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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 July 2, 2016 through July 22, 2016. For additional information on plant diseases and their control, visit the PDDC website at pddc.wisc.edu.

PLANT	DISEASE/ DISORDER	PATHOGEN	COUNTY
Apple	<i>Black Rot</i>	<i>Sphaeropsis</i> sp.	Trempealeau
	<u>Cedar-Apple Rust</u>	<i>Gymnosporangium</i> sp.	Grant
Blueberry	<u>Root Rot</u>	<i>Pythium</i> sp., <i>Fusarium</i> sp.	Jackson
Cherry	<i>Anthracnose</i>	<i>Colletotrichum</i> sp	Dane
	<u>Brown Rot</u>	<i>Monilinia</i> sp.	Dane
	<u>Powdery Mildew</u>	<i>Oidium</i> sp.	Racine
Grape	<i>Anthracnose</i>	<i>Spaceloma ampelinum</i>	Taylor
Strawberry	<u>Root/Crown Rot</u>	<i>Pythium</i> sp., <i>Rhizoctonia</i> sp.	Bayfield and Columbia

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 July 8th and July 21st, 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](#).

-Japanese beetles are in full swing as of mid-July. Most reports coming in to the diagnostic lab have involved ornamental plants, although many cases of damage to raspberries and grapes have been noted. Early reports suggest that Japanese beetle activity may be up compared to the last two summers, although activity can vary quite a bit among localized areas. Japanese beetles' activity typically starts to drop off in early September in Wisconsin.

-Grape Phylloxera has been confirmed on several grape samples sent in to the IDL. Important considerations for phylloxera include variety/rootstock selection. For more information on grape phylloxera, please refer to the Grape section of previous issues of this newsletter, for example [Volume 1, Issue 6](#), page 18.

-Brown Marmorated Stink Bug nymphs have been spotted two more times in Dane County (Madison). In one case, a single tick-like second instar nymph had been collected from a private residence in Madison. In the second case, over two dozen nymphs (ranging from 2nd - 4th instars) and a mating pair of adults were observed on a dogwood shrub on the UW-Madison campus.

The following insects were previously reported to the Insect Diagnostic Lab (IDL), as being active in the state between June 23rd and July 7th:

-Rose Chafers—Reports of rose chafers have dropped off over the last two weeks, so the adult populations of these insects should be just about done for the year. Remember that the rose chafer has only one generation per year, so will not return until next year. Based on reports coming in to the UW Insect Diagnostic Lab, rose chafer populations seem to be up compared to the past few years.

-Gooseberry Fruitworm—A report of gooseberry fruitworm came in from Vernon county. These caterpillars hollow out developing currants and gooseberries and may tie several berries together with webbing.

-Codling Moth—A few reports of codling moth damage in apples have recently been submitted to the IDL.

-Grape Cane Gall Maker—A report of this insect recently came in to the IDL. This tiny snout-nosed beetle (weevil) leaves canker-like egg-laying scars on grape stems.

Raspberry Planting & Establishment Guidelines

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

Some growers are hesitant to plant any new acreage of raspberries due to the difficulty of SWD control. However, SWD control is not impossible and a good number of growers are finding that raspberries can still contribute a significant amount of profitability to an enterprise. With the resources that are being used to research this pest and its control, there are a multitude of control avenues that look promising for the future. If a grower does decide to add or maintain raspberries in the farm diversity plan, then it becomes doubly important to concentrate on making every effort count towards the optimum, productive, raspberry planting.

As a brief review, **bare root cane stocks** are dug dormant as “sucker” plants. They may or may not have been propagated originally from virus-indexed, tissue-cultured stock plants. The best nurseries will offer stock, field-grown as first generation removed from tissue culture, but they could be up to 2 or 3 generations removed, depending on the nursery (or not derived at all from tissue-cultured mother plants). To clarify, “first generation removed from tissue culture” means that the nursery used tissue culture as the first step in propagation, harvested plants out of culture, acclimated them in the greenhouse, set them in the field for at least a year and then dug the suckers that developed from those plants as bare root cane stock. If insufficient sucker plants developed the first year, one or more growing seasons may have passed since the original plants were set in the field to build up a good supply to harvest to sell to growers. Other options could be that first generation plants were harvested by the nursery to be reset in a new field to sucker even more in order to reduce plant production costs. These plants would then, be 2nd generation removed from tissue culture. The least expensive bare root cane stock plants that can be purchased would have been propagated from suckers from multiple mother generations that may never have gone through tissue culture. These are also the most likely to have contracted viruses along the way if pest control (most commonly aphid vectors) was inadequate at the nursery. Verticillium wilt and crown gall are other major concerns with this plant form.

Bare root cane stock should be planted about the same time or even earlier than bare root strawberries would be; usually in early-mid April, depending on soil workability and snow! Early planting allows these plants to establish a good root system before it starts turning warm. Root system size varies dramatically in bare root cane stock by cultivar and among nursery sources, as there are no federal or state nursery stock quality and grading standards for raspberries. It will probably be necessary, whether planting by hand or by machine, to trim the roots on some plants so that they do not curl upwards in a shallow hole. I have gotten some raspberries with 4' long roots and trying to stuff them in a planting hole is impossible without major root curling that can dramatically stunt the plant over the long-term. I usually have a good, heavy, 12" x 2" board to place the plant root systems on and a sharp axe ready to go. Mechanical tree planters can work well transplanting large cane stock. Once planted, either with packer wheels or your foot, make sure the soil is firmly pressed around each plant. Then, when the first shoots emerge, the roots can support rapid, active, growth. Most bare root cane stock has a good root system and a “handle” which is essentially, a small section of floricanes that is the first to sprout on the plant after planting. Since it is a section of floricanes, it will also try to fruit. Just like first-year june-bearing strawberry plants, pick off any flowers or fruit that appear. Typically, the leaves that come out on this section will lack some vigor but will provide a temporary food source for the establishing plant until the vigorous suckers/turions start emerging from the base of the plant. These new suckers should grow quite vigorously and will be considered primocanes. Do not cut off the old, floricanes handle until there is some good primocane growth present.

Tissue-cultured plants are usually propagated from virus-indexed/ELISA- tested mother stock. The entire procedure of producing tissue-cultured plants more likely ensures that the plants you will receive are “virus free”. Consider, though, that there are, in all likelihood, still some diseases/viruses present because protocols required would be prohibitively expensive in order to render stock free of all the known hundreds of diseases/viruses that can infect

raspberries. This should not change your mind about tissue-cultured plants as being superior to bare root plants- since the most important viruses and diseases **have** been screened for!

Tissue-cultured plants are usually shipped directly from the nursery greenhouse. “Plantlets” have been removed from the agar growing media (usually in babyfood jars/test tubes) and then transplanted into a sterile, soilless, growing media in the greenhouse (usually plants are temporarily acclimated under a mist system) and then grown bedding-plant style as “deep plugs” until they are ready for shipping at 4-8” tall. They are then shipped to you, the grower, as “green” (actively growing) plants to be transplanted in to the field for establishment. **They are very tender plants at this stage and should be treated as “frost susceptible” like a tomato transplant would be.** This is the plant form that is least likely to harbor viruses since they are the youngest and have had the least amount of time to contract diseases. Nurseries have also intermittently offered “nursery-matured” tissue-cultured stock. These are plants that were originally grown in the greenhouse (as above) and then set out in the field nursery for the remainder of the growing season (8-12 weeks). Next, they are dug dormant and shipped to growers in the spring. “Nursery-matured” is the most expensive plant form available to growers because they are the best compromise between disease-free status and “field ready” (less shock at transplanting). They have relatively good cane diameter and an extensive root system. Some nurseries label their plants as “nursery-matured” but the greenhouse plants have, in this case, only been given a short cold/possibly short day treatment to render them semi-dormant.

