Wisconsin Fruit News

Volume 1 Issue 11 – September 2, 2016

Events this Week

September 7, 2016 – WMARS Vineyard Walk and Table Grape Tasting
5-7 pm; West Madison Agricultural Research Station, Verona, WI.

General Information

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

By: Brian Hudelson, Sean Toporek, and Ann Joy

The PDDC receives samples of many plant and soil samples from around the state. The following diseases/disorders have been identified at the PDDC from Aug 20, 2016 through Sept 2, 2016.

PLANT	DISEASE/ DISORDER	PATHOGEN	COUNTY
Apple ('Honeycrisp')	*Honeycrisp Leaf Chlorosis*	*None*	*Jo Daviess (Illinois)*
Apple (Unspecified)	*Bitter Rot*	*Colletotrichum gloeosporioides*	*Dane*
Blueberry	*Phomopsis Canker*	*Phomopsis sp.*	*Chippewa*
Cranberry	*Bitter Rot*	*Colletotrichum acutatum, Colletotrichum gloeosporioides*	*Juneau, Wood*
	Early Rot	*Phyllosticta vaccinia*	*Wood*
	Upright Dieback	*Phomopsis vaccinii*	*Monroe*
Grape	*Anthracnose*	*Sphaceloma ampelinum*	*Buffalo*
	Downy Mildew	*Plasmopara viticola*	*Buffalo*
	Septoria Leaf spot	*Septoria sp.*	*Buffalo*
Pear	*Fire Blight*	*Erwinia amylovora*	*Waukesha*

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

Endosulfan in strawberry and correction on the Rimon article.

By: Christelle Guédot, University of Wisconsin, Entomology

Endosulfan, which was mentioned on the article for strawberry rootworm in the last issue of this newsletter, has been gradually phased out by EPA. Its use in strawberry ended on **July 31, 2016,** ending the use of Endosulfan on all crops. **Thus, you are no longer allowed to use Endosulfan on any crop per EPA's regulations**. So please, make sure to consider alternative products mentioned in the article, such as Assail, Rimon, or Brigade.

In the last issue of the WFN (issue 10), we discussed Rimon as a reduced risk pesticide for tree fruit. After talking with the sales rep from ADAMA, he pointed out that ADAMA is the registrant for novaluron but does not market Rimon. Rimon is marketed by Arysta, formerly known as Chemtura. Rimon was first registered on pome fruit in 2005.

UW-Madison/Extension Insect Diagnostic Lab update

By: PJ Liesch

The following insects were reported to the Insect Diagnostic Lab (IDL) as being active in the state between Aug 18th and Aug 31st, and have the potential to impact fruit production in the region. If you would like more information about the UW Insect Diagnostic Lab, you can visit our website.

-Spotted Wing Drosophila is perhaps the top insect issue facing growers of late-season berries at the moment in the state. Similar to previous years, SWD damage can be very noticeable in late summer and early fall berry plantings. Reports of damaged raspberries and blackberries have come in to the UW Insect Diagnostic Lab from many areas of the state. Spotted wing drosophila has been the focus of many articles in this newsletter previously this year, so if you would like more information please check our previous issues.

Plum curculio. Photo credit of E. Levine, The Ohio State University, Bugwood.org.

-Insect damage noticed at the time of harvest: as we approach the time of harvest of fruit such as apples, many home and small-scale growers are just noticing damage and sending samples in to the UW Insect Diagnostic Lab. Damage from **stink bugs**, **plum curculio**, and **codling moth** have been noted, although at this point no corrective approaches can remedy damage that has already occurred. Still, knowing what's present on your particular fruit trees can help with scouting efforts for next year.

Yellow jacket feeding on a damaged grape. Photo by Janet van Zoeren.

-Secondary insect pests: several "secondary" insect pests are starting to be noticed in various fruit crops, ranging from tree fruit to grapes and caneberries. Insects such as **yellowjackets**, **ants**, **multicolored Asian lady beetles**, and many other "secondary" pests don't damage sound/intact fruit, and instead target fruit that has been compromised by physical damage, insect feeding, disease, etc. These insects will become more common as the season proceeds.

Unusual fruit crops for Wisconsin markets: Saskatoon

By: Janet van Zoeren and Amaya Atucha

Saskatoon berries are a healthy and tasty native Wisconsin fruit, which has become increasingly popular as a commercial crop and is often marketed in farm stands and farmer's markets. The fruit are called by a variety of names, including juneberry, serviceberry, prairie berry, and shadbush. The berries look somewhat similar to blueberries, although they grow on a small tree and they are not closely related. The fruit is considered healthful, providing antioxidants, protein, and fiber, and has been described as sweet, with an apple- or almond-like flavor.

Growing Conditions and Management

Saskatoon trees grow well in most conditions, although they do not prefer sites with a high water table. Ideal growing conditions are similar to those of strawberries—sandy loam soils with good drainage. Saskatoons can survive our Midwestern winters, being hardy to -40°F. However, many varieties bud out early in the spring, so may be susceptible to damage from a late spring frost; this can be prevented by staying away from planting Saskatoon in low areas. Mulching young saskatoons will help with water retention and weed management; both organic mulches such as woodchips and straw or black plastic mulches are suitable.

Ripening Saskatoon berries. Photo credit of Mary Ellen (Mel) Harte, Bugwood.org.

Regular pruning is important to keep saskatoons healthy and to optimize production. This is similar to many fruit trees – the most important elements are to remove any diseased, damaged, or low-spreading branches, to open up the canopy, and to keep the tree from getting to be too tall for easy harvesting. In general, irrigation is only needed during the first year, since saskatoons are adapted to survive with our normal annual Wisconsin rainfall. Disease and insect pests are rarely a significant problem for Wisconsin Saskatoon production. Birds can be a problem, and netting may be necessary if you find you are losing berries to the birds.

Some Cultivars for Wisconsin Production

Most cultivars are self-fruitful and do not need cross pollination. The following recommendations are based on the most commonly planted varieties in commercial orchards in Canada.

