Wisconsin Fruit News

Volume 2, Issue 1 – Apr 14, 2017

In This Issue:

Welcome back! We're excited to get started on the second year of the Wisconsin Fruit News.

Thanks to everyone who took part in the survey last fall. We hope you will continue to enjoy the articles and information here and on our Wisconsin Fruit website (fruit.wisc.edu).

General Information

Insecticide update

By: Christelle Guédot, University of Wisconsin, Entomology

Decision on Chlorpyrifos products (e.g. Lorsban)

A petition to revoke all tolerances for use of all Chlorpyrifos products (Lorsban and similar generics) had been filed by the 9th Circuit Court of Appeal. The EPA (Environmental Protection Agency) dismissed the petition last week, meaning that **chlorpyrifos products can continue to be used** in tree fruits (apple, cherry, nectarine, peach, pear, plum, and prune), cranberry, grape, and strawberry, as per the label.

Updates for the 2017 Midwest Fruit Pest Management Guide

Every year, the Midwest Extension Fruit Workers meet in the fall in Indianapolis to review the Midwest Fruit Pest Management Guide and provide the new recommendations for the year ahead. The 2017 Midwest Fruit Pest Management Guide saw several insecticides removed from the guide due to several reasons, which I detail below for each product.

Belt – Cancelled by the EPA (Environmental Protection Agency) due to concerns with aquatic organisms. It was first suspended in Feb 2016, then upheld in Aug 2016.
Calypso – Discontinued by manufacturer (Bayer Crop Science)
Carzol – Being discontinued. Not registered in Wisconsin. Only registered on nectarines in California, Washington and Oregon.
Endosulfan and Thionex – Phased out by EPA because of health risks to workers and wildlife, and persistence in environment. Final cancellation was on strawberries on 7/31/2016. No longer registered on any crops.
Provado – Discontinued and replaced by Admire Pro (Bayer Crop Science)
Renounce – Discontinued by manufacturer (Bayer Crop Science)
Spintor – Being discontinued by manufacturer (Dow AgroSciences)
Portal on stone fruit – Discontinued because the supplemental label expired in 2016.
Applaud – Not registered in most of Midwestern states, including Wisconsin.

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 January 1, 2017 through April 7, 2017.

PLANT/ SAMPLE TYPE	DISEASE/ DISORDER	PATHOGEN	COUNTY
FRUIT CROPS			
Apple	*Bitter Pit/Cork Spot* *Nectria Twig Blight* *Thread Blight*	*None* *Tubercularia vulgaris* *Corticium stevensii*	*Lafayette* *Oneida* *Vernon*
Apricot	*Bacterial Canker*	*Pseudomonas syringae*	*Dane*

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

UW-Madison/Extension Insect Diagnostic Lab update

By: PJ Liesch

Early Season Insect Report:

Wisconsin hasn't accumulated many Growing Degree Days (GDD) yet, so insect activity is still low overall. However, with the forecasted temperatures in many parts of the state, insect activity will increase in the near future.

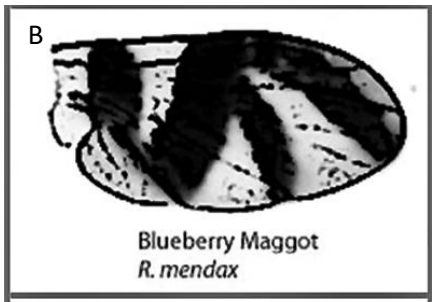
Eastern Tent Caterpillar: Eggs of this species typically hatch at approximately 50 GDD (base 50°F). The southern-most parts of the states have reached, or are close, to this threshold, so eastern tent caterpillar activity will increase in the next few weeks. Scouting for and dealing with small tents early in the season can help minimize damage.

Looking ahead to the 2017 growing season, a few insects stand out to have on the radar of fruit growers in the state: brown marmorated stink bug, rose chafer & Japanese beetle, and spotted wing drosophila. **Brown marmorated stink bug** has been in Wisconsin for several years now, but has increased its range and numbers dramatically in the last 2-3 years. In 2016, we saw some of the first reports of BMSB on plants as well as mating adults and juveniles in the field. At this point, the greatest amount of BMSB activity has been seen in south central WI (Dane and Rock counties). Images of suspected BMSB adults have been submitted from Door County, which is of concern for the fruit industry in that part of the state. Both **rose chafers** and **Japanese beetles** had strong years in 2016. Overwintering white grubs in the soil likely faced favorable winter conditions with our second consecutive mild winter, so growers should be on alert for these insects as summer approaches. Lastly, the **spotted wing drosophila** has been a significant issue for late season berry growers the past few years and will likely be a considerable pest of cane fruits this year.