Raspberries can grow well in a wide range of soils but grow best in deep, well-drained, loamy soils with organic matter levels greater than 3%. Heavier soils are not recommended due to problems with poor drainage or likelihood of remaining wet too long, thus greatly increasing the chances of Phytophthora root rot and similar root problems. Sandy loam soils dry out rapidly, but are actually very acceptable when compost is added and drip irrigation is employed. Raspberries also typically contract the least amount of root diseases in these soils. If raspberries, strawberries, tomatoes, potatoes, eggplants or cucurbits (watermelons, muskmelons, cucumbers) were in previous rotations for the site, there is a much greater chance of Verticillium wilt being present which can also devastate raspberry plantings. Raspberry plantings should also be isolated as much as possible from wild brambles ($\geq 600'$) as native raspberries and blackberries can be a source of many virus diseases. Virus diseases are the primary factor that limits raspberry planting longevity in Wisconsin.

Grass should be planted in the raspberry aisles but there is some flexibility as to when; and certainly benefits and disadvantages to that timing. Perhaps the easiest is to plant the grass the fall before planting when it is typically cooler and wetter. This will facilitate a good establishment. I would suggest a good winter-hardy and rust-resistant perennial ryegrass, possibly mixed with a chewing- or sheep fescue. This combination will be less aggressive or invasive, so it does not become a raspberry weed. Fine-leaved fescue species will have minimum negative impact on a raspberry planting as they have a low water demand, compact growth habit, and show resistance to insects and diseases. They also require less mowing. The raspberry row itself should be maintained such that no grass is allowed to grow in a 3-5' wide strip, thus minimizing competition problems.

Make certain that the deep plug tissue-cultured plants are thoroughly moist before planting in the field in late May; they can dry off very quickly on a hot, windy day. Cover the top of the root/plug with $\frac{3}{4}$ “of soil and then firm in the soil around the transplant. Plant spacings for both bare root cane stock and tissue cultured plugs should be 2' apart within row, with between-row spacings typically 3-4' wider than your tractor. This should give you a solid hedgerow by the end of the second fall. Growers may be very tempted to increase the within-row spacings of more vigorous cultivars like ‘Killarney’ and ‘Latham’ but it is not a good idea. Remember, weeds will be one of your biggest enemies and early cash flow is your friend. Closer spacings mean that your planting will fill in much faster to prevent weed influx and produce higher yields earlier in the planting life for much better cash flow.

Water immediately after transplanting for both types of stock! Bare root, again, are easier at the beginning than tissue-cultured because they have a much more extensive root system to start with and have been typically planted much earlier in the year when it is cooler and wetter. Although one should always rely on a tensiometer or soil moisture meter to decide when to water, generally you will need to water tissue-cultured plants 3+ times per week whereas bare root, about

1+ time per week. This translates into the “more often, less-at-a-time theory for tissue-cultured and “less often, more-at-a-time for bare root” Of course, the same holds true for irrigation guidelines for a sandy vs. a heavier soil, respectively. Try to keep the soil moisture at 50-70% of field capacity, with the higher end for tissue-cultured stock and sandy sites. Drip irrigation is the preferred system for establishment.

Bare root cane stock plants appear more vigorous in the establishment year (up until mid-late July) than tissue-cultured planting stock; but then, the tide turns and once tissue-cultured plants become more established they will significantly out-grow their bare root counterparts by the end of the first growing season, easily becoming twice as large as the bare-root cane stock plants. Cheaper bare root cane stock does not seem like such a good idea anymore once you experience this phenomenon.

Although herbicides are never a great idea for first year establishment, bare root cane stock can tolerate herbicides much better than green tissue-cultured stock. I would suggest **no** herbicides for green tissue-cultured stock; use straw mulches (4+” depth-1st year only; equates to about 2-4T/A) and/or hand/mechanical cultivation for both types. Remember to remove the mulch early enough in the fall to allow proper “hardening off” or acclimation for winter. On sandy sites, once the hedgerow is established (typically end of year 2), mulch can be used annually with beneficial results but it is not recommended for heavier soils. Since the tissue-cultured green stock is much smaller than bare root cane stock, (they are almost like strawberries in susceptibility to weed competition) weed control must be timely and thorough. Even though bare root cane stock has much larger root systems to start with, they are also quite vulnerable to weed competition and should be kept as clean as possible.

As with any fruit plants, the smaller the plant and/or root system, (especially in the establishment year) the more often the fertilizer application (usually nitrogen) and the lighter the dosage. Rely on pre-plant–applied nitrogen for the first several weeks and then N can be applied through the drip irrigation at the rate of 5-7 lb/A, actual, every 4-5 days. Low mobility nutrients like phosphorous and potassium should be incorporated pre-plant, based on a soil test. Typically, soil phosphorous availability should be 25 ppm and potassium, 100 ppm. The pH should be adjusted to 6.5. Granular nitrogen applications should be curtailed by mid-late July in order to allow plants to slowdown in growth and facilitate fall/winter acclimation. Nitrogen fertilizer applications in drip systems can continue until early September, since doses are at such low levels and there is no residual action.

Trellis construction for summer-bearing raspberries (floricane fruiterers) is perhaps easier before planting but could be delayed until mid-summer. A double wire / double T trellis is the best compromise between a simple hedgerow and a V-trellis (requires two angled posts every 20-30ft.). Make sure a sufficiently tall T-post is purchased based on cultivar vigor. One of the easiest methods I use to obtain crossbars is to weld rebar on the T-posts. The crossbars should be placed at about 3 ft. and again, at a 5-6 ft. height, depending on the vigor of your site and cultivars. The lower crossbar should span about 18” and the upper about 48-65”. Two wires can be strung from each end of the crossbars, so that the canes can be just slipped in between instead of needing to be tied. At the top crossbar, or even both crossbars, another double wire fitment can be made where the T-post and the crossbar meet. This double wire arrangement can be used in later years to train the primocanes up through the middle of the trellis and the tips of the crossbars on either side can be used to direct and hold the floricanes for easier harvest.

Primocane fruiting (fall bearing) raspberry trellis construction can be simplified, especially when just a fall crop is desired, as only primocanes will need to be managed. One important procedure for trellis installation with fall fruiterers is to make annual post removal a simple process. I sink 1.5- 2’ sections of PVC pipe just slightly bigger than the T-post diameter every 20’ so I can easily remove the T-posts when I want to mow off the field in late fall or early spring. Typically, heavy twine or rope strung through the trellis makes the whole procedure of annual trellis removal easier but wire will work too, if you’re careful.

Attention to detail in the establishment year will reap big rewards later in the life of the raspberry planting. Cultivar selection is one of the most important aspects not mentioned in this article but will be covered in a future newsletter.

Japanese beetle in berry crops

By: Janet van Zoeren and Christelle Guédot, UW- Extension, Entomology



A Japanese beetle, showing the characteristic metallic coloring and the 5 tufts of white hairs along each side of its body.

As we mentioned in previous newsletters, this year seems to be a particularly bad one for Japanese beetle damage. This could cause problems for many fruit growers, but is especially problematic for raspberries and grapes. We discussed Japanese beetles briefly in the grape section of this newsletter in [Volume 1, Issue 6](#) (page 18), but would now like to go into more depth on the life cycle, preferred crops, monitoring, and cultural as well as chemical controls of this pest.

Identification and Life cycle: Adult Japanese beetles show up in our crops in early July, immediately after emerging from pupation. These relatively large, metallic green, shiny beetles are easy to spot, and can be distinguished from other similar beetles by the 5 tufts of white hairs along each side of their body. Adults are long-lived, and will continue to feed on crop plants throughout their 6 to 8-week life span. After feeding and mating during the day, female Japanese beetles fly in the evening to moist, grassy areas to lay their eggs. By September, adults begin to die off, and the larvae hatch and begin to feed on grass roots. As soils cool, the larvae move deeper to stay warm and overwinter underground. In the spring, larvae continue to feed, until they pupate and emerge as adults the following July. There is only one generation per year.

Damage symptoms and monitoring: Adult Japanese beetles feed primarily on the leaves of most of our fruit crops, but are especially attracted to raspberries and grapes. They generally feed on the younger leaves, and feed on the tender tissues leaving the veins behind. This leads to a characteristic “skeletonization” of the leaves. Adults may also feed on fruits and flowers. Larvae feed on grass roots underground, and can lead to swaths of brown grass where they reach high densities.