Honeywood stems grow to 11ft high and a spread of 11ft. They bloom later than other cultivars and bear large clusters of medium to large fruits (0.5-0.6 in). This highly productive cultivar is a good alternative for locations with high risk of spring frosts. Uneven ripening in big clusters, suitable for U-pick. Late harvest period. Fruit has a deep blue with dark purple skin when ripe.

JB-30 stems grow to 16ft high and a spread of 20ft. Very productive with large fruit (0.7 in) of uniform ripening; mid-season harvest.

Martin stems grow to 10ft high and a spread of 13ft. Medium productivity with medium to large fruit (0.6 in). This is an early cultivar with excellent fruit flavor and deep blue color.

Nelson is a compact bush with stems growing up to 8ft and a spread of 8ft. It flowers and fruits about a week later than other cultivars, and so is more likely to avoid spring frost. Fruit has deep blue skin when ripe; uneven fruit ripening within the cluster.

Northline stems grow to 12ft high with a spread of 18ft. Very productive; early harvest; medium-large sweet fruit (0.6 in). Precocious variety.

Smokey stems grow about 14ft high with a spread of 18ft. Fruits are small size (0.5 in) but have an excellent flavor (high sugar to acidity ratio). Flowers bloom mid-season giving some protection against spring frosts. Very productive.

Thiessen stems grow to about 15ft high with a spread of 18ft. Blooms earlier than other varieties, making it more prone to frost damage. Large fruit (0.7 in) of uneven ripening; best for U-pick and home gardens.

Uses and Benefits Saskatoons have many of the same excellent nutritional benefits that characterize the more tropical "superfruits" found in the grocery store. The fruit have high levels fiber, protein, antioxidants, iron, Vitamins C and A, magnesium, and calcium. They also taste good, whether eaten fresh or processed into a juice, jam, wine, or other value-added product, and so can contribute to either a farm-stand or a wholesale production system.

Mechanical harvesting black currants

By: Jason Fischbach and Janet van Zoeren

In the previous issue of the Wisconsin Fruit News (Volume 1, Issue 10, pages 3-5), we included an article on growing black currants in Wisconsin. This week we'll discuss the possibility for using a mechanical harvesting system to increase the efficiency and economic viability of black currant production.

Black currants are a viable crop for Wisconsin growers and can be harvested with little to no modification to sway-action blueberry harvest equipment. Using a combination of pruning and trellising to keep the stems upright can significantly improve harvest efficiency.

Black currants are well suited for commercial production in the fruit growing regions of Wisconsin, due to their excellent winter-hardiness and frost tolerance. The healthful properties of black currants, and their use in value-added products, particularly for beverages and jams, represents a niche market opportunity for growers across the state. Viable production depends on a cost-effective means of harvest, particularly if the fruit is sold to value-added processors at wholesale prices. Hand-picking is labor intensive and is seldom cost-effective except for fresh-markets. Machine harvesting black currants with a blueberry picker is possible, but has three main challenges: 1. the dense bushes with fruit born along the length of the branches insulates the berries from the sway action of the harvester, so the berries remain attached to the stems, 2. the long ripening window and lack of labelled growth regulators in Wisconsin (to manage abscission) can make harvest timing a challenge, and 3. the heavily laden outer-canes bend to the ground and without pruning and training can often fall beneath the catch plates of the harvester. Jason Fischbach, county extension agent in Bayfield County, has been working with Chris Dale at Highland Valley Farm in Bayfield to evaluate the effects of pruning and trellising strategies on mechanical harvest efficiency.

For these experiments, harvesting was done when 95% of the berries had turned black and before more than 5% were overripe. The cultivars used were Titania and Ben Sarek. Trellising systems used included a "flat fan system", a "two-wire system", a "ring system", and the "hedging system", which are described below.

For the **flat fan system**, three wires at 24", 36", and 54" from the ground were run the length of the row and the canes were tied to the wires. As with standard pruning, during the dormant season the 4-year-old canes were removed and an even mix of 1- to 3-year-old canes were retained with priority given to the most upright canes.

For the **two-wire system**, two single wires, each on a side of the row, were tied to each other to squeeze the canes into a 6-12" space. The wires were 12" from the ground in 2008 and 2009 and 36" from the ground in 2010. For the **ring system**, twine was used to encircle each plant and pull it tight to force all the canes in an upright position. Finally, for the **hedging system**, the tops of each plant were headed to shorten the stature of the plant and reduce the chances of canes bending to the ground.

For all three years that the trials were conducted, the flat fan trellising system was most conducive for machine harvest, with an average of 83.6% of the fruit harvested by machine. The drawback for this system was the considerable labor and material expense required to construct the trellis and fasten each cane to the three wires each year.

Two-wire trellis system for black currants.

The two-wire trellis was better than the control for machine harvesting, especially when the wires were at 36", instead of at 12". The ring system was also effective, but required more labor than the two-wire system. The hedging system was easiest to maintain, since it did not require any manpower for trellising, but reduced total yields compared to the control with no consistent improvement in machine harvest efficiency.

