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General Information

UW Insect Diagnostic Lab—Fruit Insect Report: August 17th, 2017

By: PJ Liesch

Below is the fruit insect report for what we've seen in the past two weeks:

Japanese beetle pressure remains high in all but the northernmost parts of Wisconsin. While beetle pressure will likely subside in September, these insects have the potential to be problematic for several more weeks.

Leaf galls of the grape phylloxera have been diagnosed several times at the UW Insect Diagnostic Lab in the past two weeks. Cases have come in from the central and south central parts of the state, although typically from home/residential settings where appropriate control measures had not been taken.

Green stink bugs (*Chinavia hilaris*) have been quite common recently. The UW Insect Diagnostic Lab has seen approximately ten reports of juveniles in the past two weeks. Juveniles are black with pale greenish stripes on their abdomen and red margins along the sides of the body just behind the head. Reports of the green stink bug have been most common thus far in the southern third of the state and in the eastern counties bordering Lake Michigan.



Russ Ottens, University of Georgia,
Bugwood.org.

Looking ahead to the coming weeks, interactions with social wasps (paper wasps and yellowjackets) will be on the rise. Their colonies have been building up in size since spring and these opportunistic insects will readily go to compromised fruits in late summer and fall. Reports of these insects have been coming in from across the state and will continue to increase over the next month. (You can read more about wasps in the grape section of this issue of the newsletter.) Likewise, other secondary fruit pests, such as multicolored Asian lady beetle, will likely increase in the coming weeks.

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 July 29, 2017 through Aug 11, 2017.

PLANT/ SAMPLE TYPE	DISEASE/ DISORDER	PATHOGEN	COUNTY
Apple	<i>Anthracnose</i>	<u><i>Gloeosporium</i> sp.</u>	Bayfield
	<i>Apple Scab</i>	<u><i>Venturia inaequalis</i></u>	Outagamie
	<i>Cedar-Apple Rust</i>	<u><i>Gymnosporangium juniperi-virginianae</i></u>	Shawano
	<i>Coniothyrium Leaf Spot</i>	<u><i>Coniothyrium</i> sp.</u>	Outagamie
	<i>Root/Crown Rot</i>	<u><i>Phytophthora</i> sp.,</u> <u><i>Pythium</i> sp.</u>	Eau Claire
Blueberry	<i>Gloeosporium Leaf Spot and Stem Canker</i>	<u><i>Gloeosporium</i> sp.</u>	Bayfield, Oneida
Cherry	<i>Anthracnose</i>	<u><i>Gloeosporium</i> sp.</u>	Sauk
	<i>Bacterial Canker</i>	<u><i>Pseudomonas syringae</i></u>	Dane
	<i>Brown Rot</i>	<u><i>Monilinia</i> sp.</u>	Dane
	<i>Cherry Leaf Spot</i>	<u><i>Blumeriella jaapii</i></u>	Dane, Outagamie, Portage
Cranberry	<i>Early Rot</i>	<u><i>Phyllosticta vaccinii</i></u>	Monroe
	<i>Phyllosticta Leaf Spot</i>	<u><i>Phyllosticta elongata</i></u>	Vilas
	<i>Ripe Rot</i>	<u><i>Coleophoma empetri</i></u>	Monroe
	<i>Upright Dieback</i>	<u><i>Phomopsis</i> sp.</u>	Vilas
	<i>Viscid Rot</i>	<u><i>Phomopsis vaccinii</i></u>	Monroe
Gooseberry	<i>Gloeosporidiella Leaf Spot</i>	<u><i>Gloeosporidiella</i> sp.</u>	Outagamie
Grape	<i>Herbicide Damage</i>	None	Columbia
Plum (Wild)	<i>Bacterial Canker</i>	<u><i>Pseudomonas syringae</i></u>	Dane
Raspberry	<i>Cane Blight</i>	<u><i>Leptosphaeria coniothyrium</i></u>	Portage
	<i>Root/Crown Rot</i>	<u><i>Rhizoctonia</i> sp.</u>	Portage
	<i>Spur Blight</i>	<u><i>Didymella applanata</i></u>	Portage

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.

Honeyberries, Haskaps, Blue Honeysuckle: Is There Commercial Potential For Wisconsin?

By: Brian R. Smith, Extension Commercial Fruit Specialist, UW-River Falls

In Part I on honeyberries ([WI Fruit News 2 \(7\):6-8](#)), I described the species involved and their geographic origins, products and uses, typical yields, profitability and marketing opportunities. If you were interested in some of the information I presented previously, then it is time to move on to the last two categories: 5. Site and growing requirements. 6. Cultivars and nursery sources.



5. Site and growing requirements. Honeyberries are no different from any other fruit plant in requiring the basics of full sun, good air drainage potential on frosty nights (planted at, or above the surrounding topography) and having the availability of water to prevent stress and promote a larger, higher quality crop. Basic wind protection from a windbreak on the north and west side of the planting will help prevent desiccation stress and could be used to facilitate snow deposition. The honeyberry cultivars that are listed later in this article should be able to produce well even in USDA Hardiness Zone 3. Honeyberries are also tougher and more adaptable than many fruit crops when it comes to soil conditions in that they can tolerate a pH of 5.5-7.5 and can grow in sand to clay, assuming there is good subsoil drainage. A well-drained sandy loam would be considered ideal. It is a good idea to always obtain a soil test before planting to reveal any large deviations in the desired nutrient, pH and organic matter levels. This will provide you with a roadmap of what to do and when, while giving you a baseline to start the planting off correctly. In general, base fertility levels should be near 65 lb. N/A, 90 lb. P/A and 355 lb. K/A. It is always a good idea to apply a liquid starter fertilizer such as an 8-32-16 at planting, which is especially easy if using a mechanical transplanter with a trip valve. Plant spacings for PYO are usually 3-5' apart within row and 8-10' between rows (somewhat cultivar-specific/growth habit dependent) which translates to about 1,100 plants/acre. If one were designing a planting for mechanical harvest, then within-row spacings should be at the low end of the range to develop a hedgerow and between-row spacings should be stretched to 16'. Plant a non-competitive grass mixture in the alleys such as a combination of a hardy variety of perennial ryegrass + sheep fescue. Maintain a 4-5' weed/grass-free band centered over the honeyberry row to prevent competition from the grass.