Pest alert: Blueberry maggot

By: Janet van Zoeren and Christelle Guédot

Common Name: Blueberry maggot
Order: Diptera
Family: Tephritidae
Scientific Name: *Rhagoletis mendax* Curran



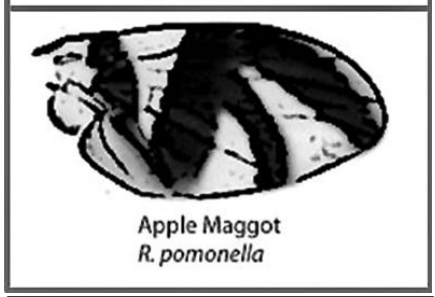


Figure 1. A, adult blueberry maggot fly (Rufus Issacs, MSU) B, wing comparison to apple maggot (https://www.researchgate.net/publication/278328605_A_Review_of_the_Blueberry_Maggot_Fly_Diptera_Tephritidae)

The blueberry maggot fly was first detected in Wisconsin last summer, and is now considered established in the state. This blueberry pest, which is closely related to the well-known apple maggot, is damaging to commercial blueberry production in the eastern and southern United States and eastern Canada, and is expected to have a significant effect on the blueberry industry in Wisconsin.

Currently, in Wisconsin, blueberry maggot has only been confirmed in Adams and Sauk counties; however, the range is expected to expand in coming years. If you suspect that you have found blueberry maggots, please contact the University of Wisconsin-Madison/Extension Insect Diagnostic Lab at (608) 262-6510 or http://labs.russell.wisc.edu/insectlab/contact-us/.

Life Cycle and Appearance: The adult blueberry maggot looks somewhat like a small housefly with dark bands on its wings, and is very similar in appearance to the closely related apple maggot (Fig. 1). Despite being virtually identical in wing-pattern and appearance, apple maggots do not use blueberry as a host, so flies trapped in blueberries are most likely to be the blueberry maggot. Adults begin to fly in June or July, and continue through August. After feeding for at least a week, they mate, and move into blueberry fields at that time. A mated female will lay a single egg under the skin of each of up to 100 nearly ripe blueberries during her approximately month-long life span.

The blueberry maggot egg hatches within a week. Damage generally first appears in mid-July, and continues until blueberries have been harvested. The larva, or maggot, is legless and has a single hook-like tooth at the mouth-end (Fig. 2). Each maggot feeds entirely within a single blueberry during its two- to three-week development. After completing development, the larva drops to the ground and overwinters as a pupa in the upper few inches of soil.

Figure 2. Larva in blueberry. Photo taken from http://msue.anr.msu.edu.

A distinctive characteristic of the blueberry maggot is that, although most pupae emerge the following spring, some will remain underground for 2 or 3 years. For this reason, spraying to control blueberry maggot one summer will not necessarily eliminate your population, as there will often still be some pupae in the soil to emerge the following summers.

Host Range: Blueberry is the only commercial crop affected by blueberry maggot. Wild hosts include wild blueberries, lingonberry, dangleberry, deerberry and huckleberries.

Damage Symptoms: Only one larva will be present in each fruit, and as the maggot feeds and develops, the berry will become soft and watery. Unfortunately, sometimes damage goes unnoticed until post-harvest, when maggots crawl out of the fruit and become obvious in processed or fresh fruit sales.

Scouting Suggestions: Scouting should begin several weeks before blueberries begin to ripen (usually in early June). Commercially available yellow sticky cards, along with a feeding attractant (ammonium acetate or ammonium carbonate), can be placed at a rate of 2 traps per 5 acres. Yellow sticky cards will be most effective if folded in a V-shape with the yellow side facing down (Fig. 3). These should be checked as often as possible until first detection. Because the feeding attractant is not specific to blueberry maggot, there will be many other species of fly present on the card – for this reason it is important to learn to identify the wing pattern of blueberry maggot, and may be helpful to bring a hand-lens or magnifying glass into the field when you check traps.