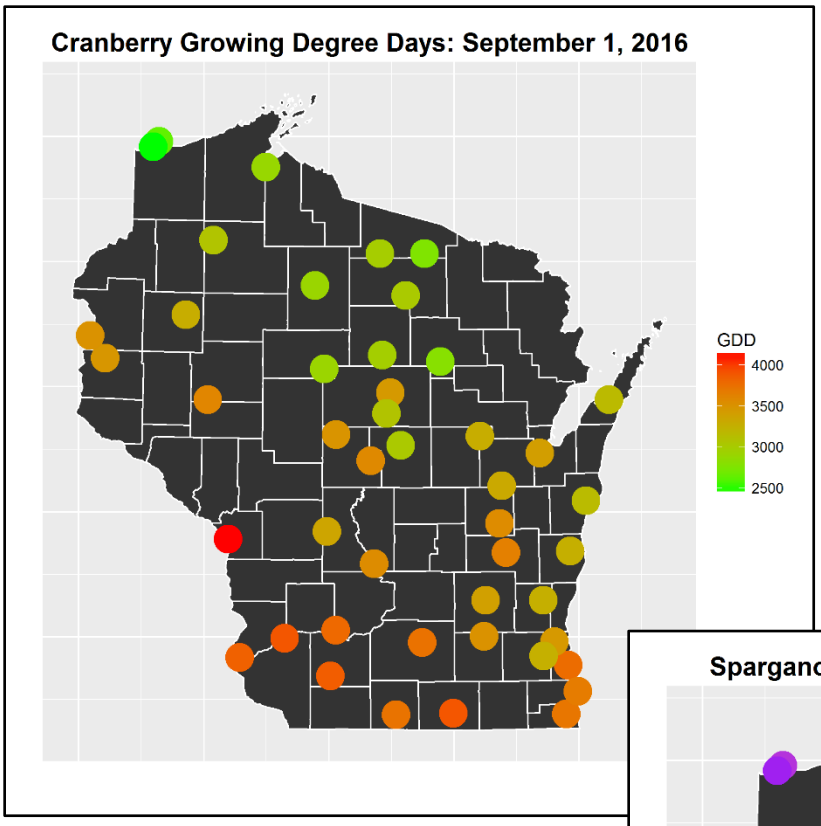
Overall, these trials show that machine harvest of black currants is feasible with blueberry harvesters with 75-85% first-pass harvest efficiency. Clearly, putting the canes in a more upright position improves the efficiency of machine harvesting. Although hedging to reduce top-loading does maintain the plants in a more upright position it significantly reduces yields. Renewal pruning to remove the exterior and prostrate stems can also be effective in maintaining more upright bushes. If sold to a processor, the price for black currants may not warrant the pruning labor, so a coppice renewal system might be more practical. If coppiced, some form of shoot management is likely necessary to force the stems up instead of out. Planting varieties with stronger, more upright canes could also achieve the same objective, but variety selection needs to consider other factors such as harvest date, flavor, and fruit presentation. For more information about black, red and white currant varieties, please see our article in the previous issue of this newsletter (link provided above).

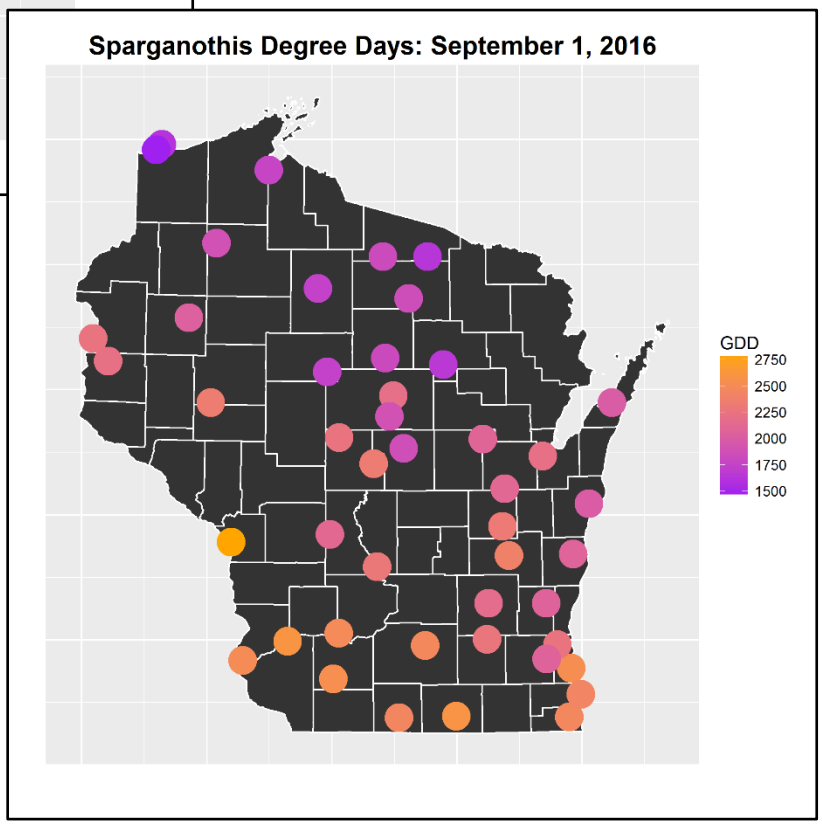
In summary, the best trellising system to be used will be a trade-off between increased labor effort, for the flat fan or two-wire systems, versus decreased harvest efficiency, for hedging or coppicing systems.

Cranberry Degree-Day Map and Update: as of September 1, 2016

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

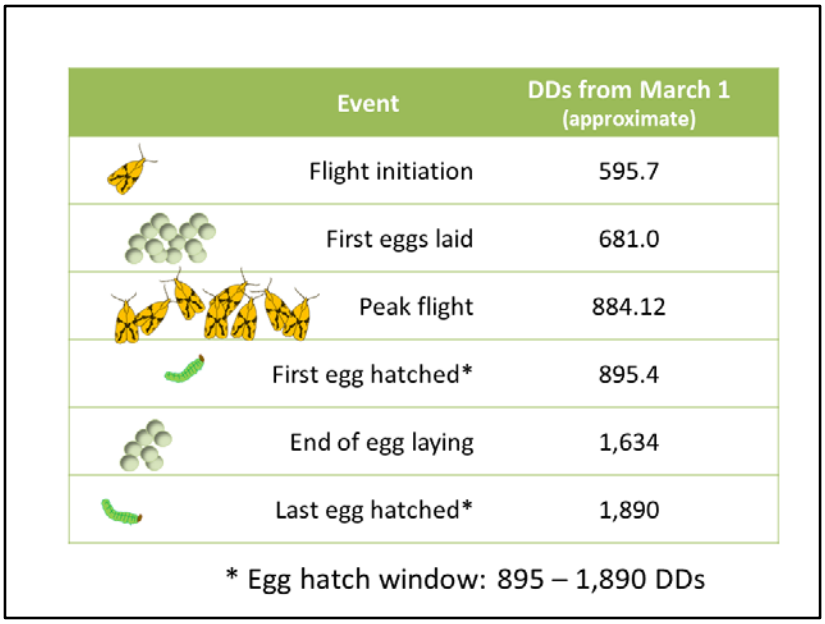
The maps below show degree-day accumulations for cranberry plants and Sparganothis fruitworm across Wisconsin up through September 1, 2016. Temperature thresholds used for these calculations are 41 and 85 °F for the plant, and 50 and 86 °F for Sparganothis.