Honeyberries have perfect flowers (both male and female parts in the same flower) but are often self-sterile and require a pollinizer cultivar that not only has a compatible different genetic background but also significantly overlaps in bloom time. Recommended pollinizers are included for each cultivar description provided. Some growers are going with a 1:1 (both cultivars equally desirable and can pollinize one another), 1:2 (cultivar X is a more desirable cultivar than the pollinizer) and others with a 1:8 pollinizer strategy (cultivar X is highly desirable, such as for mechanical harvesting and pollinizer has excellent bloom overlap and highly cross-fertile (notice even here that all plants of cultivar X border a pollinizer):

1:2 Pollinizer Strategy

X	P	X	X	P	X	X	P	X
X	P	X	X	P	X	X	P	X
X	P	X	X	P	X	X	P	X
X	P	X	X	P	X	X	P	X
X	P	X	X	P	X	X	P	X
X	P	X	X	P	X	X	P	X

1:8 Pollinizer Strategy

X	X	X	X	X	X	X	X	X
X	P	X	X	P	X	X	P	X
X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X
X	P	X	X	P	X	X	P	X
X	X	X	X	X	X	X	X	X

The choice you make may change because some cultivars have very desirable pollinizer companion cultivars and others not so much. If one goes much past the 1:8 pollinizer ratio, there could be major consequences if one of the pollinizer plants dies or if poor pollination conditions prevail. Whatever your strategy, it will not be effective unless you include bumblebees or honeybees in the picture when it comes time for that first harvest year.

Timing of planting your honeyberry orchard depends on the growth stage of plant materials you receive. Dormant plants can be planted any time the soil can be safely worked in the spring but plants that arrive already leafed out in pots have probably not been acclimated and should not be field planted until they have been (takes 3+ weeks). Non-acclimated should be able to be planted safely by the middle of May in most years. Watering is critical to the survival, establishment and early fruiting of honeyberries as it is with most crops. A thorough deep-soaking should occur as soon after planting as possible and then 1"/week on average. Water applied through drip irrigation is the most efficient and minimizes weeds and foliage and fruit diseases. Mulches are not necessary but can be especially advantageous on sandy sites; a mulch of 3-4" would work best.

Honeyberries are typically less afflicted by pests than most fruit crops. However, a few have surfaced in various commercial plantings. Among these more common insect pests are leafrollers, aphids, and scale; while spider mites can quickly multiply under hot and dry conditions some years. I also have some anecdotal evidence that Japanese beetles do not seem to be attracted to honeyberries. In my potted plant nursery on campus that covers over a ¼ acre, I have fruit plants in 1-25 gal. pots that include grapes, strawberries, aronia, stone fruit, and pome fruit and 25 honeyberries in 5-gal. pots. None of the honeyberries were touched and there was feeding on multiple fruit species in and around those honeyberries! Diseases that occasionally occur are powdery mildew, botrytis, downy mildew, black spot, rust, Alternaria, anthracnose and various leaf spots.

It is certainly desirable to have a low-maintenance fruit crop like honeyberries but "low" does not mean "no" when it comes to maintaining that all-important vegetative vs. reproductive vigor, especially when the plants are quite young and again, when they are fully-established and at maximum yield potential. A careful analysis of watering and fertilizing practices and plant response should be noted and adjusted to the situation. Honeyberries should also be pruned after the first 3-4 years; preferably in late February or March up until bud-break. The goal is to leave 4-6 of the most vigorous and healthy older stems, a few strong 1-yr.-old stems and hopefully encourage 2-3 new, vigorous shoots. Also, be sure to remove any damaged, diseased or weak wood. Once your planting is old enough to harvest, you should prune every 1-2 years but do not remove more than 25% of the plant. Remember, the more you prune, the more you invigorate; but if you prune too much, you will not have any fruit!

Honeyberries are quite precocious, so they may try to fruit earlier than they really should, which can have long-term effects on establishment and longevity of your planting. Honeyberries are best kept more on the "vegetative vigor" side of things for the first couple of years and if they have established well, you can start promoting fruiting by Year 3. Since honeyberry fruit are very attractive to birds, you will probably want to have a system for covering them with bird netting (hole size should not exceed ½").

6. Cultivars and nursery sources. Perhaps the most important subject has been left for last. The correct cultivar will impact every aspect of your operation, from pruning and harvest to marketing and profitability. New cultivar releases are mirroring the interest by growers and the general public; each improvement feeds interest to the next level of expansion. Although I would never say that it is bad to have so many new cultivars, it presents quite a quandary for the grower. Since this is a new industry and many cultivars are just being released for Midwest adaptation (both Canada and U.S.), incremental improvements are also being made for better fruit quality, size and yield. This fact also means that even slightly older cultivars are being eclipsed on a regular basis. What should theoretically be a cultivar/plant investment for 30-50 years may actually need to be replanted earlier than that because of the competitive advantage of the



newest cultivars in a new industry (think about how fast just one cultivar like Honeycrisp even changed the much older apple industry). However, that conundrum does not really offset the fact that there could be some good profitability in this crop if you choose what appear to be the best cultivars right now. Most for our climate are originating from Bob Bor's program in Saskatoon, but there are probably some very viable exceptions from elsewhere. Due to limitations on space, I have only included the cultivars originating in Saskatchewan:

Tundra (Kiev#8 x Tomichka; Kurile x Russian type) - Good flavor and firmness and very appropriate for mechanical harvesting and sorting. Average berry size is 1.5 grams and tends to be long to flat and ovoid; more firm skin and less scar bleeding than other cultivars. Great for IQF processing. Mature height is 4-5'. Best pollinizers are 'Aurora', 'Honeybee', 'Polar Jewel', 'Berry Blue' and 'Cinderella'.

Aurora (Solovey x MT46.55; Russian x Japanese type) - Very large, elongated oval 2.2g fruit are sweet and juicy. Very productive and ripens early July in Saskatchewan. Easy harvest due to fruit visibility and lower bush retention. Mature height is 5-6' bush. High mildew resistance.

Borealis (Kiev#8 x Tomichka; Kurile x Russian type) - One of the best tasting of any. Less firm than Tundra and some scar bleeding; not suited to mechanical harvesting or sorting. Strictly home garden or PYO. Fragrant, white flowers. Precocious. Short and flat boxy berries average 1.6 grams and are somewhat hidden by foliage. Plant at maturity is 4'. Best pollinizers are 'Aurora', 'Honeybee', 'Berry Blue' and 'Cinderella', 'Polar Jewel', 'Night Mist', 'Midnight Blue'.

Indigo Gem (Sel. 9-15; same parentage as 'Borealis')- Good flavor and appears to have some good characteristics for processing and has very high yields (up to 2X that of others). Short, ovoid berries (1.3g) are said to be "chewy". Best pollinizers are 'Aurora', 'Honeybee', 'Polar Jewel', 'Berry Blue' and 'Cinderella'. Mature plant height is 5-6'. Some susceptibility to mildew on leaves.

Honeybee (Souvenir x F-1-9-58, known as 'Blue Pacific'; Russian x Kurile type) – Developed as a great pollinizer cultivar for 'Tundra', 'Borealis' and 'Indigo' series. Tart-flavored, 1.9 g, elongated fruit on a large bush (5-6'+). Productive, precocious and fast-growing. Cylindrical shape and strong fruit retention could allow for the production of honeyberry raisins but primarily used for juice, wine or jelly due to stem retention on berries. 'Honey Bee' pollinized best by 'Borealis'.