The easiest, and most effective way to monitor for Japanese beetle, is to inspect crops for the very visible beetles. It is also worth watching for the characteristic skeletonized leaves, although those may be caused by another pest such as the rose chafer. It is not recommended to monitor with pheromone-based traps, since those attract beetles from other locations into your crop. If you would like to use the pheromone-based traps, it is better to place them away from any susceptible crops.



Typical Japanese beetle damage, showing “skeletonized” leaf, on grape vine.

Cultural and chemical controls: Cultural controls can go a little way toward making your farm and landscape less attractive to Japanese beetles; however, on a bad year like this summer is shaping up to be, chemical controls will probably be necessary. Due to Japanese beetles’ aggregative tendencies and strong flying ability, even if your landscape is not desirable to the beetles, they are likely to continue coming in this summer from elsewhere. Some insecticides labeled for use on raspberries, blackberries and blueberries are listed in the following tables.

In general, though, some things you can do to help maintain low Japanese beetle levels on a year to year basis include minimizing moist grassy areas where they can lay their eggs, and planting less attractive crop varieties and landscape

plants. Because the females are looking for moist dirt near grassy sod, it might be worth watering less frequently or being sure to water only just on the soil immediate surrounding your crop plants, and also if possible removing grassy areas and re-planting with non-grass cover crops in aisles.

This year, however, the key will be to scout frequently and spray each time populations begin to increase, while rotating IRAC codes to prevent insecticide resistance build-up. The table below offers several IRAC code options, all of which are registered for use on raspberries, blackberries, and blueberries. To prevent Japanese beetle build-ups, it is recommended to spray raspberries as needed from post-bloom until pre-harvest, and to spray blueberries as needed from green berry to pre-harvest. **As always, make sure to read the label before using any pesticide.**

Insecticides registered for caneberries and blueberries:

Product Name	Mode of Action	PHI	Rate
Sevin XLR Plus (4F)	Carbaryl (1A)	7 days	1 – 2 qt. / acre
Malathion 57EC	Malathion (1B)	1 day	Blueberries: 1.5 pints / acre Caneberries: 2 pints / acre
Pyganic EC 1.4	Pyrethrin (3A, organic)	Depends on conditions	16 - 64 oz. / acre
Danitol 2.4EC	Fenproparthrin (3A)	3 days	Blueberries: 10.67 -16 oz. / acre Caneberries: 16 oz. / acre
Mustang Max	Zeta-cypermethrin (3A)	1 day	4 oz. / acre
Assail 30SG	Acetamiprid (4A, RR)	1 day	4.5 – 5.3 oz. / acre
Entrust SC	Spinosad (5, RR)	3 days	*** See note below
Delegate	Spinetoram (5, RR)	3 days	*** See note below

IRAC Code = Insecticide Resistance Action Committee Mode of Action group **RR** = reduced risk

*** Although these insecticides do not contain Japanese beetle on the label, they are registered for both caneberries and blueberries in Wisconsin, and have shown efficacy against Japanese beetle in insecticide trials.

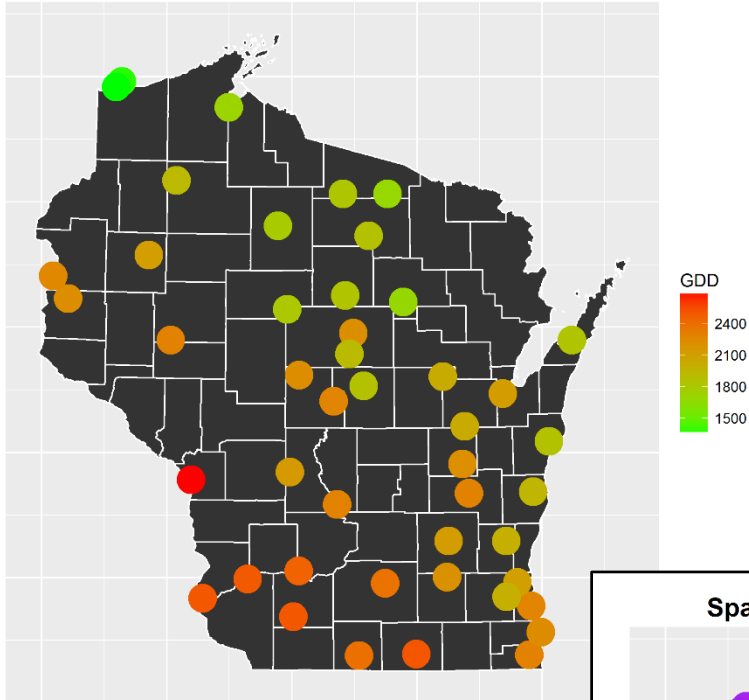
Cranberries

Cranberry Degree-Day Map and Update: as of July 20, 2016

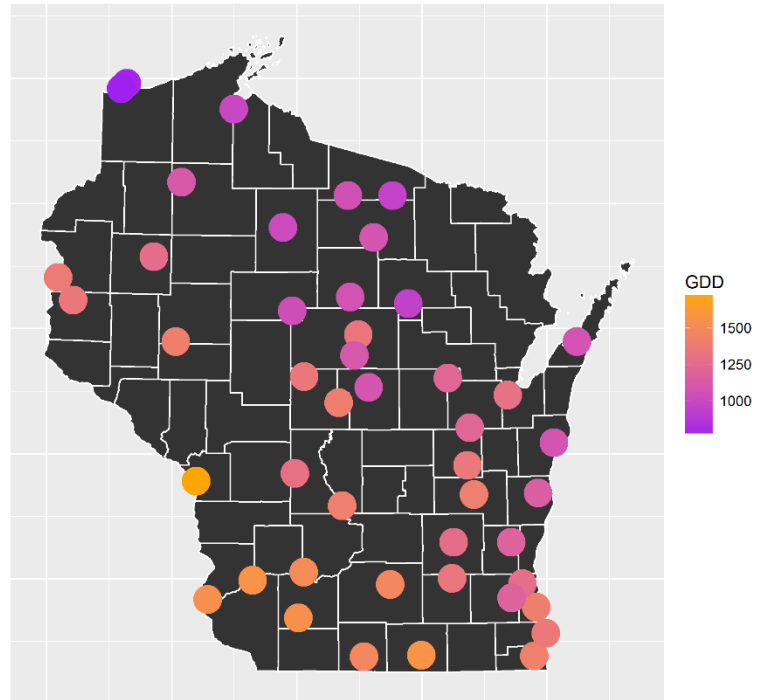
By: Elissa Chasen and Shawn Steffan, USDA-ARS and UW Entomology

The maps below show degree-day accumulations for cranberry plants and *Sparganothis* fruitworm across Wisconsin up through July 20, 2016. Temperature thresholds used for these calculations are 41 and 85 °F for the plant, and 50 and 86 °F for *Sparganothis*.

Cranberry Growing Degree Days: July 20, 2016



Sparganothis Degree Days: July 20, 2016



Plant DDs throughout WI range from 1,371-2,676. The central WI growing region has accumulated around 2,200 DD, while the northern WI growing region has accumulated around 1,800 DD. Throughout WI, *Sparganothis* degree-days range from 754-1,721 DD. In central WI, *Sparganothis* DDs are around 1,400, while in northern WI, *Sparganothis* DDs are about 1,000. See the image below for life history benchmarks of interest for *Sparganothis* fruitworm and the associated degree-day estimates for each benchmark (based on Deutsch et al. 2014).

	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

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

July 20	Cranberry Growing Degree Days			Sparganothis Degree Days		
	2014	2015	2016	2014	2015	2016
Central WI (Wisconsin Rapids)	2,048	2,229	2,267	1,266	1,354	1,404
Northern WI (Minocqua)	1,751	1,766	1,825	1,049	990	1,057

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 July 18th, 2016 issue of the Cranberry Crop Management Journal you will find information about: phosphorous management, the insecticide delegate, observations from an intern, early rot, early rot identification in the field, and grower updates.