Plant DDs throughout WI range from 2,477-4,124. The central WI growing region has accumulated around 3,600 DD, while the northern WI growing region has accumulated around 3,000 DD.

Throughout WI, Sparganothis degree-days range from 1,476-2,782 DD. In central WI, Sparganothis DDs are around 2,300, while in northern WI, Sparganothis DDs are about 1,800. See the image below for life history benchmarks of interest for Sparganothis fruitworm and the associated degree-day estimates for each benchmark (Deutsch et al. 2014). In northern WI, larval emergence is nearly complete.



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

Sept 1	Cranberry Growing Degree Days			Sparganothis Degree Days		
	2014	2015	2016	2014	2015	2016
Central WI (Wisconsin Rapids)	3,256	3,447	3,583	2,089	2,187	2,333
Northern WI (Minocqua)	2,802	2,852	2,988	1,722	1,696	1,835

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

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 August 10th, 2016 issue of the Cranberry Crop Management Journal you will find information about: timing of insecticide applications, potassium management, observations from the field, atmospheric nitrogen fixation, and grower updates.

Grape insect pests: multicolored Asian lady beetle

By: Janet van Zoeren and Christelle Guédot

As grape berries near harvest, the main insect pests found in the vineyard are yellow jackets and other wasps, and multicolored Asian lady beetles (MALB). These pests 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, although it is thought wasps may be able to open up undamaged berries as well. Wasps not only damage the berries, but are a nuisance and pose a potential safety issue due to stings. More information about yellow jackets and wasps in the vineyards can be found in the Wisconsin Fruit News, Issue 8 (page 17).

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. Like so many of our pests, MALB is non-native; however, an interesting thing about this insect is that it was in fact brought here initially with the idea that it be beneficial, as they eat aphids and help reduce pest pressure. In fact, MALBs do feed on a number of our agricultural pests, and generally are a net benefit on the farm. Unfortunately, they additionally can be a nuisance or a pest in the vineyard in the fall.

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 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).

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

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.

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.**

Product Name	Mode of Action (IRAC code)*	REI	PHI
Baythroid XL ***	Beta-Cyfluthrin (3A)	12 hours	3 days
Mustang Maxx ***	Zeta-Cypermethrin (3A)	12 hours	1 day
Scorpion 35 SL	Dinotefuran (4A)	12 hours	1 day
Venom 70 SG	Dinotefuran (4A)	12 hours	1 dav
Belay 2.13 SC	Clothianidin (4A)	12 hours	0 days

***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.

Grape disease update

By: David S. Jones and Patty McManus

PARS (Sturgeon Bay): As of August 28th, we had accumulated 1929 GDD (base 50) and have recorded 7 rain events in the past two weeks. Fruit has sized nicely in the past two weeks, and ripening is progressing quickly. Harvest is still at least two weeks away on most cultivars, as sugar still remains low and acid remains high.

Powdery mildew has continued to cause damage at this site over the past two weeks. Damage is particularly bad on Leon Millot, Marechal Foch, and Brianna. Leaves, canes, rachises, and fruits are damaged on all three of these cultivars. Frontenac, Frontenac Gris, and Marquette are all lightly infected. Infections are particularly severe on rachis tissues on Frontenac and Frontenac Gris. LaCrosse berries and canes are showing damage, but leaves are not colonized by the disease at this time. We have passed the peak susceptibility window for powdery mildew berry infections on most cultivars, but

berries can still be indirectly affected through damage caused to the rachis as ripening occurs. The rachis is responsible for transferring water and nutrients to the developing berries, so severe damage to the rachis will slow or halt this process and deter effective ripening. Make sure to scout cane and rachis tissues as you scout for powdery mildew in addition to leaves. Several cultivars have minimal foliar symptoms but advanced rachis or stem tissues at this time, highlighting the importance of full-plant scouting. Remember that symptoms for powdery mildew are different on leaves, canes, and fruit.

Downy mildew damage is severe on LaCrescent, LaCrosse, and Valiant. St. Croix and Brianna both have light levels of infection, but have not been severely damaged by the disease. Only the berries of Valiant have been damaged by downy mildew this season. All other cultivars have shown only foliar symptoms.

Phomopsis fruit rot picked up significantly at PARS this past week. Damage is particularly bad this year on St. Croix, Brianna, and Petite Pearl. Marquette has less extensive damage. Remember that berries that are browning, shriveling, and developing pycnidia at this time are NOT black rot. Black rot damage on fruit is done for the year, although foliar infections are still possible on new growth.

WMARS (Madison): As of August 28th, we had accumulated 2339 GDD (base 50) and have recorded 4 rain events in the past two weeks. Fruit has ripened nicely over the past two weeks. Harvest of Brianna occurred during the final week of August, with harvest of other cultivars fast approaching in the first two weeks of September.

Powdery mildew has still not caused significant damage on any cultivars at this site.

Downy mildew has continued to damage on LaCrosse, LaCrescent, and Valiant. Damage is also severe on St. Croix and Brianna at this site. This differs from the Sturgeon Bay site, where these final two cultivars are minimally damaged by the disease. LaCrosse, LaCrescent, Valiant, and St. Croix are all being defoliated by downy mildew at West Madison.

Phomopsis fruit rot has picked up in the past two weeks on Brianna and St. Croix. Cane and leaf lesions are present in addition to fruit damage.