Indigo Treat (Sel. 9-91; same parentage as 'Borealis')- Excellent flavor. Berries are considered flat cylindrical, and average 1.4g. Appears to be suitable for mechanical harvesting. Best pollinizers are 'Aurora', 'Honeybee', 'Berry Blue' and 'Cinderella'. Mature height is 4-5'.

Boreal Blizzard (Sel. 22-06-25.5)- Fruit are "surfboard"-shaped, average a very large 2.8g and have excellent flavor, meaty texture and good firmness. Harvest typically overlaps with strawberry season (early-mid-June, southern WI, late June to July, northern WI). Late bloom (4-7 days post Tundra and Indigo series). Best pollinizers would be 'Boreal Beast', 'Indigo Gem', 'Tundra', 'Honey Bee'. Vigorous and upright growth habit. Very productive and has excellent resistance to mildew and sunscald.

Boreal Beast (Sel. 14-16-9.25)- Fruit average 2g. and have excellent flavor with a very nice aftertaste, whether fresh or frozen. Late bloom; best pollinizer is 'Boreal Beauty'. Ripens after 'Aurora' and 'Boreal Blizzard' (mid-late July in Saskatchewan). Strong, upright growth habit and excellent resistance to mildew. Suitable for mechanical harvesting. Not available until Fall 2018.

Boreal Beauty (Sel. 21-12-11.5)- Very unusual late bloom time and very late ripening; up to a month after other cultivars. Firm, thick oval to thick heart-shaped 2.6g, excellent-flavored berries. Best pollinizer is 'Boreal Beast'. Strong, upright growth habit and mildew-resistant. Very productive. Suitable for mechanical harvesting.

Indigo Yum (Sel. 9-92; same parentage as 'Borealis') - May not be considered as good a flavor by some due to tanginess. Berries are long and flat-ovoid and average 1.3g. Best pollinizers are 'Aurora', 'Honeybee', 'Berry Blue' and 'Cinderella'.

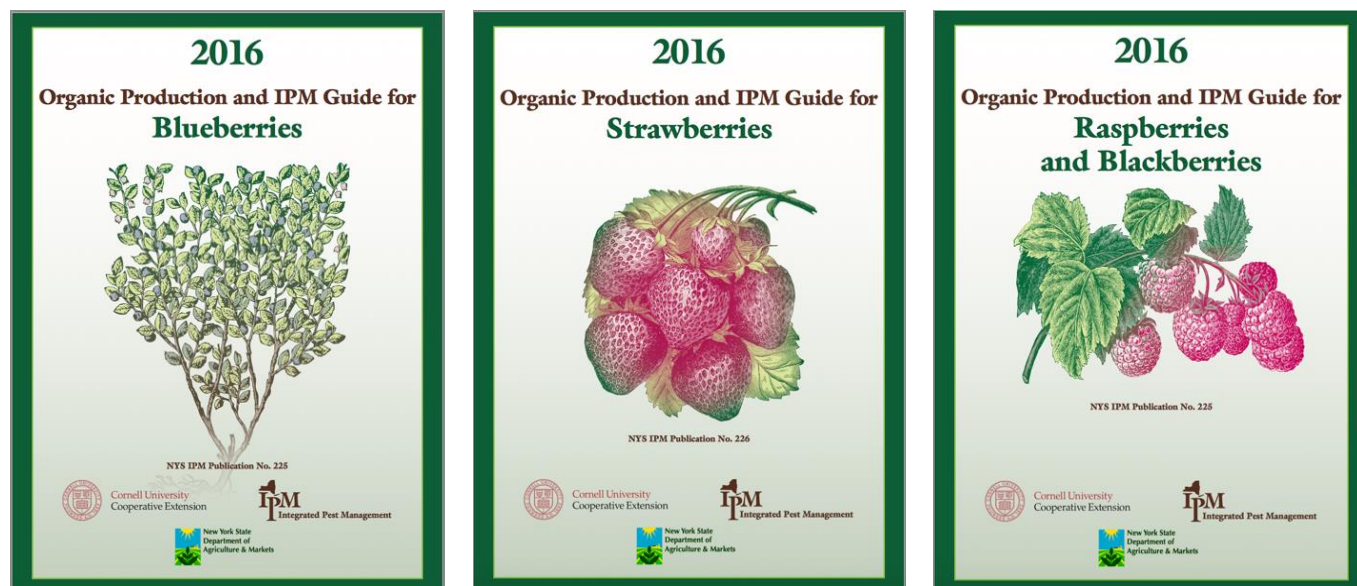
Other cultivars available include Berry Smart Blue (Czech # 17), Sugar Mountain™, Berry Blue, Blue Bird, Blue Nova, Polar Jewel, Blue Hokkaido, Blue Forest, Blue Moon, Blue Sea, Blue Sky, Cinderella, Solo™ ‘Kapu’, Maxie™ ‘Kuchi’, Honey Bunch™ ‘Kaido’, Sugar Pie™ ‘Hoka’, Keiko, Tana, Taka, Kawai, Chito, Happy Giant, Blue Moose, Honey Delight, Bunny Blue, Strawberry Sensation, Blue Treasure, Giant’s Heart, Blue Banana, Blue Stuart, Blue Angus, Honey Gin, Blue Palm, Kamchatka, Wojtek and Zojka.

Some Nurseries Offering Honeyberry Plants ^z

Nursery	Location
Berries Unlimited https://www.berriesunlimited.com/about-berries-unlimited/info_11.html	807 Cedar Lane, Prairie Grove, AR 72753 (479)846-6030
Honeyberry USA http://www.honeyberryusa.com/honeyberry-plants-1.html	Mailing address: PO Box 512 Bagley, MN 56621 Location: 19736 350th St Bagley, MN 56621
Rolling River Nursery info@rollingrivernursery.com	319 105 th Ave, Oakland, CA 94603 (510)-224-6806
J.W. Jung Seed Company https://www.jungseed.com/C/231/HoneyberryorHaskap	335 S. High St Randolph, WI 53956 1.800.297.3123
Bergeson Nursery https://www.bergesonnursery.com/index.php	4177 County Highway 1, Fertile, MN 56540 (218)-945-6988
Stark Bro’s. Nursery https://www.starkbros.com/wholesale	P.O. Box 1800 Louisiana, MO 63353 (800)-435-8733
One Green World https://onegreenworld.com/	6469 SE 134 th Ave Portland, OR 97236 1-(877) 353-4028
Great Northern Berries http://www.greatnorthernberries.com/gnb_contact_us.html	506 Whiteface Road, North Sandwich, NH 03259 (603) 284-6886
Gardens Alive! http://www.gardensalive.com/	P.O. Box 4028 Lawrenceburg, IN 47025 (513)-354-1482
Gurney’s Seed and Nursery Co. https://www.gurneys.com/	P.O. Box 4178 Greendale, IN 47025-4178 (513) 354-1492
Haskap Central Sales Ltd. http://www.haskapcentral.com/	P.O. Box 21 Henribourg, Saskatchewan S0J 1C0 Phone: (306) 764-2514
Henry Field’s Seed & Nursery Co. http://www.henryfields.com/	P.O. Box 397 Aurora, IN 47001-0397 (513) 354-1494

^z No endorsement intended of any nursery in this list and not meant to be a complete list.