Wine and Table Grape Developmental Stages

By: Janet van Zoeren, Becky Wiepz, Annie Deutsch, and Amaya Atucha – UW-Extension

Development at the Peninsular Agricultural Research Station (PARS) has nearly caught up with that at the West Madison Agricultural Research Station (WMARS), with all berries at both sites at E-L* developmental number 32 (beginning or bunch closure) or 33 (bunch closed, berries hard and green). We anticipate veraison at WMARS to begin late-July to early-August, and at PARS a couple weeks later as those berries will need more time to finish up the lag period in their development.

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

Following photos taken on July 19th at West Madison Agricultural Research Station.



Brianna at WMARS; "bunch closed, berries hard and green" E-L number = 33



La Crescent at WMARS; "bunch closed, berries hard and green" E-L number = 33



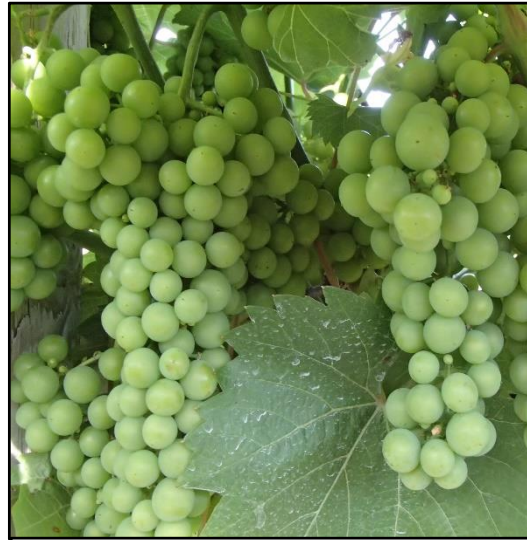
St. Croix at WMARS; "bunch closed, berries hard and green" E-L number = 33



La Crosse at WMARS; "bunch closed, berries hard and green" E-L number = 33



Frontenac at WMARS; "bunch closed, berries hard and green" E-L number = 33



Marquette at WMARS; "bunch closed, berries hard and green" E-L number = 33



Somerset at WMARS; "bunch closed, berries hard and green" E-L number = 33



Einset at WMARS; "beginning of bunch closure" E-L number = 32

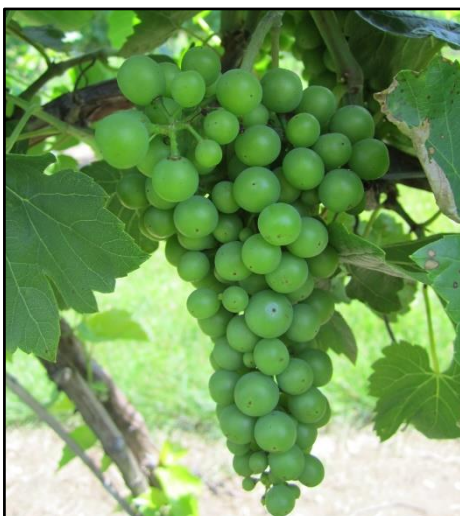
Following photos taken on July 19th at the Peninsular Agricultural Research Station.



Brianna at PARS; "bunch closed, berries hard and green" E-L number = 33



La Crescent at PARS; "beginning of bunch closure" E-L number = 32



La Crosse at PARS; "bunch closed, berries hard and green" E-L number = 33



Marquette at PARS; "bunch closed, berries hard and green" E-L number = 33



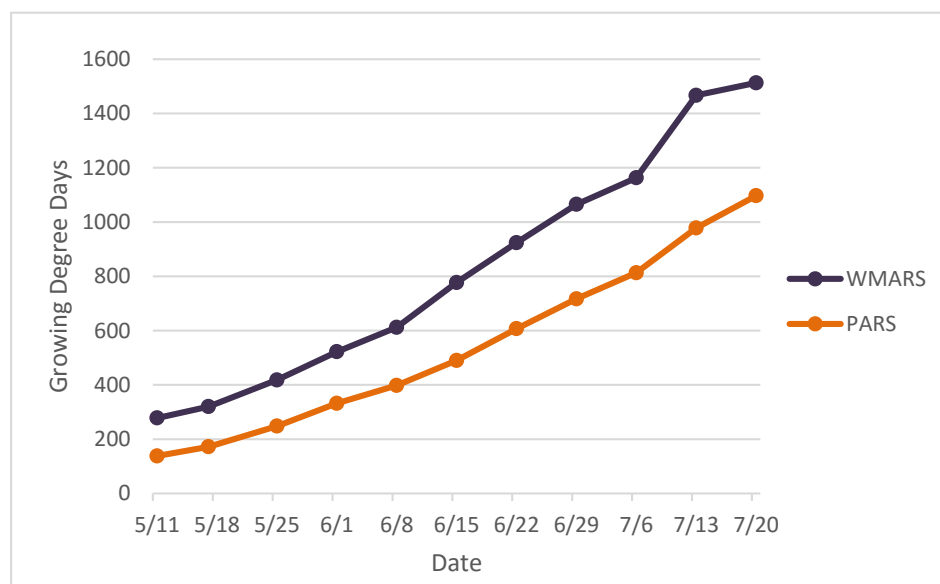
Frontenac at PARS; "beginning of bunch closure" E-L number = 32



Frontenac gris at PARS; "beginning of bunch closure" E-L number = 32

The growing degree day accumulations as of July 20th for this year are: 1513 GDD at WMARS and 1097 GDD at PARS. Especially in central Wisconsin, warm temperatures have led to a sharp increase in degree day accumulations in the past couple weeks, as you can see in the graph below. We are now ahead of the degree day accumulations for 2015. All growing degree days are calculated using a base of 50°F.

Grape Growing Degree Days		
April 1 - July 20, 2016		
	2106	2015
WMARS	1513	1467
PARS	1097	1004



Grape disease update

By: David S. Jones and Patty McManus

Warm summer temperatures in the 80s and low 90s across the state in recent weeks have pushed grape growth along rapidly. These warm temperatures have been accompanied by very regular rainfall throughout most of the state. This is already shaping up to be a big year for grape diseases, as we have been getting rainfall every several days for much of the season.

PARS (Sturgeon Bay): As of July 19th we had accumulated 985 GDD (base 50) and have recorded 6 rain events in the past two weeks. Things have been very wet in the region over the past several days, and temperatures have remained in the 70s and low 80s. The vines in this region have done quite a bit of catching up to those in southwest Wisconsin. We are at early bunch close, and veraison is not far off. Downy mildew has begun to cause damage on Valiant and LaCrosse leaves, and black rot damage is becoming evident on Valiant and Marquette clusters.

WMARS (Madison): As of July 20th, we had accumulated 1376 GDD (base 50) and have recorded 6 rain events in the past two weeks, with significant rainfall on the forecast in the next 7 days. Shoots have pushed over the top wire of our VSP over the course of the past two weeks and have been hedged, while clusters are at bunch close or early veraison. Downy mildew is causing severe foliar damage to Valiant, LaCrosse, and LaCrescent. St. Croix and Brianna are also showing foliar downy mildew symptoms at this time. Of these cultivars, only the clusters of Valiant being damaged by the disease.

Black rot damage on clusters will be evident throughout southern Wisconsin at this time. We have noted that damage is particularly bad this is year at both WMARS and PARS on Marquette and Valiant. It important to remember that fruit showing black rot damage right now cannot be “cured” with fungicides. The black rot fungus infects primarily during the 4-6 weeks following bloom, which we have already passed. These infections have a latent phase during which no damage is evident. Infection progresses and becomes evident near bunch closure and veraison. Black rot strikes that you find right now are due to missed coverage during the susceptible peak either during or following bloom. Sprays made against black rot are no longer needed to protect fruit, as we have passed the 6-week mark since bloom. Fruit at this time have become relatively resistant to new infections, and should not require further treatment. Similarly, grape leaves acquire ontogenic (age-related) resistance to black rot once fully expanded, so leaves within your canopy are no longer at significant risk either.



Above: black rot damage on Valiant (left) and Marquette (right). “Hot spots” such as these should be flagged in your vineyards as you scout so that they can be removed later. Photos by D.S. Jones.