Weekly Disease Images/Discussion:

Above: powdery mildew damage to the rachis of a Frontenac Gris cluster. Note that these symptoms are not at all "powdery" in appearance as we might expect on leaves. The black webbing is caused by cell death due to poor epidermal expansion of infected cells. Photo by D.S. Jones.

Above and at right: downy mildew damage on a Valiant leaf. Downy mildew infections that occur late in the growing season, particularly during hot, dry periods, often display little sporulation on leaf undersides and widespread necrosis on the surface of infected leaves. Note that sporulation is not visible with the naked eye on the underside of this leaf. These necrotic lesions typically follow the veins of the leaf. Photos by D.S. Jones.

At left: Phomopsis fruit rot on a Brianna cluster. These symptoms are commonly mistaken for black rot, but remember that black rot only causes damage prior to fruit ripening, while phomopsis fruit rot causes damage during ripening. The numerous black "pimples" across the surface of damaged berries are asexual fruiting bodies of the fungus, called pycnidia. Unlike black rot mummies, these infected fruits will mostly fall to the vineyard floor to overwinter rather than clinging to the rachis. The pycnidia present on the berry surface will help to supply spores to cause next year's infections when warm spring temperatures and rain arrive next season. Photo by D.S. Jones.

At right: Phomopsis cane spot on Brianna. The cane spot symptoms of this disease are found at the base of a cane, close the the junction between cane and spur. Long, cracked lesions expand upwards from the junction between cane and spur, often resulting in a blackening and cracking of the entire area. These regions often become brittle, so snapping can be common. Look for these symptoms where you see fruit resembling the image above, as the two are typically found together. The phomopsis fungus also overwinters in infected canes, so it is common to see damaged fruit in regions with heavy cane damage due to the proximity of the fruit to overwintered spores during peak susceptibility of young fruits in the spring. Photo by D.S. Jones.

At left: St. Croix cane, rachis, and berries damaged by Phomopsis fruit rot. Look for the combination of these symptoms as you scout for this disease. Photo by D.S. Jones.

Above: Sour rot. Photo by Eric Stafne, Mississippi State University.

Sour Rot has appeared to a small extent on several cultivars. It appears to be most common on tight clustered cultivars such as LaCrosse and Brianna in our trials this year.

What is sour rot?

Sour rot is a condition that is associated with berry colonization by acetic acid producing species of bacteria, often accompanied by several different fungal species. Sour rot typically develops on fruit that is poorly aerated by leaf thinning or damaged in some way. While the combination of acetic acid producing bacteria and fungi can vary, the common result of sour rot damage is the collapse of affected the cluster

radiating from centrally infected berries accompanied by a sour, vinegary smell. The vinegary smell is caused by the production of acetic acid inside of the berries as the bacteria convert ethanol into acetic acid. Infected berries turn light brown and soft, and do not develop sporulation as infection progresses. Damage can spread rapidly outwards from infected fruit, ultimately destroying most of the affected cluster. Sour rot can cause serious problems with off flavors in wine made from infected grapes, so high levels of this disease can make a crop unmarketable.

What do I do if I notice that my vines are being damaged by sour rot?

Maximizing air circulation helps to minimize sour rot, so make sure to conduct leaf pulling to open up canopy and speed the drying of the canopy. Sour rot also enters fruits that have suffered damage to the skin. Bird damage can be a source of entry for these organisms, so minimizing bird pressure in your vineyard may help to minimize sour rot. Feeding damage from insects such as wasps and grape berry moths can also serve as entry points for the organisms that cause sour rot. Fungicides can also be used to address problems with sour rot, but sour rot is best controlled by maximizing air flow through leaf pulling and avoiding damage from birds and insects. Michigan State University Extension recommends complimenting appropriate leaf thinning with applications of Serenade if fungicide application is necessary.

Having scouting troubles? Don't forget about our diagnostic resources!

UW-Madison Plant Disease Diagnostic Clinic: http://labs.russell.wisc.edu/pddc/
UW-Madison Insect Diagnostic Lab: http://labs.russell.wisc.edu/insectlab/
UW-Madison Soil and Forage Lab: https://uwlab.soils.wisc.edu/fees/

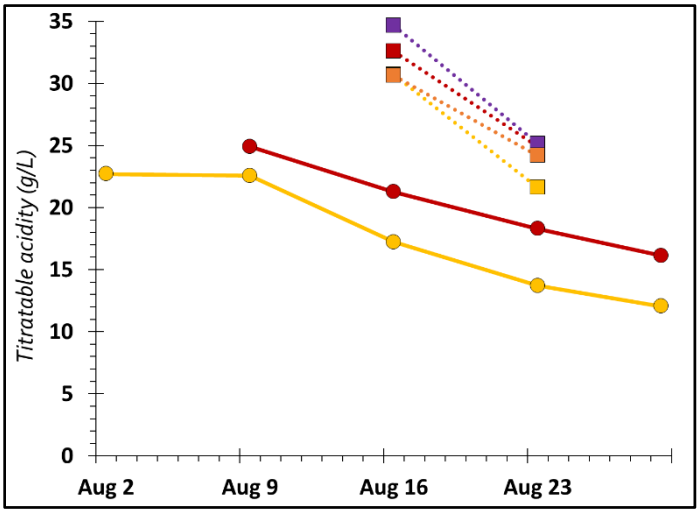
Wine and Table Grape Developmental Stages

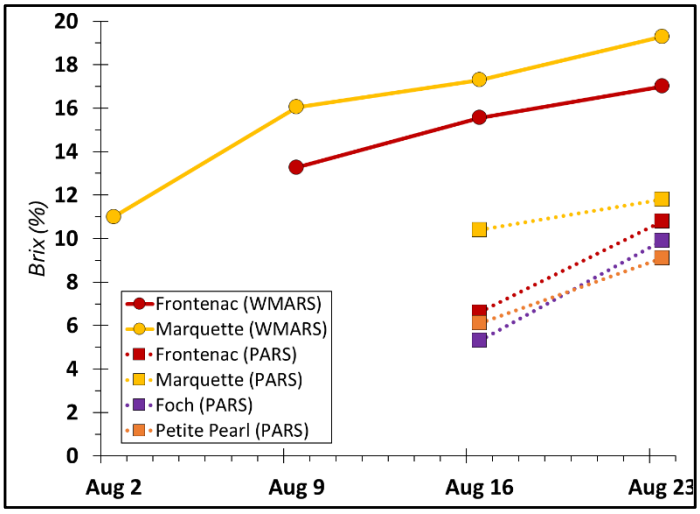
By: Janet van Zoeren, Annie Deutsch, Madeline Wimmer, and Amaya Atucha – UW-Extension

We have begun harvest at the West Madison Agricultural Research Station (WMARS), and are now monitoring sugar and acidity of grapes at the Peninsular Agricultural Research Station (PARS) as they begin to soften and ripen. Sugar (Brix) and TA (titratable acidity) concentrations are shown in the chart and graphs below.