Figure 3. Blueberry maggot trap. Photo taken from http://msue.anr.msu.edu.

Following first detection, if you would like to continue to scout, yellow sticky cards can be removed and replaced with green sticky sphere traps combined with a synthetic fruit-volatile lure. You can also test the fruit directly for infestation rates. To do so, collect approximately 100 berries from throughout your planting, and then spread the berries on a screen above a tray of sand. After four or more hours, you can strain through the sand to find the mature larvae or pupae that have dropped down from the berries. Alternatively, you can break the skin of the berries and mix the berries with a salt-water solution, which causes maggots to float out of the berries.

Control: Some cultural control methods can help prevent blueberry maggot infestations. These include:

- Removing weeds in the blueberry patch, as these can provide habitat for blueberry maggot.
- Removing wild blueberry and huckleberry alternate-host refuges near your plantings.
- Harvesting thoroughly, and solarizing or freezing any damaged or unsalable fruit. Never compost crop waste without first solarizing it, as blueberry maggot pupae can survive in the compost and infest crops in future years.
- Being careful to clean soil away from any equipment or honeybee hives that are moved between blueberry farms, so as not to introduce blueberry maggot pupae in the soil.

Chemical control is recommended if you find on average more than one blueberry maggot adult per trap for multiple days in a row. In general, spraying should begin about a week after the first blueberry maggot flies appear in your traps, and should continue every 7 to 10 days through harvest. Some of the reduced risk chemistries, such as Rimon, Delegate, and Entrust, are most effective when used as soon as flies are found in the traps.

Because you will need to spray while berries are ripe, it is especially important to pay attention to the pre-harvest interval when choosing which chemistry to use. Additionally, it may be beneficial to choose an insecticide that also shows efficacy against spotted wing drosophila. As always, it is recommended to rotate IRAC chemical classes to delay insecticide resistance, and to consider the effects on non-target and beneficial insects.

The following insecticides are registered for use in blueberries in Wisconsin. The list is not inclusive of all chemistries that can be used against blueberry maggot, and does not signify that we recommend these insecticides above others. As always, be sure to read and follow label directions for the most up-to-date legal requirements and recommendations.

Class (IRAC code)	Trade name	Active ingredient	PHI (days)	Effectiveness * (BM and SWD)	Optimal Spray Timing
Spinosyns (5)	Delegate WG **(RR**)**	Spinetoram	3	BM – Good SWD – Excellent	**Immediately following** first adult fly trap-catch
	Entrust **(OMRI*** RR)**	Spinosad	3	BM – Good SWD – Excellent	**Immediately following** first adult fly trap-catch
Diamides (28)	Exirel **(RR)**	Cyantraniliprole	3	BM – Good SWD – Excellent	**Seven days after** first adult fly trap-catch
Benzoylureas (15)	Rimon EC **(RR)**	Novaluron	8	BM – Good SWD – Poor	**Immediately following** first adult fly trap-catch
Organo-phosphate (1A)	Imidan W	Phosmet	3	BM – Excellent SWD – Excellent	**Seven days after** first adult fly trap-catch
Carbamate (1B)	Sevin XLR Plus	Carbaryl	7	BM – Good SWD – Excellent	**Seven days after** first adult fly trap-catch
Pyrethroids / Pyrethrins (3A)	Danitol 2.4EC	Fenpropathrin	3	BM – Good SWD – Excellent	**Seven days after** first adult fly trap-catch.
	Mustang Maxx EC	zeta-Cypermethrin	1	BM – Good SWD – Excellent	**Seven days after** first adult fly trap-catch
	Asana XL	Esfenvalerate	14	BM – Good SWD – Good	**Seven days after** first adult fly trap-catch
Neonicotinoids	Assail SG (RR)	Acetamiprid	1	BM – Excellent SWD – Poor	**Seven days after** first adult fly trap-catch

*Effectiveness codes are for blueberry maggot (BM) and spotted wing drosophila (SWD), and are designated as "excellent", "good", or "poor" levels of control.