Organic production and IPM guides available for Blueberries, Strawberries, Raspberries and Blackberries



The New York State Integrated Pest Management Program and Cornell University have released new guides for organic production of berries, that include cultural and pest management practices for blueberries, strawberries, raspberries and blackberries. The guides are available for download through the links below, and will also be made available on our website (<http://fruit.wisc.edu>).

<https://ecommons.cornell.edu/bitstream/handle/1813/42887/2016-org-blueberry-NYSIPM.pdf?sequence=5&isAllowed=y>

<https://ecommons.cornell.edu/bitstream/handle/1813/42890/2016-org-strawberries-NYSIPM.pdf?sequence=5&isAllowed=y>

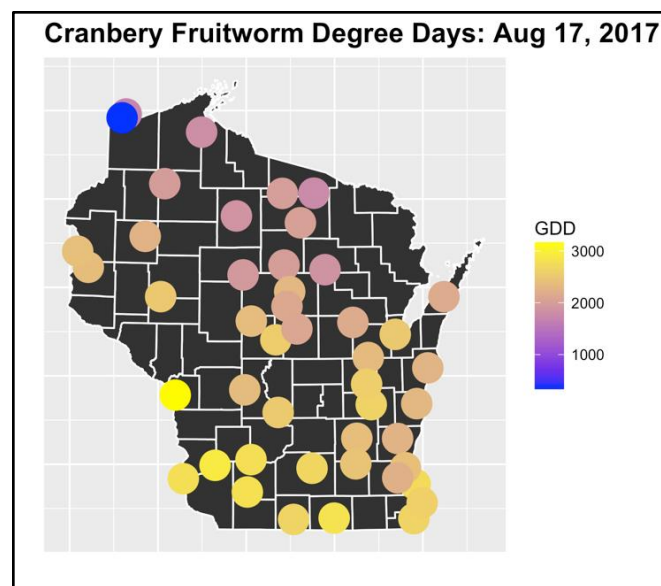
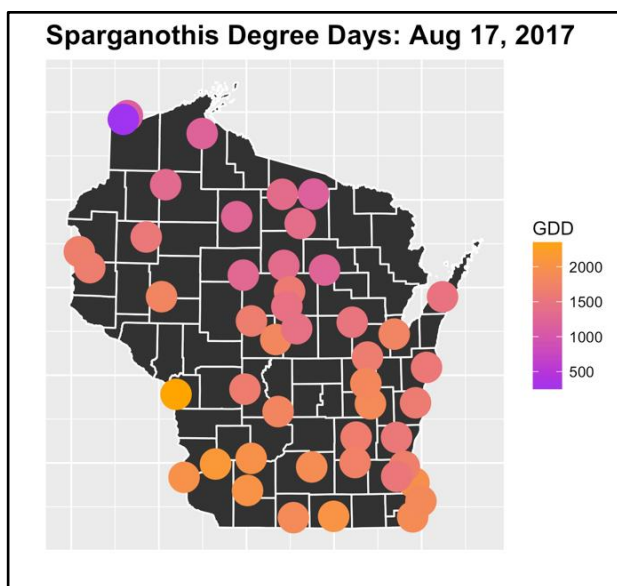
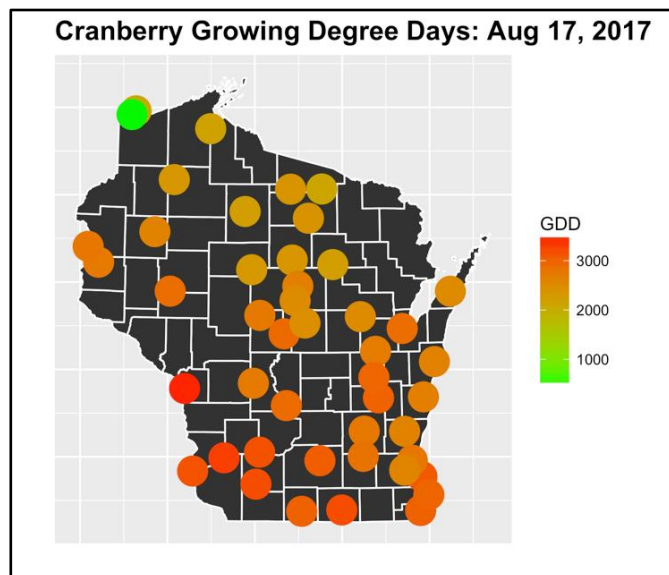
<https://ecommons.cornell.edu/bitstream/handle/1813/42889/2016-org-rasp-blackberry-NYSIPM.pdf?sequence=5&isAllowed=y>

Cranberries

Cranberry plant and pest degree-days: Aug 17, 2017

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







See the maps below for the degree-days of the cranberry plant and associated pests. Developmental thresholds for each species are: cranberry plant - 41 and 85°F; sparganothis fruitworm - 50 and 86°F; and cranberry fruitworm - 44 and 87°F. Interactive maps are posted online. The interactive feature allows you to click on the map locations, prompting a pop-up that names the location and gives exact degree-days. These are available through the Steffan lab website (<http://labs.russell.wisc.edu/steffan/cranberry-growing-degree-days/>). Once on the website, follow the link to the interactive maps.



Aug. 17	Cranberry DDs			Sparg DDs			CFW DDs		
	2015	2016	2017	2015	2016	2017	2015	2016	2017
<i>Northern WI (Minocqua)</i>	2527.1	2631.2	2366	1501.1	1611.7	1363.5	2163.4	2271.4	2009.1
<i>Central WI (Wisconsin Rapids)</i>	3103.3	3172.3	2943.6	1976.8	2057	1839.1	2710.1	2777.1	2555

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

The table at right shows the predicted life benchmarks and their associated Sparg DDs.

Event		DDs from March 1 (approximate)
	Flight initiation	595.7
	First eggs laid	681.0
	Peak flight	884.12
	First egg hatched*	895.4
	End of egg laying	1,634
	Last egg hatched*	1,890

* Egg hatch window: 895 – 1,890 DDs

Powdery Mildew in the Vineyard

By: Annie Deutsch and Denise Smith

A common disease seen in the vineyard mid- to late summer is powdery mildew. Powdery mildew in grapes is caused by the fungus *Erysiphe necator*. Common symptoms of powdery mildew include a white-grayish powder-like substance on the top of leaves and on the surface of rachises and berries. During early infection, the leaves may need to be held in the light to see the disease, but it becomes more apparent as the disease progresses. Severely infected leaves may die and drop to the ground.