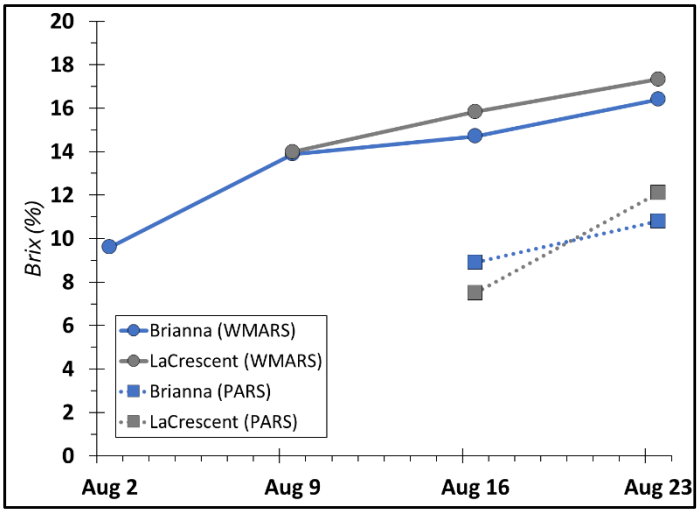
Aug 30, 2016 **Grape Brix and Titratable Acidity (TA)**

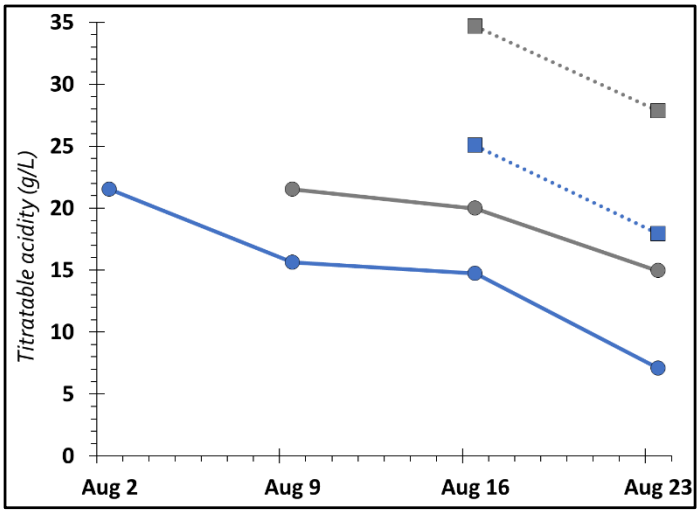
	WMARS		PARS	
Grape Variety (Reds)	**Brix (%)**	**TA (g/L)**	**Brix (%)**	**TA (g/L)**
Frontenac	16.1	16.1	10.8	24.932.6
Marquette	18.4	12.0	11.8	21.6
Foch	n/a	n/a	9.9	25.1
Petite Pearl	n/a	n/a	9.1	24.2
Grape Variety (Whites)	**Brix (%)**	**TA (g/L)**	**Brix (%)**	**TA (g/L)**
Brianna	HARVESTED	HARVESTED	10.8	17.9
La Crescent	15.8	20.0	12.1	27.8





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





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

Somerset table grapes and Brianna wine grapes have already been harvested at WMARS. The remaining varieties are nearing full maturity, and will most likely be harvested in the next two weeks. At PARS grape are still just beginning to ripen, and will remain on the vines for a few more weeks.

Following photos taken on August 30th at West Madison Agricultural Research Station.

La Crosse at WMARS

La Crescent at WMARS

St. Croix at WMARS

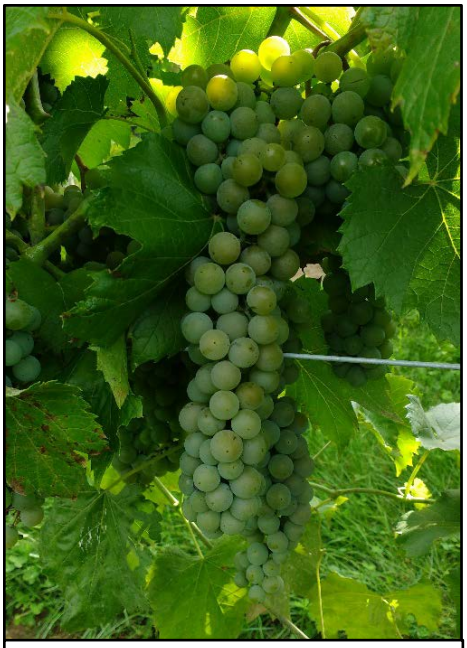
Frontenac at WMARS

Marquette at WMARS

Einset at WMARS

Following photos taken on September 1st at the Peninsular Agricultural Research Station.

