disease data and images that can be used by growers over the course of the 2016 growing season.

A third vineyard site is being added at PARS this season, allowing more ratings and images to be collected. With the addition of this third field site, we have an excellent sampling of the cultivars grown here in Wisconsin. This season we will be able to provide information regarding Petite Pearl, Marechal Foch, Leon Millot, Frontenac, Frontenac Gris, LaCrosse, La Crescent, St. Croix, Brianna, Marquette, and Valiant. As in 2015, sites will be scouted weekly and images of each cultivar will be collected.

During the upcoming 2016 season we will be providing regular updates in the Wisconsin Fruits Newsletter discussing disease progression on the cultivars included in our work, particularly emphasizing pictures useful in diagnosing important vineyard disease over the season. We anticipate regular updates on Downy Mildew, Powdery Mildew, and Black Rot. We will also report on additional diseases that appear in any of our test sites, and discuss appropriate action for management. We aim to provide a regular summary of disease findings at both sites to date and a discussion of appropriate action. These publications will be designed to provide an additional resource to help in decision making and disease identification throughout the season. We hope that our photos, observations, and management information will be valuable to growers as they scout their own vineyards.



## Grape Variety Developmental Stages

By: Janet van Zoeren

This summer I will also be scouting for grape developmental stages and for insect damage on grapes at the West Madison Agricultural Research Station. Once things start to warm up over the next month, we will also provide pictures and notes regarding the development stages reached by several grape varieties in each newsletter. We'll include information about the following wine grape varieties: Marquette, Frontenac, La Crescent, and Brianna. We will also include information about table grape developmental stages – to begin with I will be scouting Baltica as the earliest developing variety at WMARS.

This week, we visited the vineyards on a blustery and cold, although sunny, day. All buds were still in the dormant stage, which is good news, as temperatures are still dropping well below freezing at times, but is likely to change pretty quickly if this week's temperatures in the 50s and 60s will continue. Although not much is happening yet, here are some pictures from our trip, demonstrating Brianna variety wine grape and Baltica variety table grape buds, still fully dormant, and with no visible growth. Over the rest of the summer I will provide photos and information about Marquette, Frontenac, La Crescent, Brianna, and Baltica varieties, but for now it is sufficient to say all are still fully dormant.

I expect that by next issue these buds will look a little different!



Baltica table grape vines



Baltica table grape buds are still dormant



Brianna wine grape buds, also still in a dormant stage

## WFFVC Grape Grower Survey Results

By: Annie Deutsch and Christelle Guédot

On January 26, 2016, attendees of the Grape Track at the 2016 Wisconsin Fruit and Vegetable Growers Conference held in the Wisconsin Dells had the opportunity to participate in an interactive survey. The information from this session allows growers to see what practices or problems others are experiencing, as well as informing researchers what research topics should be their priority. The following report summarizes the survey results broken into sections of farm demographics and management practices, then followed by horticultural, insect, and disease-specific topics. In the tables, the “count” column indicates the number of respondents and the “percent” column indicates the % of respondents.

### FARM DEMOGRAPHICS

The attending growers are from farms spread fairly evenly throughout the state (n=36). The acres of grapes grown in each vineyard was: 21% grow less than 0.5 ac, 28% grow 1-2 ac, 28% grow 3-4 ac and 23% grow 5 or more acres (n=39). In the next two years, those numbers may be shifting upwards, because 62% reported plans to increase their vineyards by at least 1 ac in the next two years (n=37). One vineyard is certified organic, 3 people responded that they would like to transition to organic, and the remaining 33 vineyards are not organic. 30% reported growing wine and table grapes, and the remaining 70% are only growing wine grapes (n=37). The grape varieties grown and the major concerns in the vineyard are listed below and to the right.

#### Major concern in the vineyard

	Responses	
	Percent	Count
Insects	6%	2
Diseases	39%	14
Weeds	14%	5
Cold hardiness	8%	3
Nutrient deficiencies	3%	1
Poor pollination/poor fruit set	0%	0
Wildlife/birds	31%	11
<b>Totals</b>	<b>100%</b>	<b>36</b>

inputs remained relatively consistent from 2014 to 2015, and the shifts can be seen in the table to the right.