What should I do if I notice that my fruit is damaged by black rot? While you cannot save berries that are already damaged by black rot with sprays, you can still reduce future risk of black rot damage. If you are seeing severe black damage this year, make sure that you check both the product that you applied this year and when you applied it. You should have made an initial application of a product specifically labeled against black rot (please read pages 76 and 77 in the 2016 Fruit Pest Management Guide) just before bloom and kept a full cover on for at least 5-6 weeks following this initial application. Lack of adequate coverage, missing the timing of a bloom with your first spray, or the application of a product that is not appropriate for black rot can all be causes of damage. Re-assessment of products, closely monitoring the timing of bloom for an initial spray, and tightening spray schedules may all be helpful to you in the future.

As you scout in the upcoming weeks, it is also a good practice to mark damaged clusters with bright-colored flagging tape so that you can find and remove the black rot clusters/mummies later on. Remember that these mummies should not be allowed to overwinter through to next year, as they provide a significant source of inoculum (spores) the following spring that can cause a significant uptick in infections. We have seen an enormous surge in black rot damage to fruit between the first and second year of withholding fungicides at both WMARS and PARS, indicating that light amounts of black rot damage, if not appropriately managed, can lead to tremendous losses the following season.

Is this black rot or phomopsis fruit rot? Phomopsis fruit rot and black rot both cause infected berries to mummify, and they both cover mummified fruits with tiny black “pimples,” called pycnidia. However, at this time of year there is an easy distinction; phomopsis fruit rot does not damage berries prior to veraison. If you see a mummified black berry covered in

pycnidia at this time of year, it is almost certainly black rot. It is also likely that if you have black rot symptoms on leaves, but not leaf spots typical of phomopsis, then the fruit rot is probably black rot. We will discuss phomopsis fruit rot as it appears in our trials as the season progresses.

Downy Mildew. Unlike black rot, downy mildew will continue to cause new infections on leaves throughout the growing season as long as conditions are conducive. The spores of the pathogen (called sporangia), form and emerge from the stomata on the underside of grape leaves in humid conditions during periods of four or more hours of darkness and the temperatures above 55 degrees F. Our trials indicate that downy mildew can cause moderate to severe defoliation on several widely grown cultivars if not managed appropriately, and conditions have been ideal throughout most of the state in recent weeks with the intermittent rains and high humidity. Growers should be maintaining a cover for downy mildew at this time to prevent new infections from occurring. Make sure to check the pre harvest interval of these products, as several products, including Ridomil and mancozeb, have lengthy PHI's. Recommendations for downy mildew control can be found in the [Wisconsin Fruits Newsletter, Volume 1, issue 5](#), page 8.



Above: downy mildew oil spots (left) and sporulation (right) on LaCrescent. Damage is visible on Valiant, LaCrosse, St. Croix, LaCrescent, and Brianna at this time in our trials. Photos by D.S. Jones.

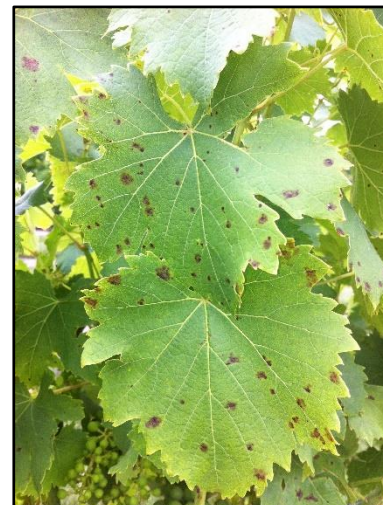
What should I do if my vines are already infected by downy mildew? While there are many products that are labeled for downy mildew control, many are best used as protectants. This means that the effectiveness of these products relies on the vine NOT already being infected with downy mildew. If you know that your vines are already infected with downy mildew, it is important to consider product choice carefully in order to achieve the best control. It is also important to rotate through your chemistry options when managing a downy mildew outbreak to minimize the possibility of the development of fungicide resistance.

Products such as Ridomil Gold MZ or Ridomil Gold Copper, while providing superior control to downy mildew, are also dangerous choices at this point in the season due to the 66-day pre-harvest interval. If these products are not an option, phosphorous acid fungicides provide both a protective and a curative effect to downy mildew. Michigan State University Extension notes that a second phosphorous acid spray made 5-days after the first application will enhance the curative effect of such treatments. Strobilurin fungicides have minimal curative effect for downy mildew, and as such are a poor choice for managing a downy mildew outbreak. Additional care must be taken with strobilurin products due to possible phytotoxicity issues with Flint and Pristine. Copper-based fungicides are effective against downy mildew, and some formulations are approved for organic production. However, in our research on sensitivity of cold-climate cultivars to copper, Brianna was highly sensitive, sometimes showing injury after just one application. Several other varieties showed injury, but only after four to six applications. See the Northern Grape News, February 18, 2016 for more information on copper fungicide use (northerngrapesproject.org).

Several newer fungicides such as Reason, Presidio, Revus, and Zampro are becoming more popular in downy mildew spray programs, but it is important to note that all are best used as protectants and have a high potential for the development of resistance. These products can be a valuable part of a downy mildew spray program, but be sure to read and follow all instructions regarding spray mix requirements and number of applications per year. More information on these newer products, as well as the older products mentioned in this article can be found on pages 87-90 if the 2016 Midwest Fruit Pest Management Guide.

Other diseases: we have received several questions about several other diseases, including powdery mildew and anthracnose. We have not detected either of these diseases at any of our field sites, but will continue to monitor them for the duration of the growing season and provide images and information via this newsletter. It is likely that grape powdery mildew will appear in our trials if we start to get drier weather – the frequent rains are actually detrimental to the development of this pathogen.

Other Vineyard Notes: Rupestris Speckle (also sometimes called “Muscat Spot”) is a physiological disorder, associated with hybrid grapes that have *Vitis rupestris* in their lineage, that often closely resembles foliar black rot. The cause is currently unknown, but we do know that it is NOT known to cause economic loss in vineyards, and no control is recommended. Our trials indicate that Rupestris speckle is very common on Frontenac and Frontenac gris. Vines in Madison are currently showing extensive symptoms. The brown spots associated with Rupestris speckle will differ from black rot lesions in that they lack the tiny black “pimples” or pycnidia scattered across the surface of the lesion. Make sure to check lesions for fungal bodies before assuming that you have a disease that requires management.



Above: Rupestris speckle on Valvin Muscat grape cultivar. Photo by Patty McManus.



Above: Rupestris speckle on Frontenac. Spots may appear isolated from one another (left) or coalesce (right) in more severe cases. These spots differ from black rot in that they lack the tiny black “pimples,” or pycnidia inside. Photo by D.S. Jones.

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://uwlabs.soils.wisc.edu/fees/>

Grape insect pests: Focus on wasps and Japanese beetles

By: Janet van Zoeren and Christelle Guédot, UW- Extension, Entomology

Wasps can be pests in the vineyard, both in terms of just being a nuisance to farm workers, being dangerous to



Wasp feeding on grapes. Photo by Katie Hietala-Henschell.

those who are allergic, and also may cause damage by feeding on the grapes themselves. Wasps tend to show up around veraison and are present through harvest, and, in fact, for the first time this year, I saw five wasps while scouting at the West Madison Agricultural Research Station (WMARS) this week.

wasps in your vineyard, now is the time to remove nests and/or trap out adult workers. It's especially important not to let wasp nests build-up to become a problem,



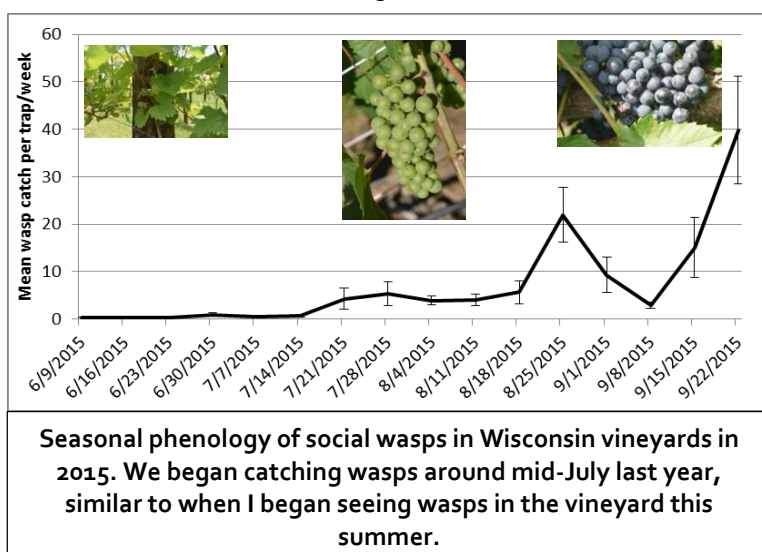
A commercially available wasp trap will remove adult wasps, but will not eliminate the nest altogether.