****RR** indicates reduced risk chemistry

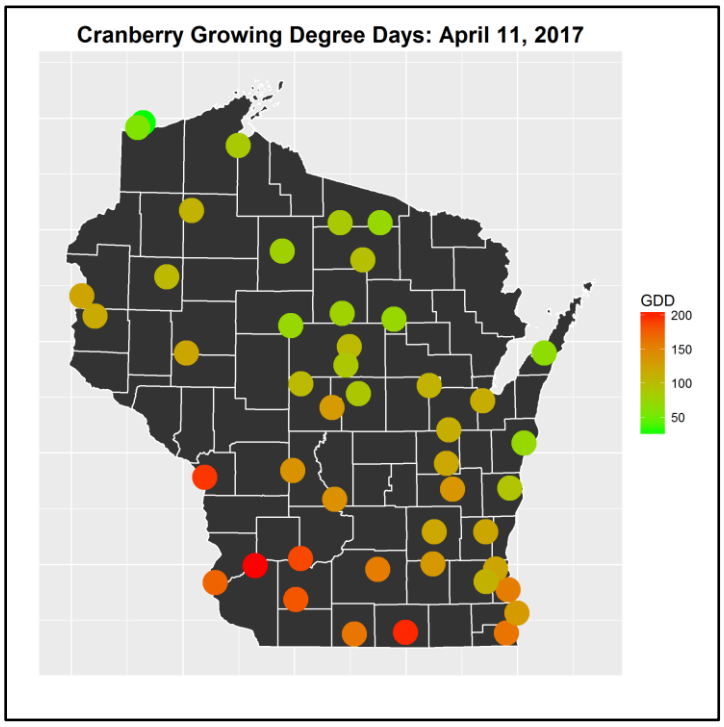
*****OMRI** indicates registered by the Organics Material Review Institute as organic certified

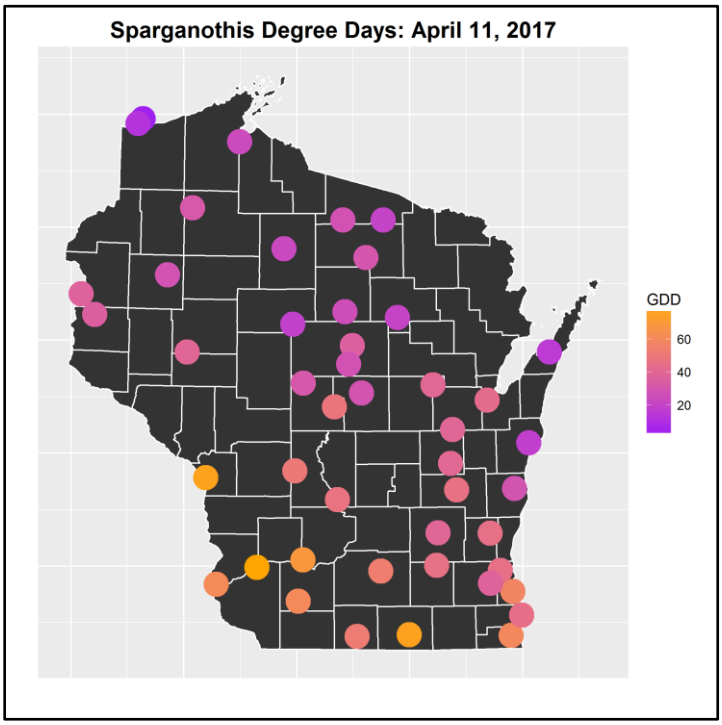
Cranberries

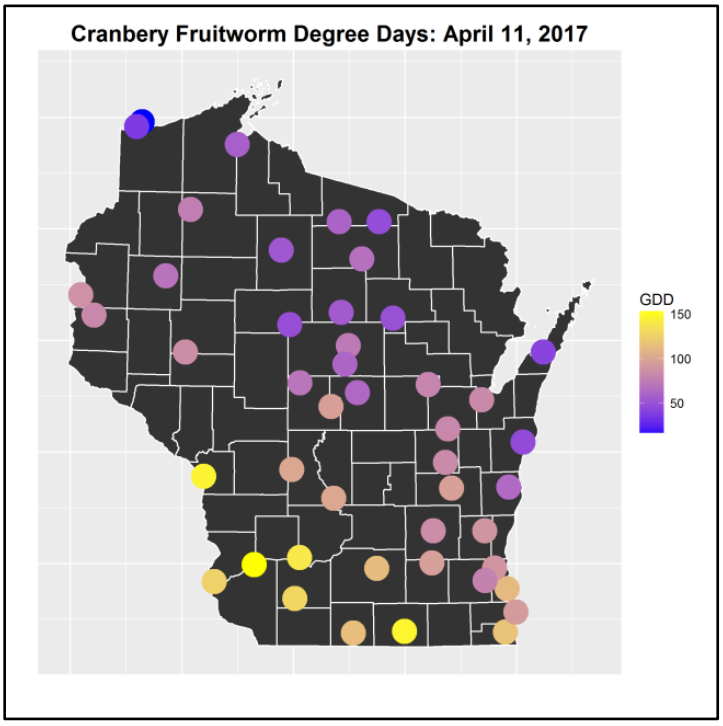
Cranberry plant and pest degree-days in 2017