The use of Integrated Pest Management (IPM) appears to be a topic of interest to the Wisconsin grape growers. 69% reported that they are currently using IPM in their vineyards (n=32). Regardless if the grower is using IPM or not, 50% of growers feel that the major road-block for

#### Grape varieties grown (> ½ ac) (multiple responses allowed)

	Responses	
	Percent	Count
Frontenac	17%	15
Foch	8%	7
St. Pepin	11%	10
Concord	3%	3
Marquette	28%	25
Frontenac gris	7%	6
La Crescent	11%	10
Edelweiss	7%	6
St. Croix	2%	2
Marechal Foch	7%	6
<b>Totals</b>	<b>100%</b>	<b>90</b>

### MANAGEMENT PRACTICES

Vineyard owners and their families make up 80% of the reported labor force, and only 4 of the 35 responders reported that the majority of their labor is hired. Of typical vineyard management practices (e.g. pruning, leaf thinning, vine combing, harvest, etc.), 94% reported that 0-25% of the work is not mechanized, and the remaining 6% reported that approximately 25-50% of their management tasks are mechanized (n=36). Vineyard

#### Change in vineyard inputs from 2014 to 2015

	REDUCED INPUTS		INCREASED INPUTS	
	Percent	Count	Percent	Count
No change	75%	24	33%	10
Labor	0%	0	20%	6
Fertilizers	3%	1	7%	2
Herbicides	3%	1	7%	2
Fungicides	0%	0	20%	6
Insecticides	0%	0	0%	0
More than one of the above	19%	6	13%	4
<b>Totals</b>	<b>100%</b>	<b>32</b>	<b>100%</b>	<b>30</b>



implementing IPM in their vineyard is that it requires more knowledge than they currently have (n=28). Concurrently, 78% would be interested in more IPM training. Regardless, 91% of the grape growers reported scouting for pests on their vineyard (n=37). As for spraying for those pests, 32% reported that they spray pesticides based on a calendar spray schedule, while the remaining 68% do not (n=37). The question of how many growers are tracking degree days using any weather data available was not asked, but 31% stated that they are tracking degree days using temperature data from their own weather station/thermometer (n=35).

## HORTICULTURAL PRACTICES

Producing high quality fruit is critical for growing table grapes as well as growing grapes for wine. Currently, growers responded that 71% were very rarely asked to improve the quality of their fruit by their buyers, however 19% were asked to improve the quality some of the time and 10% were asked to improve the quality most of the time (n=21). The majority of growers (85%) reported using canopy management practices to improve fruit quality (e.g. initial shoot thinning, leaf thinning, lateral shoot thinning, and fruit thinning; n=34). Of the remaining 15% that did not use canopy management practices to improve fruit quality, half reported that they didn't have the time, while the other half would like to but don't know how (n=4).

The timings for leaf thinning and when to harvest are shown in the tables to the right. Of growers that grow La Crescent, 67% reported that they are concerned about berry shelling (i.e. berries falling off the clusters; n=21), and of those who were concerned, 64% estimated that they

lost 10% of their crop to berry shelling, 27% lost 20% of the crop, and 9% lost more than 30% of the crop (n=11).

Nutrient of main concern		
	Responses	
	Percent	Count
Nitrogen	30%	7
Phosphorus	0%	0
Potassium	61%	14
Magnesium	4%	1
Iron	0%	0
Other	4%	1
<b>Totals</b>	<b>100%</b>	<b>23</b>

Timing of leaf thinning		
	Responses	
	Percent	Count
Bloom	0%	0
Fruit set	5%	1
After fruit set	47%	9
Veraison	32%	6
A week or so before harvest	16%	3
<b>Totals</b>	<b>100%</b>	<b>19</b>

Method of determining when to harvest grapes		
	Responses	
	Percent	Count
Track Brix	24%	8
Track TA	0%	0
Track Brix and TA	39%	13
Keep the fruit in the vines as long as possible	3%	1
It depends on the buyer	33%	11
<b>Totals</b>	<b>100%</b>	<b>33</b>

Nutrient management is always a challenge (see table to left). At this time however, only 28% are annually taking petiole samples to assess the nutrient status of their vines (n=32). Despite the difficult and time consuming labor needed for vine management, 84% feel like the quality of their harvest reflects the amount of time and work that they put into their vineyard (n=31).