Brianna at PARS; "berries at intermediate sugar values" E-L number = 36



La Crescent at PARS; "berries begin to soften" E-L number = 34

La Crosse at PARS; "berries begin to soften" E-L number = 34

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

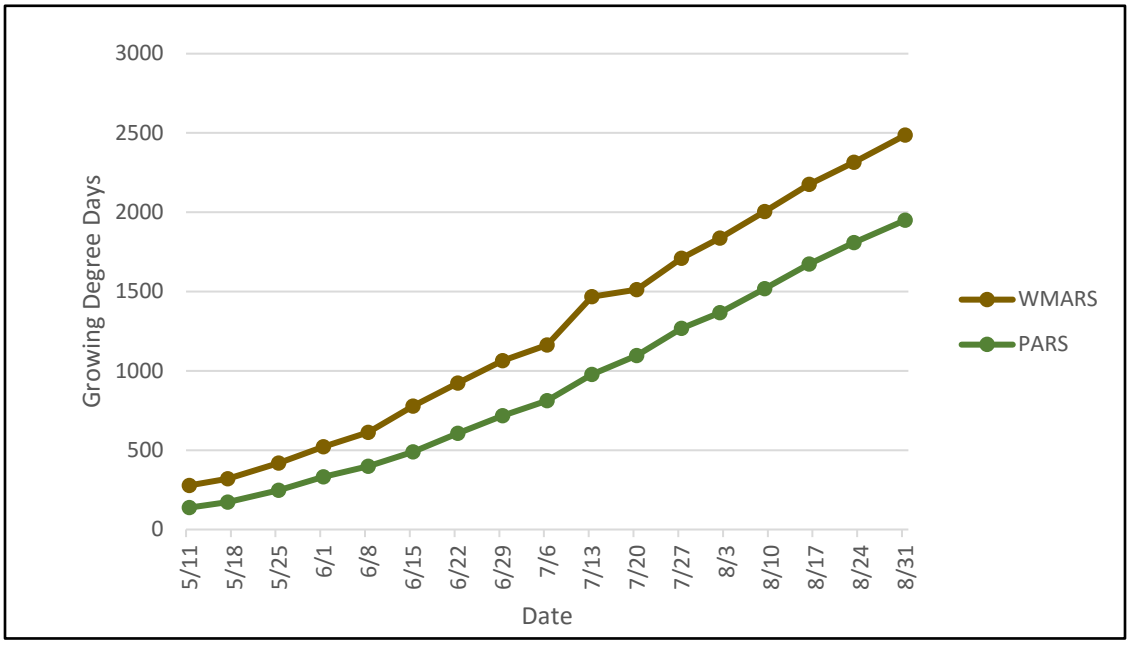
Frontenac at PARS; "berries begin to enlarge" E-L number = 35

The growing degree day accumulations as of August 31st for this year are: 2,486 GDD at WMARS and 1,950 GDD at PARS. All growing degree days are calculated using a base of 50°F.

Grape Growing Degree Days

April 1 - Aug 31, 2016

	2106	2015
WMARS	2486	2330
PARS	1950	1731



Reduced risk insecticide: Entrust

By: Christelle Guédot, University of Wisconsin, Entomology

Insecticide: Entrust

- Available as 80WP (80% AI, Wettable Powder) and 2SC (2 lb AI, Soluble Concentrate)
- Restricted re-entry interval (**REI**): 4hours
- Pre-harvest interval (**PHI**) of 7 days on pome fruits and variable on stone fruits (7 days for cherry)
- No more than 4 applications for pome fruits and 3 for leafrollers per season
- Do not exceed a total of 9 oz. per acre per season of 80WP and 29 fl. oz. of 2SC
- Rate of use per acre: 1.25 – 3 oz. of 80WP and 4-10 fl. oz. of 2SC based on pest and crop
- Minimum interval between applications is 10 days for pome fruits, and 7 days for stone fruits

Entrust is registered for use in Wisconsin on pome fruits, including apple, crabapple, pear, and quince as well as stone fruits, including apricot, cherries, nectarine, peach, prune and plum. It is marketed by Dow AgroSciences® under the formulations 80WP (80% active ingredient as a Wettable Powder) and 2SC (2 lb of active ingredient per gallon as a Soluble Concentrate). Entrust is a Naturalyte insect control product that is OMRI approved and contains the active ingredient Spinosad. Spinosad is biologically derived from the fermentation of *Saccharopolyspora spinosa*, a naturally occurring soil bacteria. Entrust is in the class of the Spinosyns (IRAC code 5). Its mode of action is primarily on the nicotinic acetylcholine receptors, causing excitation of the insect nervous system which leads to muscle contractions, paralysis, and eventually death. Entrust is most effective through ingestion of treated plants but also has highly effective contact activity.

Entrust is registered for control of spotted tentiform leafminer, codling moth, European grapevine moth, oblique banded leafroller, pandemis, light brown apple moth, oriental fruit moth, tufted apple bud moth, thrips, cherry fruit fly, green fruitworm, red banded leafroller, variegated leafroller, peach twig borer, and for suppression of apple maggot.

In our previous trials conducted at the Peninsular Research Station in 2014, Entrust showed good activity against plum curculio, codling moth 1st and 2nd generations, and leafrollers.

Entrust may be applied by ground equipment, chemigation, and by air (see label for specific application regulations). Dilute sprays should be sprayed to the point of runoff.

Entrust is toxic to bees exposed to treatments for 3 hrs. following treatment. As a precaution, avoid applying any pesticide during bloom when bees are flying.

Entrust is toxic to aquatic invertebrates and must not be applied directly to water.

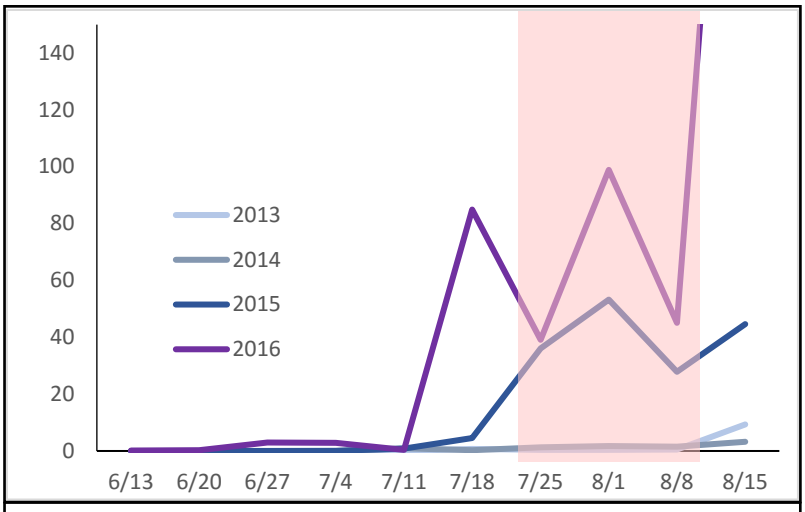
As always, make sure to read the label before using any pesticide. You can find the labels of Entrust at the following link for Entrust 80WP and for Entrust 2SC.