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

Happy spring! It is actually starting to feel like winter has ended here in Madison. In 2017, we will be sharing degree-day accumulations for the cranberry plant and sparganothis fruitworm, as we did in 2016. However, we will also be sharing degree-day accumulations for cranberry fruitworm this year. We have some preliminary data linking cranberry fruitworm degree-days with their flight initiation and peak flight from last summer, and it will be interesting to confirm and validate this correlation in the coming season.







As you can see from the maps for the state of Wisconsin for each of these three organisms (above), they have all accumulated different amounts of degree-days. This is because each organism has specific temperature thresholds for their development (the range at which development occurs). For the cranberry plant: 41 and 85°F; sparganothis fruitworm: 50 and 86°F; and cranberry fruitworm: 44 and 87°F.

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

April 11	Cranberry Growing Degree Days			Sparganothis Degree Days		
	2015	2016	2017	2015	2016	2017
Northern WI (Minocqua)	66	64	86	14	13	28
Central WI (Wisconsin Rapids)	141	121	131	52	35	49

Even though we had a warm February, we have accumulated a similar number of degree-days as the last couple of years, because we don't begin accumulating degree-days until March 1.

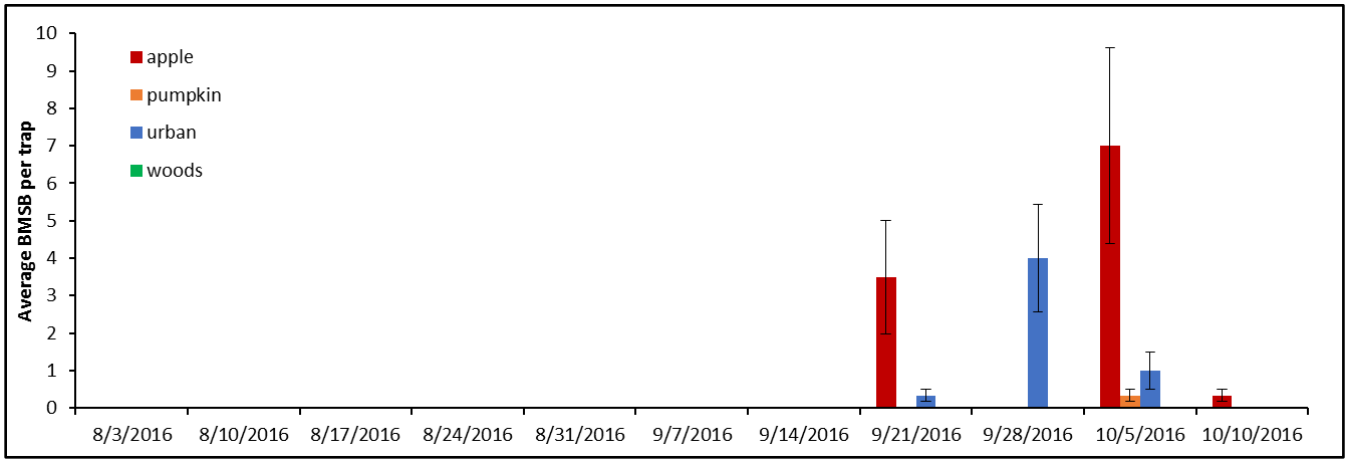
Grapes

Brown marmorated stink bugs and grapes

By: Janet van Zoeren and Christelle Guédot

Brown marmorated stink bug (BMSB), an invasive pest of many crops across parts of the United States, was found in agricultural crops in Wisconsin for the first time last summer. Traps in Dane County caught BMSB in apple orchards and pumpkin patches, as well as in urban areas (where the adults go into houses to stay warm over winter). We have discussed BMSB life history and identification in previous newsletter issues – for more information about BMSB please visit our website (fruit.wisc.edu), to read the BMSB pest alert and to catch up on prior newsletter issues on the subject.