## INSECT MANAGEMENT

Overall, there were a variety of insect problems and resulting management practices amongst the growers. When controlling for insects, 50% of the growers used insecticides in multiple classes, 6% did not use insecticides, and the remaining 44% used organophosphates, carbamates, pyrethroids, neonicotinoids, or organic compounds (n=32). The most damaging insects, the number of insecticide sprays used in 2015, and the change in insect pressure from the previous season are in the tables on the following page.

Insect causing greatest economic damage in 2015		
	Responses	
	Percent	Count
Yellow jackets	28%	8
Japanese beetles	45%	13
Grape phylloxera	10%	3
Grape berry moth	0%	0
Grape flea beetle	3%	1
Rose chafer	7%	2
Spotted wing drosophila	0%	0
Cutworms	3%	1
Other	3%	1
<b>Totals</b>	<b>100%</b>	<b>29</b>

A handful of questions were asked regarding spotted wing drosophila (SWD), due to the significant damage it is causing in other fruit crops. 38% of the growers reported that they could identify both male and female SWD, 3% could only identify the males, and the remaining 59% could not identify either (n=32). While the majority of growers didn't check for the flies in fruit (53%), 39% did check and did not find them, and the remaining 8% found them but with non-significant damage (n=36). All of the growers reported that there was no grape loss due to SWD in their vineyard in 2015 (n=34).

Another set of questions focused on wasp and hornet management. 66% of the growers reported being able to identify wasps from bees, while 31% could identify wasps and bees from other flying insects but not from each other (n=35). 50% of the growers reported having problems with wasps and hornets in their vineyard, while 24% only had problems in some years and the remaining 26% did not have problems with wasps and hornets. Only 26% reported managing for wasps/hornets. The methods employed are described in the table below. Although there was not a consensus amongst the growers as to what types of grapes are most affected, all agreed that the damage is happening mid to late season (see tables below and to the right). 48% would like more information since wasps damage their grapes, 36% wanted more information, but do not feel like wasps are an issue and causing damage, and 16% said that they did not want more information and wasps are not a concern (n=31).

Management practices for wasps/hornets		
	Responses	
	Percent	Count
Spraying	25%	4
Finding and removing nests	44%	7
Trapping	13%	2
Other	19%	3
<b>Totals</b>	<b>100%</b>	<b>16</b>

Number of insecticide sprays applied in 2015		
	Responses	
	Percent	Count
0-1	43%	15
2-3	40%	14
4-5	6%	2
6+	11%	4
<b>Totals</b>	<b>100%</b>	<b>35</b>

Insect pressure in 2015 compared to 2014		
	Responses	
	Percent	Count
Greater	30%	10
Less	18%	6
Similar	52%	17
<b>Totals</b>	<b>100%</b>	<b>33</b>

Grape type with the most wasp/hornet damage		
	Responses	
	Percent	Count
White grapes	25%	6
Red grapes	4%	1
Table grapes	4%	1
Wine grapes	21%	5
More than one of the above	46%	11
<b>Totals</b>	<b>100%</b>	<b>24</b>

Timing of wasp/hornet damage		
	Responses	
	Percent	Count
All growing season	0%	0
May-June	0%	0
July-August	15%	4
September-October	81%	22
More than one of the above	4%	1
<b>Totals</b>	<b>100%</b>	<b>27</b>

## DISEASE MANAGEMENT

As mentioned above in a previous question, the growers identified disease issues as the most commonly cited concern in their vineyard. When asked about the frequency of fungicide applications, half the growers reported spraying 0-3 times, 44% sprayed 4-6 times, 3% sprayed 7-9 times and 3% sprayed more than 9 times (n=36). The chemicals being used were primarily a mixture of modes of action (47%), but 31% sprayed only a single type of fungicide, and the remaining 22% did not use any fungicide in 2015 (n=32). This survey found that copper or sulfur are not commonly used for disease control (74% did not use either one), however, 7% used copper only, 11% used sulfur only, and 7% used both copper and sulfur for disease control (n=27). Lime-sulfur was used slightly more frequently with 24% of growers reporting that they use it every year, 12% use it some years, and the remaining 64% do not apply lime-sulfur (n=33). The growers' practices of timing of the fungicide sprays and the most damaging diseases are listed below. Additionally, 52% of the growers have noticed that one grape variety seems to have more disease problems than the rest (n=31) and the varieties that they identified are listed below.