For this year, if you have begun seeing

since there are no insecticides labeled for use on this pest in Wisconsin at this time. The best case scenario is if you are able to locate and remove nests early in the season, either with

an aerosol spray you can pick up at any garden center, or by spraying the nest down with a power washer. If you aren't able to find and remove the nest itself, you can trap adult wasps using a wasp trap and lure available in a garden center or homemade traps and baits; however, those only attract and remove the adult worker wasps, so will not remove the nest altogether. In order to minimize damage in your vineyard through simple sanitation practices, you can harvest promptly and often, and remove the over-ripe or damaged berries, which are most attractive to wasps.

Previous work in the Guédot lab has identified the most abundant species of wasps in Wisconsin vineyards, tracked their phenology, and identified scents which are most attractive to each species. In the future, we hope to look more closely into attractants as well as repellents, to be able to use a push-pull strategy to encourage them away from the vineyard and prevent crop damage or worker annoyance.



Japanese beetles continue to be a problem out at WMARS, despite three insecticide applications targeting them so far this season. This is an indication of what a bad year it is likely to be throughout Wisconsin for Japanese beetles, especially since we can expect 5 to 6 more weeks of damage by Japanese beetle in our vineyards. For more general information about Japanese beetle's life cycle, identification, damage symptoms, and monitoring, please see the article on Japanese beetle in the berry crops section of this issue (page 6). For a list of insecticides registered for use on grapes in Wisconsin, see the table at the end of this article.

Cultural controls, such as planting resistant cultivars, may reduce Japanese beetle damage in many years, although with the large numbers so far this summer, it's likely that a chemical control will be necessary. Overall, *Vitis labrusca* variety vines can handle more Japanese beetle defoliation without a corresponding decrease in yield, which may be useful to consider in your spray schedule. Also, older vines can withstand more defoliation than young vines. Interestingly, at WMARS this summer, I have found more Japanese beetles on Marquette than on the other cultivars; however, because this observation is based on one summer at one location, it does not necessarily indicate a true trend, but does suggest that beetles may show a preference for individual cultivars.

Another organic option for grape growers is the use of Kaolin clay, such as Surround. Surround coats the grape vine with a white film, in effect physically deterring the beetles from feeding on the foliage. A disadvantage of this is that it does not actually reduce beetle populations, but rather protects the crop as long as it remains on with full coverage. Reapplications are necessary following a rain event or as the crop grows and expands. However, Surround is OMRI certified, has a 0-day PHI (although you will probably want to wash the residue off before harvest for), and can provide an effective and low-impact solution to Japanese beetle damage to your grapes.

Product Name	Mode of Action	Timing	PHI	Rate
Imidan 70WP	Phosmet (1B)	shatter through harvest	14 days	2.125 lbs. / acre
Assail 30SG	Acetamiprid (4A, RR)	shatter through harvest	3 days	2.5 – 5.3 oz. / acre
Belay 2.13 SC	Clothianidin (4A, RR)	shatter through harvest	0 days	2 – 4 oz. / acre
Avaunt 30WG	Indoxacarb (22A, RR)	shatter through harvest	7 days	3.5 - 6 oz. / acre
Altacor 35WG	Chlorantraniliprole (28, RR)	shatter through harvest	14 days	3 – 4.5 oz. / acre
Surround WP	Kaolin clay (organic)	deterrent only	0 days	25 – 50 lbs. / acre

IRAC Code = Insecticide Resistance Action Committee Mode of Action group **RR** = reduced risk

As always, make sure to read the label before using any pesticide.

Northern Grapes Project

By: Patty McManus

If you are not yet aware of it, please check out the web site and newsletter for the [Northern Grapes Project](http://northerngrapesproject.org), a USDA-funded multi-state research and extension project (northerngrapesproject.org). From this site you can access webinars, news and updates on research, progress reports from the team, and the newsletter "Northern Grapes News." In the newsletter, my graduate student David Jones and I have posted articles on downy mildew in cold-climate grapes (Vol. 4, Issue 4, November 2015) and the use of copper, sulfur, and difenoconazole fungicides on cold-climate grapes (Vol. 5, Issue 1, February 2016). The newsletters and webinars contain a wealth of information on cold-climate grape and wine production from several researchers. The Northern Grapes Project funding is expiring this year, but an effort is underway to submit another grant to continue the work.

Many of the topics covered in this issue were discussed last week at the Peninsular Agricultural Research Station Vineyard Walk. Specialists spoke about grape pruning and trellising, disease management and insect management, as well as discussing the history of the research station and some of the research taking place there. Be sure to keep your eye on the current events section at the end of this newsletter to stay informed of future field days and vineyard walks, as these provide a great hands-on opportunity to learn about fruit production and some of the research going on in this state!



Dave Jones discussed disease management at the Peninsular Agricultural Research Station vineyard walk last week.

Peach varieties for Wisconsin: old and new cultivars

By: Amaya Atucha, UW-Extension State Fruit Specialist

There is a big interest among growers and homeowners for peach varieties that perform well in our short growing season, and cold winter climate in Wisconsin. Unfortunately, peaches trees and cold temperatures do not get along and in last year's extreme cold weather events (e.g. polar vortex) make growing peaches in our state a very risky business. New varieties claiming to be "cold hardy" have been released over the last decade, and even though they prove to be very cold hardy during mid-winter (January-February), they can still suffer substantial damage during fall or early spring due to slow acclimation to cold temperature during fall or early deacclimation (lost of low temperature resistant) in the spring when unusual warm weather precedes cold temperatures. In addition, peach trees bloom earlier than other fruit crops (e.g. apples, pears), which predispose them to higher risk of spring frost damage. All of these factors add up to what we call cumulative cold damage, which is the overall effect of multiple non-lethal cold weather events that produce damage to buds, trunks, limbs, and roots of trees over several winters, resulting in trees collapsing and dying. In addition, cold damage to limbs, trunks, and buds debilitates trees making them more susceptible to fungal diseases (e.g. cytospora canker) and shortening the trees' lifespan.

I have gathered information from other states with comparable growing condition to come up with this list of new and old peach varieties with potential to be grown in Wisconsin (note that these varieties have not been tested in a replicated trial in Wisconsin!).

Allstar: Medium-size bright red fruit with clear yellow flesh. Matures mid-August. USDA hardiness zone 5-8.

Blushingstar: Large-size red skin fruit; high quality and white flesh. Matures in mid late-August. USDA hardiness zone 4-8.

Contender: Medium-size orange-red fruit with sweet yellow flesh. Matures early-September. USDA hardiness zone 4-8.

Intrepid: Medium-size fruit with red skin and sweet yellow flesh, good quality for canning and freezing. Matures in mid-August. USDA hardiness zone 4-8

Madison: Medium-size fruit with red bright skin and yellow firm. Matures early-September. USDA hardiness zone 5-8.

McKay (Wisconsin Balmer): Large-size fruit with firm flesh of medium quality. Matures early to mid-August. USDA hardiness zone 4-8.

Reliance: Large round-size yellow skin with red blush fruit and yellow flesh. Matures mid-August. USDA hardiness zone 4-8.

Starfire: large-size fruit, solid bright orange-red fruit with clear yellow flesh. Matures mid-August. USDA hardiness zone 5-8.