Although we have not yet seen BMSB in grapes in Wisconsin, vineyards on the east coast have reported significant damage and west coast grape growers are now on the lookout for this pest. Luckily, grape is not a preferred host for BMSB, but may move in when numbers are high in other crops or wild hosts. Now is the time to learn about BMSB, so that we can be ready to catch this invasive pest as soon as it begins to move into Wisconsin vineyards.



Brown marmorated stink bug adult. Photo by John Joutras.

Damage to grapes

Brown marmorated stink bugs, at high densities, have been shown to cause significant damage to both wine and table grapes. BMSB feeds directly on the grape berry and sometimes on the rachis, leaving small punctures in the skin and flesh of the fruit, and often leading to soft, discolored grapes. Additionally these openings allow access for diseases like sour rot and insects like spotted wing drosophila (Nielson et al 2016).

Off-flavors in wine and juice

In addition to damage to the grapes themselves, BMSB can be problematic if they are crushed with the grapes, potentially leading to an off-flavor in wine or juice. Especially as nights cool-off in fall, BMSB often hides in the warm, moist, hidden areas inside the grape clusters, where they may be harvested with the grapes, unnoticed by vineyard workers. Preliminary research suggests that 5-10 BMSB per lug (25 pounds) of juice leads to a detectible "musky, cilantro" flavor, but that this off-flavor is no longer detectible following fermentation (Fiola 2011). Another study reported that more than three stink bugs per cluster cause the wine to taste less desirable to the consumer, although personal preference plays a large role in consumer desirability (Mohekar et al 2017). Further research is needed, using different varieties and under different fermentation conditions. Ideally, BMSB contamination of juice and wine will be minimized by careful and consistent monitoring for BMSB and, if necessary, implementing control measures immediately.

Monitoring and Control

Because BMSB does not overwinter in vineyards, but rather moves in each summer from the surrounding landscape, damage is worst along the edges of vineyards. This is especially marked for vineyards bordering on ornamental alternate hosts such as broadleaf maple, English holly, catalpa, or tree of heaven, or on apple, soy, corn, or wheat fields.

Brown marmorated stink bug trap. Photo by John Joutras.

You can monitor for BMSB using a black pyramid trap baited with a commercially available lure. There is some indication a clear plastic sticky trap baited with a lure is as effective as the pyramid trap, and we will be researching their relative effectiveness this summer. Monitoring should begin in late spring. It is important to note that these lures are somewhat attractive to our native stink bugs, so be sure to review identification materials, such as those provided at the stopbmsb.org website. Additionally, please send suspected BMSB specimens and/or high quality photos with a reference for size in to the UW Insect Identification Lab, UW-Madison, 1630 Linden Drive, Madison, WI 53706 for confirmation.

We do not expect BMSB to be a major economic threat to grapes this summer; however, it may be useful to begin monitoring now to be sure to catch the first signs of BMSB on your property. If you do find BMSB for several consecutive weeks in traps in your vineyard, you may want to consider implementing management practices in your vineyard. If you decide to apply an insecticide, spraying only vineyard borders, especially when BMSB is present at low densities, can eliminate most of the population. Additionally, kaolin clay (Surround) has been shown to deter BMSB away from clusters, so it could be a good organic-certified option. Management options will be discussed in follow up articles should we find BMSB in vineyards or if populations increase in agricultural crops this coming field season.

Please be in touch with us (guedot@wisc.edu) if you do find BMSB in your vineyard, as we will want to warn other growers as this invasive pest moves across the state and into new crops.

References:

Fiola, J.A. 2011. *Brown Marmorated Stink Bug (BMSB) Part 3-Fruit Damage and Juice/Wine Taint*. Timely Viticulture. University of Maryland extension.

Mohekar, P., J. Osborne, N. Wiman, V. Walton and E. Tamasino. 2017. *Influence of Winemaking Processing Steps on the Amounts of (E)-2-Decenal and Tridecane as Off-Odorants Caused by Brown Marmorated Stink Bug (Halyomorpha halys)*. Journal of Agricultural Food Chemistry 65: 872-878.