The fungus causing powdery mildew overwinters as tiny, spherical fruiting bodies within bark crevices. The spores within the fruiting bodies, ascospores, are released and dispersed by the wind as temperatures warm in the spring. Ascospores infect leaves and the growing fungus produces asexual spores, which are called conidia. Conidia are responsible for the white powdery appearance of this disease. Conidia get carried by the wind, infect more plant tissue, and result in the production of more conidia; a cycle which can repeat through the end of the growing season. Mid- to late summer, the overwintering fruiting bodies begin to form. The fruiting bodies look like tiny black dots on diseased leaves and can be seen with a hand lens. Those that land in a favorable environment, such as bark crevices, will survive the winter.

Unlike many other plant diseases, powdery mildew spores do not need leaf moisture for infection. The initial release of ascospores requires water, but fungal growth, spore production, and spore germination can occur in dry conditions. However, high humidity or light rain followed by humid conditions will favor development of the disease. Very intense rainfall (e.g., an inch or more per hour) will inhibit powdery mildew development.



Powdery mildew on grape berries. Photo by Julie Beale, University of Kentucky, Bugwood.org.

Scouting for powdery mildew should begin once temperatures average above 50°F. Areas to focus on are parts of the vineyard that have a history of powdery mildew infection as well as vines with vigorous growth. Inspect lower leaves within the canopy, especially those in dense, shaded areas. Two years of research from the UW has shown that of some of the cold hardy grape varieties, Brianna, Frontenac and Frontenac gris, are severely at risk for foliar damage caused by powdery mildew. Marquette is at high risk, La Crosse is at a moderate risk, St. Croix is at a low risk, and La Crescent and Valiant are at a very low risk of foliar damage. Fruit on all these cultivars was susceptible to powdery mildew damage. (D. Jones, et al., [Grape Summary Supplemental Issue](#)). Studies about grape varieties' relative resistance to powdery mildew are continuing in 2017 and 2018 at the UW West Madison Agricultural Research Station and the UW Peninsular Agricultural Research Station.

When powdery mildew has been identified within the vineyard, the vines should be monitored and treated accordingly. While leaves can sustain minor amounts of powdery mildew without negative effects, infected fruit are not marketable. Fungicides are important to protect fruit, keep the disease from spreading, and to reduce the number of spores in the vineyard the following year.

(<https://grapesandwine.cals.cornell.edu/newsletters/appellation-cornell/2013-newsletters/issue-15/grapes-101>).

To prevent making unnecessary fungicide applications, spraying can begin once powdery mildew has been found, although this requires frequent scouting (at least weekly) to ensure that infections are not missed. Fungicides for powdery

mildew control can be found in the 2017 Midwest Fruit Pest Management Guide (<https://fruit.wisc.edu/wp-content/uploads/sites/36/2017/02/Midwest-Fruit-Pest-Management-Guide-2017-red.pdf#page=81>).



Powdery mildew on upper leaf surface. Photo by D. Jones.

Social Wasps in Vineyards

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

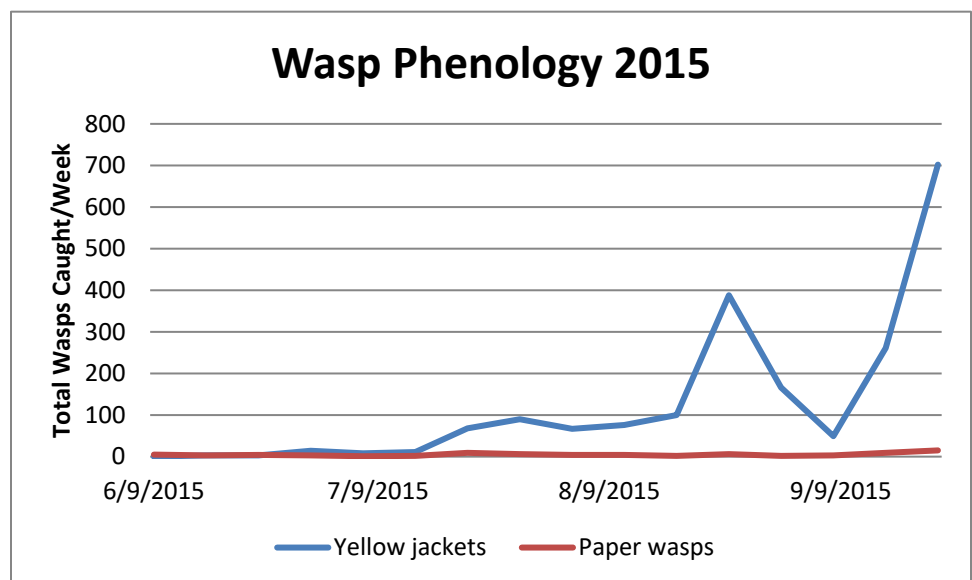
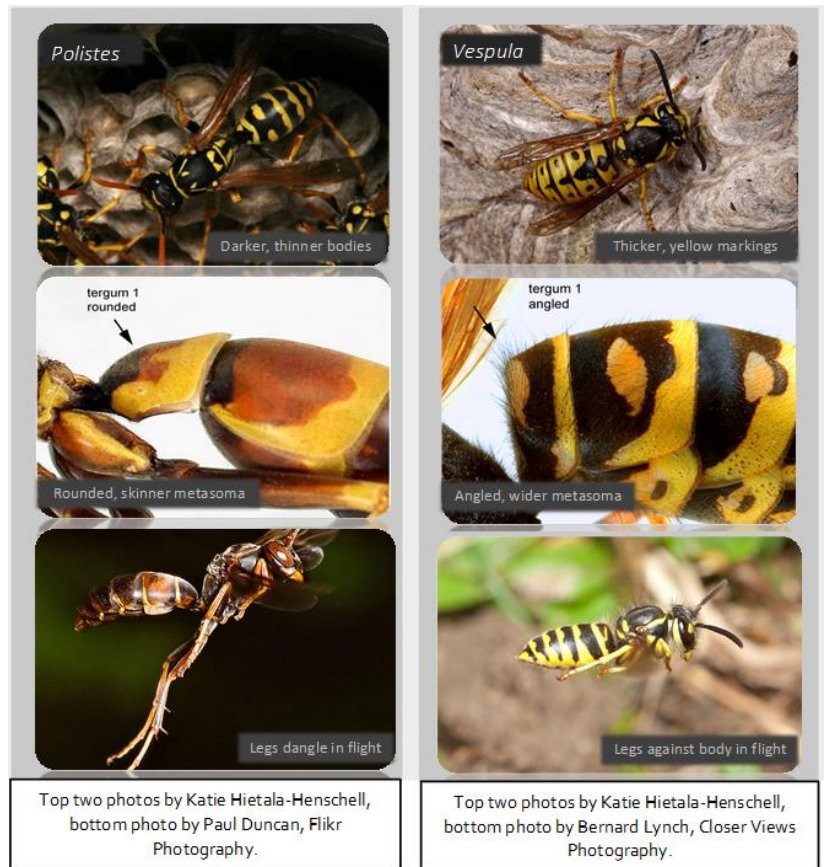
The interplay between social wasps and fruit crops can be a difficult relationship for growers to navigate. On one hand, wasps can be major vineyard pests, as they represent a stinging threat for visitors and workers, and may even damage grapes to feed upon their sugars. However, wasps are also beneficial, as they provide some pollination services and are predatory insects that help regulate other pestiferous vineyard species. Furthermore, not all social wasp species represent the same level of threat to vineyards, complicating the ability to find a healthy balance between the beneficial and pest aspects of this group of insects.