PF24C-Cold Hardy: Large-size red blush over yellow skin fruit with yellow flesh. Matures mid-September. USDA hardiness zone 4-8.

Harrow Diamond: Medium-size peach with red blush over yellow ground; yellow firm flesh. Matures early-August. USDA hardiness zone 5-8.

Insecticide profile: Delegate

By: Christelle Guédot, University of Wisconsin, Entomology

Insecticide: Delegate

- Available as 25WG (25% AI, Water Granule)
- Restricted re-entry interval (REI): 4 hours
- Pre-harvest interval (PHI): 1-14 days depending on crop
- No more than 4 applications per year
- No more than 3 consecutive applications
- Do not exceed a total of 28 oz. per acre per year
- Rate of use per acre: 4.5 – 7 oz. in pome fruit and 3 – 7 oz. in stone fruit
- Minimum interval between applications is 7 days (3 days for thrips in stone fruit)

Delegate is registered for use in Wisconsin on pome fruits, including apple, crabapple, pear, and quince as well as on stone fruits, including apricot, cherries, nectarine, peach, plum, plumcots and prunes. It has been registered for some time now so you probably have some experience with it. It is marketed by Dow AgroSciencesTM under the formulation 25WG (25% of active ingredient as Water dispersible Granules). Delegate is in the class of the spinosyns (IRAC group 5) with a mode of action acting on the insect's acetylcholine and GABA receptors on postsynaptic membranes of the insect nervous system, causing abnormal neural transmission. Delegate contains the active ingredient Spinetoram, a mixture of chemically modified spinosyns. Delegate is effective primarily through ingestion of treated plants and secondarily through contact. Delegate also provides translaminar activity by moving into and across leaf tissue. Affected insects will rapidly stop feeding within minutes, become paralyzed and eventually die. It provides control across multiple insect growth stages.

Delegate is registered for control of codling moth, oriental fruit moth, European corn borer, gypsy moth, European grapevine moth, green fruitworm, lacanobia fruitworm, leafminers, leafrollers, lesser appleworm, light brown apple moth, thrips, peach twig borer, tufted apple bud moth, and pear psylla. It also provides suppression of apple maggot and plum curculio populations. Delegate may be applied by ground equipment, chemigation, and by air (see label for specific application regulations).

Delegate is toxic to bees exposed to it within the first 3 hrs. after application. It is not considered toxic to bees after the spray deposit has been allowed to dry, but as a precaution, avoid applying it during bloom when bees are flying.

Delegate 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 label of Delegate at the following link:
<http://ws.greenbook.net/Docs/Label/L89337.pdf>

Apple aphids: how to identify and control wooly and rosy apple aphids

By: Janet van Zoeren and Christelle Guédot, UW- Extension, Entomology

Rosy Apple Aphid, *Dysaphis plantaginea*

Timing of Damage/When to monitor: Rosy apple aphid is most prevalent in the spring, from tight cluster to pink stages, although aphids and damage can be seen, at lower levels, throughout the summer. Monitoring for adults should take place during the spring (tight cluster to pre-pink), while monitoring for eggs should take place during the dormant period.

Description and Life Cycle: Rosy apple aphids overwinter as eggs on the bark of the apple tree, generally on fruiting spurs. Each egg is 0.4 mm long, ovular, and initially bright yellow but turning greenish-yellow to black.

Nymphs (pale yellow or pink to rosy brown or purple) hatch between silver tip and ½-inch green, and find flower buds to feed on. They suck the sap inside newly emerging leaves and flower buds, which causes leaves to curl up – serving to protect the aphids from predators and from insecticide sprays.

Adults can be winged or wingless, and live in colonies on terminal growth. They are 1/10th inch-long and purple-pink, and each has an abdominal cornicle (see picture on 3rd page) and long antennae. Each female produces up to 185 young. During the summer all offspring are females produced parthenogenetically (no sexual reproduction). 2nd, 3rd and 4th generations produce some winged offspring which fly to **plantain, dock, or other weeds** for the summer. By fall winged females and males fly back to the apple tree, mate, and lay eggs on the bark again.



Rosy apple aphids on an apple leaf.
Photo by Dr. Greg Krawczyk, Penn State University.

Damage Symptoms include:

- Leaf curling
- Misshapen fruit (saliva transmitted from leaves to fruit can stunt fruit development)
- Honeydew produced by aphids can lead to sooty fungus growth etc.

Monitor for eggs during the dormant period:

- collect ~100 fruit spurs from throughout the orchard block
- using a hand lens look for rosy apple aphid eggs
- If any egg is found, treat for eggs during the dormant period



Rosy apple aphid damage to new leaves. Photo by Dr. Greg Krawczyk, Penn State University.

Monitor for adults at tight cluster – pre-pink:

- monitor on more susceptible varieties- Golden Delicious, Rome, York, Ida Red or Cortland
- examine tree for indicative tightly curled leaves and for aphids, open up the curled leaves to see if aphids are still present (to avoid spraying if predators are already controlling your population)
- if there is on average more than one tightly curled leaf-cluster / tree, spraying is recommended

Control:

- Do not allow alternate host plants to grow (i.e. Plantain and dock species)
- Avoid most susceptible cultivars (i.e. avoid Cortland, Ida Red, Golden Delicious, Rome, York, Stayman)
- Prune trees to maintain airflow and allow complete chemical control coverage
- Encourage natural enemies such as: lady beetles, lacewings, syrphid fly larvae, and Braconid wasps

Product Name	Mode of Action (IRAC)	Timing	PHI	Rate
Delayed Dormant Oil	Horticultural Oil	Green-tip to ½" green	0 days	4 - 9 gallons / acre
Superior Oil	Mineral Oil	Tight cluster to pink	0 days	1 – 8 gallons / acre
Lorsban EC	Chlorpyrifos (1B)	Tight cluster to pink	0 days	1 – 2.67 lbs. / acre
Assail 30 SG	Acetamiprid (4A, RR)	Tight cluster to pink	7 days	2.5 – 4 oz. / acre
Actara 25 WG	Thiamethoxam (4A)	Tight cluster to pink	35 days	4.5 oz. / acre
Calypso 4F	Thiacloprid (4A)	Tight cluster to pink	30 days	2 – 4 oz. / acre
Closer SC	Sulfoxaflor (4C)	Tight cluster to pink	7 days	1.5 – 2.75 oz. / acre
Sivanto 200SL	Flupyradifurone (4D, RR)	Tight cluster to pink	14 days	7 - 10.5 oz. / acre
Abamectin 0.15 EC	Abamectin (6)	Tight cluster to pink	28 days	10 – 20 oz. / acre
Exirel	Cyantraniliprole (28, RR)	Tight cluster to pink	3 days	13.5 – 20.5 oz. / acre

IRAC Code = Insecticide Resistance Action Committee Mode of Action group **RR** = reduced risk

As always, make sure to read the label before using any pesticide.

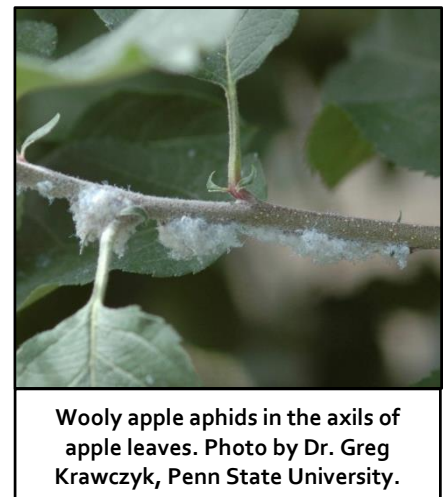
Wooly Apple Aphid, *Eriosoma lanigerum*

Timing of Damage/When to monitor: Populations (and damage) build up throughout the season, so may be present in the spring, and left uncontrolled will cause significant damage by mid-summer into fall. Damage is especially bad on younger trees, which can be permanently stunted. Because damage gets worse further into the season, it's important to catch this pest early on; monitoring will be most effective in spring (pre-pink through petal-fall).