Rationale for timing of fungicide spray		
	Responses	
	Percent	Count
I spray preventatively, before any disease symptoms are noticed	25%	8
I wait until symptoms are visible, then spray	9%	3
Both a and b, depending on the disease and/or variety	59%	19
I do not spray fungicides	6%	2
<b>Totals</b>	<b>100%</b>	<b>32</b>

Apart from using fungicides, many growers reported that they are using integrated practices to control the level of disease in their vineyard. 85% reported that they consider the level of disease resistance when choosing what grape variety to plant (n=33). 63% used cultural control methods (e.g. sanitation) in 2015 to control disease pressure (n=35). Lastly, while only 9% reported using disease prediction models, 81% said that they keep an eye on the weather to guide their sprays (n=32).

Thank you to everyone who participated in this live survey!

Survey conducted by Annie Deutsch, Dr. Amaya Atucha (UW Department of Horticulture), Dr. Christelle Guédot (UW-Department of Entomology), Dr. Patty McManus (UW Department of Plant Pathology), Janet van Zoeren (UW Department of Entomology), Katie Hietala-Henschell (UW Department of Entomology), and Anna Maenner (Wisconsin Apple Growers Association).

Timing of the majority of fungicide sprays		
	Responses	
	Percent	Count
Before bloom	32%	8
Around bloom	36%	9
When fruit are sizing	4%	1
Only after we see symptoms	20%	5
Don't spray fungicides	8%	2
<b>Totals</b>	<b>100%</b>	<b>25</b>

Variety with most disease problems		
	Responses	
	Percent	Count
Marquette	23%	5
La Crosse	18%	4
La Crescent	36%	8
Petite Pearl	0%	0
Frontenac	0%	0
Foch	0%	0
Other	23%	5
<b>Totals</b>	<b>100%</b>	<b>22</b>

Disease causing greatest economic loss		
	Responses	
	Percent	Count
Powdery Mildew	9%	3
Downy Mildew	19%	6
Anthracoze	9%	3
Botrytis Bunch Rot	3%	1
Black Rot	19%	6
Other	3%	1
None—excellent disease control	9%	3
Don't know	28%	9
<b>Totals</b>	<b>100%</b>	<b>32</b>

## Tree Fruits

### Promalin, a frost rescue alternative for apples

By: Amaya Atucha-Fruit Crop Specialist UW-Madison

It's that time of the year once again when we start getting nervous about bud break and spring frost, and with the crazy weather pattern and swings in temperatures we have experienced in the last few weeks I thought this could be a timely resource for growers.

Studies in New York and North Carolina State have reported that applications of the plant growth regulator Promalin (gibberellin plus cytokinin) following a severe frost event can significantly increase fruit set and yield in apple trees by mitigating frost damage of flowers. Promalin will stimulate the retention of fruit with unviable seeds that otherwise would have dropped. Basically, it sends signals to fruitlets that the seeds inside are still viable and that it should keep on growing. This often results in the development of parthenocarpic (seedless) fruit.

The recommended rate of application is 1 pint (16 oz) of Promalin per acre using 100-150 gallons of water per acre within 24-48 hours of the frost event. However, there is evidence that applications up to 3 days after the frost event can still increase fruit set. The product can be applied from pink to petal fall stages; if applied later once fruit size is between 5-20 mm it will provide very little benefit. Ideally the product should be applied once temperatures rise to 65°F. However, if temperatures do not warm up the product can still be applied with cooler temperatures, as long as it is during the 3-day window of application.