In a previous study, we looked at the seasonal pattern and species composition of social wasps in Wisconsin vineyards and identified two common social wasp genera in Southwest Wisconsin Vineyards, *Vespula* and *Polistes*. *Vespula*, known commonly as a yellow jackets or hornets, are shiny, bare of hair, and sleeker than bees. *Polistes*, also called paper wasps, may look similar to *Vespula*, but have slightly darker, more elongated bodies, and long legs that dangle in flight (Fig. 1). Both are prevalent near wooded locations, since they utilize a mix of saliva and wood to build complex paper nests. These nests can be found in sheltered locations, such as the eaves of houses, or in underground areas, which pose an increased risk to workers who may come across them unexpectedly. In addition, *Vespula* and *Polistes* are often confused, one for another or with other species, due to similar black and yellow markings.

In our study, we found that populations of *Vespula* greatly outnumbered *Polistes*, and represent the largest threat to growers. This was especially true in August as grapes began to ripen and *Vespula* populations quickly ramped up at most vineyards. *Polistes* maintained a constant presence throughout the growing season, but at much lower population levels, and seems to represent little to no risk to grapes, at least in 2015 (Fig.2). This large split between abundances may be due to the ability for *Vespula* species' to learn quickly from olfactory cues, which allows them to return easily to a food source once successful. Furthermore, *Vespula* are scavengers, which consume a larger variety of non-living foods such as carrion, garbage, and other human produce. Whereas studies indicate *Polistes* prefer caterpillars to feed their larvae, both genera are opportunists that feed on a range of arthropods like beetle grubs, grasshoppers, flies, aphids, spiders, and available sources of carbohydrates like nectars and honeydew.

Our previous study identified four predominant species of social wasps in Wisconsin vineyards in 2015 (*Vespula maculifrons*, *Vespula germanica*, *Vespula vidua*, and *Vespula Floabopilosa*). Of these, we do not know yet which are more likely to be pests of grapes and whether they can do the actual damage to intact common table and wine cold climate grapes. We received funding from DATCP to assess these questions this summer. We are also interested in determining if the patterns we observed in 2015 are consistent. Social wasps often locate food sources by responding to volatiles released by plants when their tissues are under attack from herbivorous insects. Therefore, our current study will seek to utilize chemicals that mimic these volatiles and other natural food sources, to identify optimal attractants as well as repellents to create a push-pull strategy that helps manage *Vespula* as a vineyard pest going into the future.

Currently, methods for managing wasps are limited and were discussed in a [volume 1, issue 8](#) of this newsletter. So far this season, populations have been incredibly low and the total number of wasps per week in our vineyard traps have stayed below five, with the exception of one week in which we caught 37. Wasp populations could potentially remain low this year, possibly due to the high moisture, or simply rise later than in previous seasons. We will keep you posted as the season progresses.



Wine and Table Grape Developmental Stages for Aug 18, 2017

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

At the West Madison Agricultural Research Station (WMARS) all cultivars have hit veraison, with berries varying from stage E-L* developmental number 35 ("berries begin to color and enlarge (beginning of veraison)") to 36 ("berries with intermediate sugar levels"). We have begun measuring Sugar (Brix) and TA (titratable acidity) concentration in berries (similarly to last year), and concentrations as of August 11th are shown in the chart below.

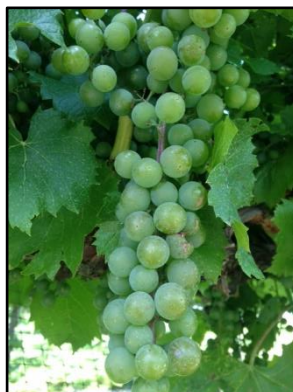
** Eichhorn-Lorenz Phenological stages to describe grapevine development*

Aug 11, 2017 Grape Brix and Titratable Acidity (TA)		
WMARS		
Grape Variety (Reds)	Brix (%)	TA (g/L)
Frontenac	10.2	32.5
Marquette	11.1	30.2
Foch	8.8	38.0
Leon Millot	8.7	34.3
Petite Pearl	6.6	29.0
Grape Variety (Whites)	Brix (%)	TA (g/L)
Brianna	9.7	28.0
La Crosse	4.9	27.9
La Crescent	10.8	31.8

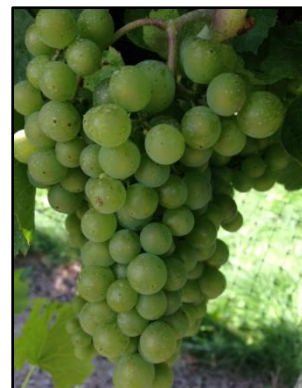
Following photos taken on Aug 13th at West Madison Agricultural Research Station.



Brianna at WMARS; "berries with intermediate sugar level" E-L number = 36



La Crescent at WMARS; "berries begin to color" E-L number = 35



La Crosse at WMARS; "berries begin to color" E-L number = 35



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



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



St. Croix at WMARS;
"berries with intermediate
sugar level" E-L number = 36



Somerset at WMARS; "berries with
intermediate sugar level" E-L
number = 36



Einset at WMARS; "berries begin
to color" E-L number = 35

At the Peninsular Agricultural Research Station (PARS), the later varieties are beginning to catch up with the earlier ripening ones. Berries vary from stage E-L* developmental number 34 ("berries begin to soften") to 35 ("berries begin to color and enlarge (beginning of veraison)").

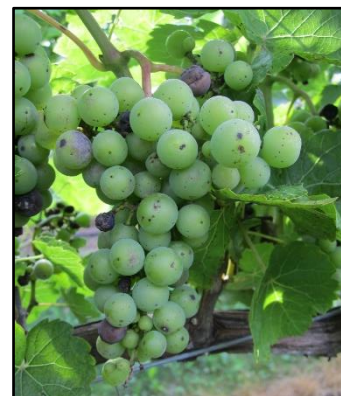
Following photos taken on Aug 16th at Peninsular Agricultural Research Station.