Description and Life Cycle: Wooly apple aphid overwinters as an egg on the bark of an elm tree, or as a nymph on the roots of an apple tree. Nymphs and adults are reddish-brown and 1/20th – 1/16th inch long, but are often covered with a downy protective waxy secretion, resembling “wool”. The adults can be winged or non-winged, do not have cornicles on their abdomen (see following page), and have shortened antennae. Often offspring are produced parthenogenetically, allowing populations to build up quickly. They generally have 3-4 generations in Wisconsin.

Damage Symptoms include

- Adults and nymphs feed on apple roots, bark, leaves and occasionally fruit.
- Forms nodules/cankers on roots and woody parts of the tree; especially prevalent at pruning scars, leaf axils, and inner branches with poor airflow.
- Root nodules cause the foliage to turn yellow.
- Honeydew produced by aphids can lead to sooty fungus growth etc.



Monitoring: Monitor for adults throughout the summer, especially on pruning scars:

- Examine tree for “wool”, focusing on interior branches at pruning scars and leaf axils on terminal shoots.
- No known treatment threshold

Control:

- Plant resistant cultivars (i.e. Northern Spy) or rootstock. The Malling-Merton roots were bred specifically for resistance to WAA: MM 106 and 111 are resistant but are full-sized trees. The Geneva line has some resistant options, including G11, G41, G213, G214, G222, G202, G969, G210, and G890.
- Encourage natural enemies such as: *Aphelinus mali* wasps, lady beetles, lacewings, and syrphid fly larvae (planting Alyssum nearby can encourage beneficial predators). Caution: the use of Delegate to control first generation Coddling Moth may also remove natural enemies, which later in the summer could lead to an increase in wooly apple aphid.
- [Movento](#) is a translaminar insecticide, which is taken up in the leaves and transported throughout the plant, even to the roots. In this way, unlike other insecticides, Movento is likely to offer some control of root-feeding as well as above-ground wooly apple aphids. Movento should not be sprayed on apple trees until after petal-fall

Product Name	Mode of Action	Timing	PHI	Rate
Diazinon	Diazinon (1B)	Pink through petal-fall	21 days	1 – 4 lbs. / acre
Lorsban EC	Chlorpyrifos (1B)	Pink through petal-fall	14 days	1 – 2.67 lbs. / acre
Closer SC	Sulfoxaflor (4C)	Pink through petal-fall	7 days	2.75 – 5.75 oz. / acre
Movento	Spirotetramat (23, RR)	Petal-fall	7 days	6 – 9 oz. / acre

IRAC Code = Insecticide Resistance Action Committee Mode of Action group **RR** = reduced risk

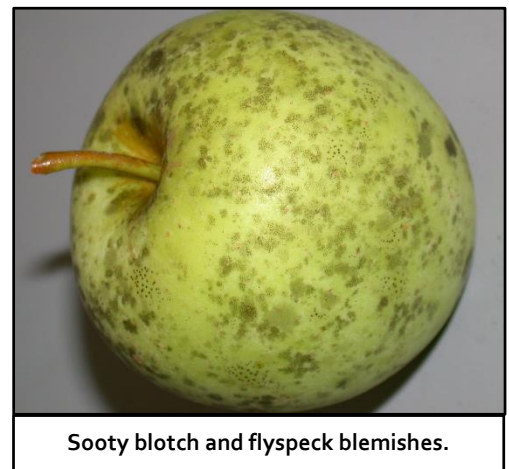
*** adding a horticultural oil to the spray can help penetrate the aphids’ “wooly” wax covering.

As always, make sure to read the label before using any pesticide.

Sooty Blotch and Flyspeck

By: Patty McManus

As we head into the dog days of summer, many apple growers will need to manage sooty blotch and flyspeck (SBFS). These diseases are caused by a complex of several fungi that live in and feed on waxes in the apple fruit cuticle and the waxy cuticles of other plants in woodlots and hedgerows, such as wild grapes and raspberries. At about apple petal fall is the time when at least some of the fungi in the SBFS complex start to produce spores on unsprayed plants in woodlots. Thus at petal fall and shortly after is when you get the first influx of spores into the orchard from surrounding areas. But at that time, if you have captan, mancozeb, strobilurins on for scab control, you will also prevent infection of the young apple fruit from infection by SBFS fungi. Meanwhile, however, out in the unprotected woodlots and hedgerows, SBFS primary infections develop, and with several weeks and several hours of



Sooty blotch and flyspeck blemishes.

wetness (just how many hours I discuss below), the primary infections in the woodlots produce a second round of spores that blow into the orchard. This is where the trouble starts—this second influx of spores is bigger than the first, and at this point in time (early to late July in most years), you’ve probably backed off your scab spray program, so the fruit are left vulnerable to infection.

There are SBFS prediction models to help you know when you need to start spraying for SBFS. If you do much reading about SBFS prediction you will find various thresholds for how many hours of leaf wetness are required for infection. Some research, including work that I was involved in with Mark Gleason about 10 years ago, uses 175 hours as the threshold, but only counting hours if they occur in blocks of 4 hours or more. Other researchers have used 185-270 hours, counting all hours of wetness. 175-270 is a huge range—so what’s going on? Old research was based on string recorders that are slower to dry than modern electronic instruments, so 270 was the threshold. 270 on a string recorder translates to about 175-185 hours on the faster-drying electronic plate sensors that we used in our research.

The primary benefit of the model is to time your first SBFS spray during early to mid-summer. But another potential use is to guide you on when you can quit spraying for SBFS. If a fruit is infected, it will take about 175 hours of wetness for SBFS colonies to become visible on the surface. So if fruit was protected continually all summer long, you could leave it unprotected for 175 hours of wetness before harvest. That would be about 7 days of continual wetness, or about 14 days with 12 hr. of wetness, or about 28 days with 6 hr. wetness. It’s impossible to know just what you’re going to get from day to day, but I think we can say that 14 straight days with 12 or more hours of wetness is not likely in late August and early September. But, if you have gaps in protection earlier in the summer, then you won’t have that 175-hour buffer leading up to harvest. You would have to count any hours accumulated during that unprotected gap and subtract the total from your 175-hour pre-harvest buffer. An unprotected gap according to Dave Rosenberger’s research at Cornell University is either 2 inches of accumulated rain or 21 days since the last SBFS spray.

The safest approach is to keep things covered during summer and then spend your 175 hours in the few weeks leading up to harvest. There are several fungicide options for SBFS control in conventional orchards. Of course, you need to consider how many sprays and how much product you used earlier in the year, and do not exceed maxima list on labels. Some options:

- Captan alone is effective on SBFS and the summer fruit rots if a higher rate is used and spray intervals are no more than 2 weeks.
- Topsin + captan is very effective, and you could get away with a lower rate of captan if mixed with Topsin. The addition of Topsin would also help with fruit rot control.
- Captan + phosphorous acid is good for SBFS, but phosphorous acids are not effective on fruit rots.
- Strobilurins (e.g., Flint, Pristine) are effective alone, but mixing with a low rate of captan is even better.
- Indar is effective against SBFS, but you should not use Indar if apple scab is seen in the orchard. Indar is an SI fungicide, and if you use it late in the season when there is scab, you could select for an SI resistant scab population that will haunt you in 2017.

Coverage matters. Work that Mark Gleason and I did in collaboration with growers in Iowa and Wisconsin showed that a spray volume of at least 100 gallons/acre was more effective than lower volumes on semi-dwarf trees (M.7 rootstocks). Also, pruning improved the success of using prediction systems, and was especially important in semi dwarf orchards.

Calendar of Events

July 29, 2016 – WGGA Vineyard Walk

4 Christi's Vineyard, 8520 Gass Lake Road, Newton, WI

August 10, 2016 – Cranberry Growers Summer Field Day

Brockway Cranberry, Black River Falls, WI

August 20, 2016 – Urban Horticulture Day

West Madison Agricultural Research Station, 8502 Mineral Point Road, Verona, WI

August 31, 2016 -- WBGA Fall Field Day

Carandale Farm, 5683 Lincoln Rd, Oregon, WI

September 7, 2016 – WMARS Vineyard Walk

West Madison Agricultural Research Station, 8502 Mineral Point Road, Verona, 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>

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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.