Applications of Promalin work best after a significant frost event (below 28°F), when there is extensive flower damage. If the frost is not that severe (29-31°F) the application of Promalin may not be necessary, because probably there will be more flowers alive to achieve a full crop. Growers should assess the level of damage to their crop and determine the stage of development of flowers and fruitlets before applying the product. The studies conducted in NY and NC States were performed in Gingergold, Jonagold, and Gala on M.9, and Taylor Spur Rome on M.26, respectively.

There are still many questions to be answered regarding this “rescue treatment”, and it is certainly not way of setting a crop. Each grower will have to consider on his or her own if it is worth trying an application of Promalin to rescue the crop.



Although sunny, it's still chilly, and our apple trees haven't yet begun to bud out.

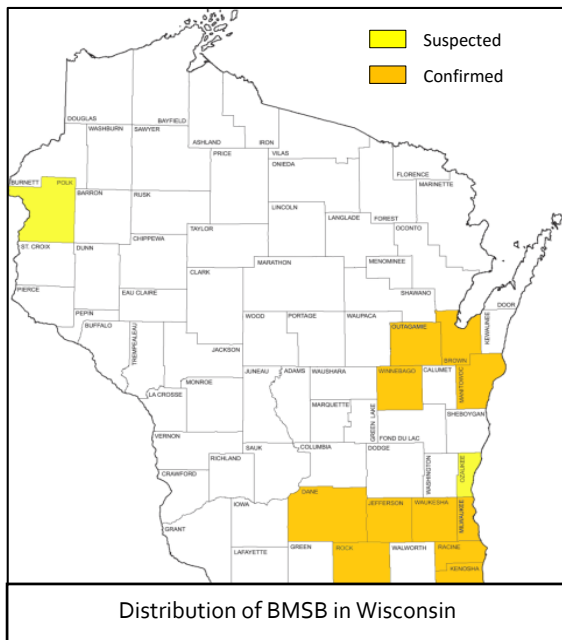
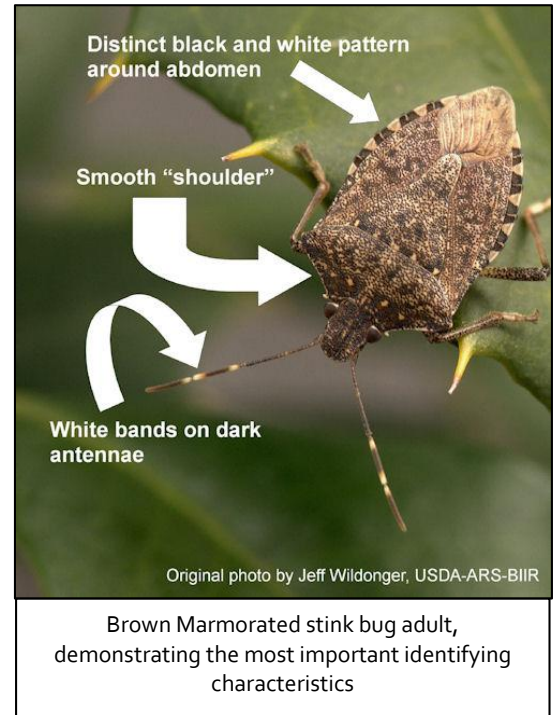


## Update on Brown Marmorated Stink Bug

Janet Van Zoeren and Christelle Guédot – UW Entomology

Brown Marmorated Stink Bug (BMSB; *Halyomorpha halys*) is an invasive insect pest which was first detected in Wisconsin in 2010. It is likely to become more and more evident in coming years, not only as a nuisance when adults aggregate and overwinter in our houses, but also as an economically-important agricultural pest. BMSB can be identified based on the white spots on their abdomen, white bands on their antennae, smooth shoulder, and brown-grey underside. However, many native stink bugs look similar to BMSB, which can make identification difficult.

BMSB was first detected in Wisconsin in 2010, and by 2015 was found in 11 counties. At present, BMSB is primarily regarded as a mild nuisance in Wisconsin, due to their tendency to aggregate and overwinter in homes. Trends in other states suggest that BMSB detection begins in urban areas, with populations slowly building up until, after about five years, bugs begin to appear as agricultural pests in the summer. Accordingly, it is likely that BMSB will soon move into agricultural crops, and will cause crop damage in Wisconsin over the next few summers. In fact, Michigan, which also first reported sightings in 2010, reported BMSB as an “agricultural nuisance” in 2015. For these reasons, it is important to increase our monitoring of BMSB and learn management practices for how to control BMSB in Wisconsin crops.