Brianna at WMARS;
"bunch closure" E-L
number = 33



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



La Crosse at WMARS;
"bunch closure"
E-L number = 33



Marquette at WMARS;
"berries begin to soften"
E-L number = 34



Frontenac at WMARS;
"berries begin to
soften" E-L number = 34



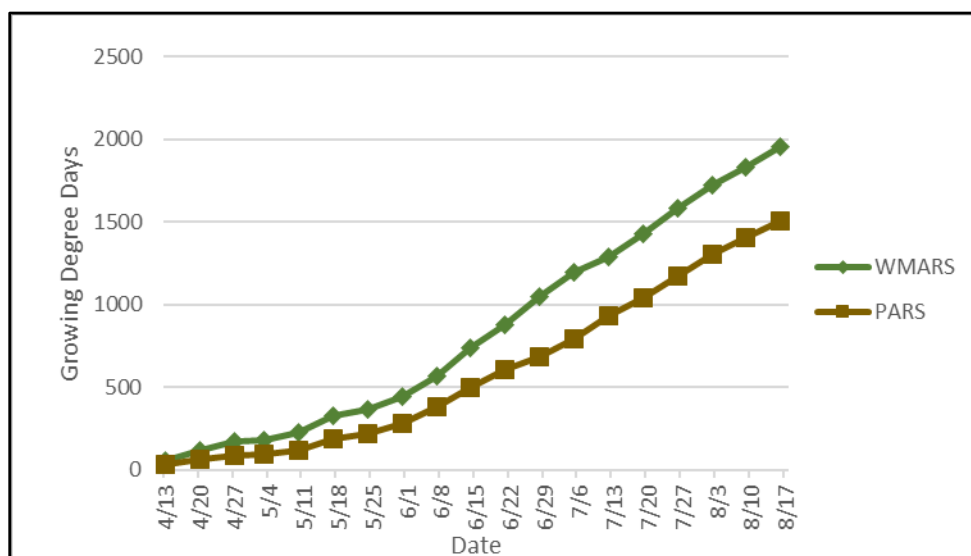
St. Croix at WMARS;
"bunch closure" E-L
number = 33

Grape Growing Degree Days

April 1 - Aug 16, 2017

	2107	2016
WMARS	1954	2177
PARS	1502	1673

The growing degree-day accumulations as of August 16th for this year are: 1,954 GDD at WMARS and 1,502 GDD at PARS. Door County continues to be over three weeks behind Dane County in terms of growing degree-days. At both locations, we are significantly behind the degree-day accumulation from 2016. Degree-days are calculated using a base of 50°F, starting on April 1st as a biofix.



Vineyard netting protection

By: Amaya Atucha, UW-Extension

Vineyard bird damage is a big concern for grape growers, as it can have a devastating effect on the crop. Birds pecking on the fruit can lead to problems with sour and bitter rot, botrytis, fruit flies, and wasps, all of which can impact fruit quality. The best alternative to control bird damage is netting, but this can be expensive and difficult to apply and remove. After several years of dealing with multiple types of nets and spending a lot of time applying and removing them, we decided to invest in a net applicator system (Figure 1). The system consists of a platform (man or machine powered), that can be mounted on a tractor or skid loader. There are several versions of this system from multiple manufacturers, but the system works best when used with nets that are more flexible and can flow easily through the net applicator.

Here are several links to articles on the web regarding net applicator and different types of nets:

<https://www.winesandvines.com/features/article/72074/To-Net-or-Not-to-Net>

<http://www.smart-net-systems.com/agricultural-machinery/vineyard-netting-applicator>

<http://www.nettergetter.com>

<http://www.mdtgrow.com/how-do-i-install-bird-netting-in-my-vineyard/>

<http://pawinegrape.com/uploads/PDF%20files/Meeting%20Presentations/Bird%20Management%20in%20Vineyards%202012.pdf>

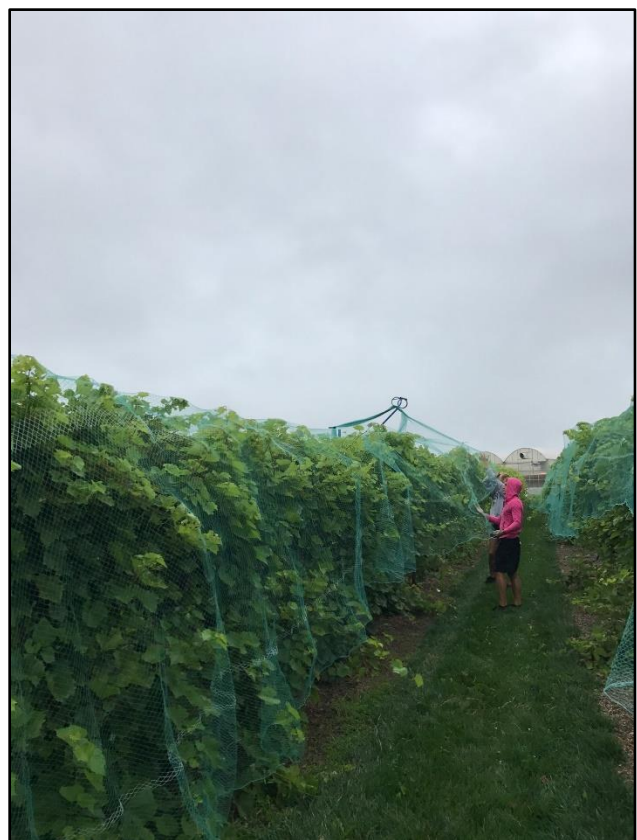


Figure 1. Applying nets in the vineyard at WMARS. The new system consisting of a hand powered platform with a net applicator mounted on a tractor. The system can be operated by 3 people, a driving and 2 others positioning the nets on both sides of the row.

Revisiting the insecticide Assail

By: Christelle Guédot, University of Wisconsin, Entomology

Assail (30SG and 70WP) is not a new insecticide for tree fruits. It is registered for use in Wisconsin on pome fruits, including apple, crabapple, pear, loquat, and quince as well as stone fruits, including apricot, sweet and tart cherry, nectarine, peach, plums, pluot, plumcot, and prune. It is marketed by United Phosphorus Inc. (UPI) under two formulations 30SG (30% active ingredient by weight, soluble granule) and 70 WP (70% active ingredient by weight, wettable powder). Assail is a neonicotinoid insecticide with the active ingredient acetamiprid (IRAC code 4A). It has activity against eggs, larvae and adults of several insect pests through contact and ingestion. Assail is rapidly absorbed by the plant tissue and quickly moves via systemic translaminar activity.

Assail Insecticide

- Available as 30 SG (30%, soluble granule) and 70 WP (70%, wettable powder)
- Restricted re-entry interval (REI): 12 hours
- Pre-harvest interval (PHI) on pome and stone fruits: 7 days
- No more than 4 applications per year
- Do not exceed a total of 32 oz. of 30 SG and 13.5 oz. of 70 WP per acre per season
- Allow at least 10 days between applications for stone fruits and every 12 days for pome fruits
- Assail is highly toxic to bees
- Rate of use per acre
30SG: 2.5 – 8.0 oz.
70WP: 1.1 – 3.4 oz.