Impact of spotted wing drosophila on the cherry industry – 2016 season

By: Janet van Zoeren and Christelle Guédot

Spotted wing drosophila (SWD), since they were first discovered in Wisconsin six summers ago, has become one of the most damaging pests in many of our fruit crop industries. Even as recently as three years ago, SWD was only a minor pest in cherries. By now, as one grower put it, "spotted wing drosophila is the most devastating thing we've had to deal with". However, cherries are a resilient crop, and with diligent control and a little understanding of the pest, growers in Wisconsin this summer (2016) still yielded 11 million pounds of cherries, on par with the most productive seasons in the past decade. For this article, we spoke with Jim Seaquist, owner of Seaquist Orchards, Lee Petrina, owner of Zekes Stony Creek Farm, and Matt Stasiak, superintendent at the Peninsular Agricultural Research Station, to learn about the effects of spotted wing at an industry level.

The first thing to understand is what has caused SWD to become so problematic in recent years. One big factor is timing – since being introduced, the initial SWD trap catch has been earlier every year, according to Matt Stasiak (see graph at right). In 2013 the first SWD trap catch barely coincided with tart cherry harvest, while by 2016 first trap catch was on June 10th, well before harvest began, giving the SWD time to build up populations, and to infest ripening and ripe fruit.



SWD trap catches in Door County tart cherries from 2013-2016. The shaded pink area represents the approximate time of cherry harvest in Wisconsin. In 2013 and 2014 SWD populations began to increase after harvest was over, in 2015 they increased just as harvest was beginning, and in 2016 they increased over a week before harvest began.

There are several reasons why SWD in particular demands so much attention from cherry growers. Compared to other cherry pests, such as plum curculio and cherry fruit fly, SWD have more and quicker generations, and so can rapidly reach outbreak levels. They also require constant insecticide coverage to keep populations down. Additionally, the "zero tolerance rule" of SWD in the processing facilities serves to exacerbate the problem; in reality eliminating all SWD from all cherries may prove impossible if populations continue to climb.

Another factor contributing to the difficulty of managing SWD is the number of wild hosts used by this pest. Because SWD larvae can develop in wild brambles, buckthorn, honeysuckle, dogwood, and other common or invasive plants often plentiful in the landscape surrounding orchards, even a perfect spray schedule will not eliminate the pest from the area. One potential management practice, which growers have expressed interest in pursuing further in future years, would be removing these wild alternate hosts. Unfortunately, because there are so many of them and many are invasive themselves, it is likely to be a difficult battle. Another thorny problem would be to determine how far from the orchard these wild hosts should be removed from to decrease the importance of such reservoirs for flies.

At present, SWD management practices generally involve spraying as soon as adults are trapped in the area, and continuing to spray every 7-10 days until harvest. In our conversations with Matt Stasiak and the growers, it was emphasized that, for long term control success, it is important to delay resistance by ensuring adequate coverage and rotating chemistries. After this summer, given that there was higher SWD pressure but most orchards still harvested a good crop, spraying often with alternating chemistries appears to effectively keep SWD to low levels. However, there is concern about how economically feasible that is, given an approximately 25-40% increase in cost and man-hours.

Another concern raised by the growers we spoke with is that, by spraying pyrethroids to control SWD, many orchards have shown an increase in mite pressure. Although the mechanism for this correlation hasn't been fully researched, it is suspected that pyrethroids eliminate natural mite predators, causing outbreaks. This summer, pyrethroid applications combined with hot, dry weather means that mites are especially bad, and many growers will need to control for them as well.

Despite all of these discouraging observations this summer, there are still plenty of things to give us hope going forward. As mentioned previously, this was overall in Wisconsin still one of the best yields in recent years. Furthermore, in coming years, researchers here at the University of Wisconsin, as well as at MSU, in Oregon, and across the country are putting SWD control as a top research priority, so more accurate management strategies will hopefully come soon. At the Guédot lab, we applied for funding with the Wisconsin DATCP to look at the potential to use biological control agents to control SWD in cherries, which would help control SWD in the surrounding landscape as well as in the orchards, and researchers at other labs are looking at more effective chemistries or spray schedules to reduce the number of applications necessary. In summary, the feeling among the people we spoke with is that spotted wing drosophila does represent a significant problem, but one that we hope to tackle with more practical, and environmentally- and economically-friendly management practices in the future. For more information on current management practices for SWD in cherry, please refer to Wisconsin Fruit News Volume 1, Issue 5 (pages 17-21).

Cherries with spotted wing drosophila damage. Photo by Annie Deutsch.

Calendar of Events

UPCOMING EVENTS:

September 7, 2016 – WMARS Vineyard Walk and Table Grape Tasting
5-7 pm; West Madison Agricultural Research Station, 8502 Mineral Point Road, Verona, WI

September 23-25, 2016 – Warrens Cranberry Festival
Warrens, WI

Photo courtesy of the Steffan Lab.

Useful Links:

You can purchase ($10) the 2016 Midwest Fruit Pest Management Guide from the UW Learning Store:
http://learningstore.uwex.edu/Midwest-Fruit-Pest-Management-Guide-2016-P1785.aspx

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

Insect Diagnostics Lab: http://labs.russell.wisc.edu/insectlab/

Plant Disease Clinic: http://labs.russell.wisc.edu/pddc/

Soil and Forage Analysis Lab: https://uwlab.soils.wisc.edu/

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

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