The Brown Marmorated Stink Bug is highly polyphagous, with the potential to feed on many crops, including fruits, vegetables, and ornamentals. In particular, it has been shown to cause high levels of damage in apples, tomatoes, and sweet corn, and shows particular preference for trees with reproductive structures. For this reason, apple is especially likely to show BMSB damage in the coming years. Reports from the eastern states have shown on average 25% of apples in infected blocks show BMSB damage, amounting to an estimated \$37 million profit decrease due to apple crop loss in the mid-Atlantic region in 2010. BMSB feeds by piercing the fruit and sucking juices, which can directly damage apples, causing a disfigurement commonly called “cat-facing”. In addition, damage from these bugs open the fruit up to secondary infections and necrosis, which cause the fruit to be unmarketable.

This pest presents a real risk to Wisconsin’s apple growers, and we will be working to reduce the risk of damage



through a combination of monitoring, research, and education. In collaboration with Krista Hamilton from DATCP, Peter Werts at IPM Institute, and an outstanding group of grower collaborators (please see the box at the end of this article if you would be interested in joining our team!), we will be working to determine where in the state BMSB provides the greatest threat to apple production, when in the season they first appear in apple orchards, and to show the yearly phenology of this pest. With the help of a student intern hired through the Guédot Lab, we provide updates here through the summer, offering a real-time early warning system to let you know which farms are likely to be at risk, when BMSB is first present in orchards, and when control measures should take place.

Future work across the United States is looking at management practices for BMSB, in order to provide growers with a variety of IPM techniques. Some management tactics currently being assessed for BMSB include the use of physical barriers, such as row covers, repellents, biological control agents, and biopesticides, along with more traditional chemical controls. Along with updates regarding Wisconsin-specific BMSB distribution and phenology, we will also keep you informed of the most up-to-date management recommendations.

So, what does all of this mean for you? If you are growing apples or other susceptible fruit crops in Wisconsin, you will want to watch for our updates this summer in order to learn about the distribution, abundance, and phenology of this new pest. Additionally, we are looking for grower collaborators for this summer, so please see the box below if you would like more information about how to collaborate on this project!

### **Are you an apple grower who is interested in collaborating with us this summer?**

The work we do would not be possible without a stellar team of grower collaborators, and we would love your help monitoring for BMSB this summer! We would provide you with traps and lures for the summer, along with identification support, and would provide email or phone support throughout the season. We simply ask that you set up the traps, check them weekly, and inform our student intern coordinator of your weekly trap-catch.

If you would like more information about being a BMSB grower collaborator, please contact Christelle Guédot by email at [guedot@wisc.edu](mailto:guedot@wisc.edu) or by phone at 608-262-0899.



© Wil Hershberger

BMSB eggs and newly-hatched nymphs



Original photo by B. Butler, [www.stopbmsb.com](http://www.stopbmsb.com)

Monitoring for BMSB with a black pyramid trap

## Calendar of Events

**April 21, 2016 – [Beginning Vineyard School](#)**

9:00am-4:00pm at Cambridge Winery, 700 Kenseth Way, Cambridge, WI

**April 28, 2016 – [Cranberry Early Season Grower Workshop](#)**

9:30am at Valley Corporation in Valley Junction, WI

1:30pm at Elm Lake Cranberry near Wisconsin Rapids, WI

**May 10, 2016 – Apple Cider Field Day**

9:00am-5:00pm at Kickapoo Orchard, 46490 State Highway 171, Gays Mills, WI

**May 26, 2016 – Berry Field Day**

White Pine Berry Farm, River Falls, WI

**June 16-19, 2016 – [Cranberry Blossom Festival](#)**

Wisconsin Rapids, WI

**July 14, 2016 – PARS Vineyard Walk**

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

---

### 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://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](mailto: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](mailto:vanzoeren@wisc.edu).