Both Assail formulations are registered for control of aphids, tentiform leafminer, leafhoppers, codling moth, oriental fruit moth, lesser appleworm, mealybug, psylla, mullein plant bug, European apple sawfly, Japanese beetle, apple maggot, San Jose scale (suppression only in pome fruit), plum curculio, dogwood borer, glass winged sharpshooter, peach twig borer, catfacing insects (e.g., tarnished plant bugs and stinkbug), cherry fruit fly, black cherry fruit fly, Western cherry fruit fly, and rose chafer.

Assail may be applied by ground equipment and by air. For both formulations of Assail 30SG and 70WP, apply in spray volume of at least 50 gallons per acre by ground or a minimum of 10 gallons per acre by air. Assail is highly toxic to bees. Do not apply immediately before or during bloom. Assail is highly toxic to aquatic organisms and birds and must be kept out of water.

As always, make sure to read the label before using any pesticide. You can find the label of Assail 30SG by clicking here: https://s3-us-west-1.amazonaws.com/www.agrian.com/pdfs/Assail_30SG1m_Label.pdf

For the label of Assail 70WP click here: https://s3-us-west-1.amazonaws.com/www.agrian.com/pdfs/Assail_70_WP1m_Label.pdf

Preventing Patulin in Apples

By: Patty McManus, UW-Extension

Patulin is a mycotoxin (i.e., a toxin produced by a fungus) that is found in rotting apples colonized by opportunistic *Aspergillus* and *Penicillium* fungi, especially *Penicillium expansum*. Patulin is not considered highly toxic, but as a mutagen, it is considered a possible carcinogen. Patulin-producing fungi are found in many different rotting fruits and vegetables. However, because *Penicillium expansum*, the cause of blue mold, is very common in rotting apples, apple juice and cider are regarded as major sources of patulin in the human diet. Patulin is heat stable and therefore is not destroyed by pasteurization. It apparently does not survive fermentation, but the potential toxicity of its breakdown products in hard cider is not known.



Blue mold, caused by *Penicillium expansum*, produces the mycotoxin patulin. Photo from APSnet.

Preventing infection of fruit by *Penicillium* is the first step to prevent patulin in apple products. While application of fungicides in the field can help minimize both pre- and post-harvest decay by various pathogens—*Botryosphaeria* species that cause white rot and black rot, and *Colletotrichum* species that cause bitter rot—the greatest exposure to *Penicillium expansum*, the main producer of patulin, occurs after harvest while fruit are in storage. Spores of *Penicillium* persist from year to year on storage bins and the walls and floors of storage rooms. Spores become airborne when fruit are loaded into bins, bins are loaded into rooms, and by fans. Washing rooms with water and to remove debris and decaying plant material before filling them with fruit is helpful, but it does not kill spores. Washing rooms with disinfectants based on chlorine, quaternary ammonia, or hydrogen peroxide significantly reduces spore loads. Sanitizers are usually more active at higher temperature (e.g., ambient temperature rather than cooled) and if in contact with surfaces longer. However, sanitizers are generally corrosive, so metal surfaces should be wiped down but not allowed to remain wet with sanitizers for extended periods.

The following recommendations on using chlorine-based sanitizers to best effect were provided a few years ago by David Rosenberger, a now-retired professor of plant pathology from Cornell University, who conducted research on post-harvest storage rot diseases (search Scaffolds Fruit Journal, Volume 23, 2014). However, for maximum efficacy and safety, ***follow label instructions in any instance where they might differ from these recommendations.***

1. The storage room should be at ambient temperature (i.e., not heated or cooled).
2. The door should be closed with the fan off for at least 24 hours before treatment, to ensure that all airborne spores will settle to the floor.
3. A labeled chlorine-based sanitizer should be mixed according to label directions, most of which allow for a solution containing 200 ppm of free chlorine.
4. The pH of the chlorine solution should be adjusted to 6.5 since high pH will make the chlorine solution less active and low pH will result in off-gassing of chlorine that can be harmful to the applicator.
5. The chlorine solution should be applied to the storage room floor using a low-pressure sprayer (e.g., a 3-gal backpack sprayer) while taking care to avoid any air turbulence that would cause spores to become airborne. Begin spraying near the door and progress to the rear of the storage room while spraying enough chlorine to wet the floor. Walking only on surfaces that have already been wetted will minimize the possibility that walking through the room will cause spores on the floor to disperse into the air.
6. Allow the room to dry slowly (or remain wet) for 24 hours before opening the door and turning on the fans to dry the room and dissipate any chlorine odor.

Other practices that can help prevent infection by *Penicillium* and other rot pathogens:

1. Minimize injury to fruit during harvest and handling. *Penicillium* can infect through apple sinuses (the cavity from blossom end to core), but more often it enters through wounds.
2. If fruit are washed after harvest, disinfect water flumes so that spores are not spread in wash water.
3. If fruit are washed after harvest, consider using a fungicide that is labeled for post-harvest drench (e.g., fludioxonil [Scholar]).
4. Store fruit at temperatures of 50 F or lower.

Apple maturity index report – Aug 17th 2017

By: Janet van Zoeren and Amaya Atucha

As a reminder, this fall we are collecting weekly samples to assess apple maturity in ‘Honeycrisp’, which we will be reporting in the newsletter through apple harvest. The maturity indices we are evaluating to determine the optimal harvest period for this cultivar include seed coloration, flesh firmness, soluble solids, and the starch pattern. To read more about apple maturity indices, please read the article we published about this subject last fall in this newsletter, [Volume 1, issue 12](#).

Honeycrisp fruit sampled this week in Richland County presented flesh firmness ranging from 8.0 – 9.7 (which is slightly lower than last week) and soluble solids (Brix) ranging from 8.3 – 11.0 (slightly higher sugar levels than the previous week). Honeycrisp fruit sampled this week in Dane County, presented flesh firmness ranging from 8.4 to 11.0 and soluble solids (Brix) ranging from 8.2 to 10.6. Fruit from both locations are still unripe with high levels of starch (giving them a rating of 1), and their seeds are mainly at “brown tip”, with a few already at “50% brown”. Overall, across all maturity indices, fruit seems to be starting the ripening process.

Iodine starch staining pattern: Honeycrisp in Richland Center



Aug 16, 2017

Apple Maturity Indices for Richland Center

	Weight (g)	Firmness (lbs)	Soluble solids (%)	Seed color	Starch Index
Average	130	9.0	9.0	1	1
Range	105 - 158	8.0 – 9.7	8.3 – 11.0	1 - 2	1 – 1.5

Iodine starch staining pattern: Honeycrisp in Fitchburg



Aug 17, 2017

Apple Maturity Indices for Fitchburg

	Weight (g)	Firmness (lbs)	Soluble solids (%)	Seed color	Starch Index
Average	138	9.7	9.45	0.9	1.1
Range	89 – 187	8.4 – 11.0	8.2 – 10.6	0 - 2	1 – 1.5

Calendar of Events

There are no upcoming events at this time. If you have anything to add to the calendar, please contact the editors (see below).

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.

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