Nielson, A.L., M. Rivera, D. Polk, T. Leskey, R. Morrison, D. Dalton, C. Hedstrom, E. Tomasino, V. Walton, N. Wiman, M. Saunders and D. Pfeiffer. 2016. *Integrated Pest Management for Brown Marmorated Stink Bug in Grapes*. Produced by the Brown Marmorated Stink Bug SCRI CAP Vineyard Crop Commodity Team.

Tree Fruits

Sudden Apple Decline—Learn All About It

By: Patty McManus, UW-Extension Fruit Crops Plant Pathologist

In recent years, there have been several reports from the northeastern U.S. and southern Canada of young (2-8 years old) apple trees suffering trunk necrosis and a general decline. Within a block, a large proportion of trees can be affected, and they are often scattered amongst healthy trees. The onset of tree decline is fast, going from apparently healthy to dead within a season, leading to the name sudden apple decline (SAD) or rapid apple decline (RAD). While this decline occurs in blocks with dwarfing rootstocks, the roots themselves are healthy. Rather, the problem seems to start at the graft union and proceeds upwards on the trunk. The affected bark and wood are firm and dry, rather than soft and spongy as observed with Phytophthora crown rot. Trees can decline very quickly from late July through September, sometimes with a full load of fruit, suggesting that things were okay early in the season.

SAD results in dry, scaly bark and rapid decline in middle to late summer. Photo credit of David Rosenberger.

The cause of SAD is not known, but it may be a combination of two or more of the following: fire blight in the rootstock; herbicide injury; boring insects; winter injury; drought stress; fungal canker; and viruses. There is no reason to panic about SAD, as the majority of young orchard blocks planted in the Northeast and here in Wisconsin continue to flourish. However, you should familiarize yourself with this problem so that you can minimize your risk.

David Rosenberger, a retired professor who spent his career at Cornell University's Hudson Valley Research Station, wrote about the problem earlier this year. Here is a link to that article:

http://www.hort.cornell.edu/expo/proceedings/2017/TreeFruitPestMGMT.AppleTrunkDisorders.Rosenberger.2017.pdf

For photos, see Dr. Rosenberger's slides:
https://blogs.cornell.edu/plantpathhvl/files/2017/01/17-01-18-Apple-trunk-problems-web-low-res-w1kksp.pdf

Dr. Kari Peters of Penn State University has been actively investigation the cause(s) of SAD. She summarizes her thoughts (some of which are not completely consistent with those of Dr. Rosenberger) and some interesting observations from her own research block here:

http://extension.psu.edu/plants/tree-fruit/news/2016/having-rad-is-also-sad

Planting and caring for your new apple tree

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

Planting season is around the corner and we would like to remind growers of some basic recommendation regarding caring for your apple trees before and after planting. Ideally, we would like to plant as early in the spring as possible, but we know this is not always possible, especially when we have rainy spring and the soil is too wet to plant. So, how do you care for your trees while you are waiting to plant?

1) Once you receive the trees from the nursery, make sure you open the boxes and plastic wrapping to let your trees breathe.
2) Make sure the trees are in good condition and that the roots are moist (contact your nursery right away if you see a problem).
3) Make sure to keep those roots moist; you can add water if needed to keep the roots covered.
4) It is critical for trees to stay dormant until planting. Make sure you store them in a cooler or a cold room with temperature ~34-36 °F.
5) Never store trees with apples, as ethylene gas produced by apples will damage the trees.

Apple trees in bins with moist sawdust to keep roots cool and moist during the planting process.

Once the soil is ready to plant, you should take the following considerations:

1) The roots of your new trees are where most of the reserves that will support the initial growth of the trees are stored. Make sure to prune only roots that are damaged, and avoid trimming off any healthy roots.

2) Before planting, soak your trees for a couple of hours in a tub with water. Also, avoid having your trees exposed to the sun and wind, as this will dehydrate them. Some growers use harvesting bins filled up with moist sawdust to keep the roots moist while planting.

3) When planting your trees, the graft union should be at least 4- to 6-inches above the ground.

4) Good contact between the soil and the roots is critical for a successful planting. Pack the soil around the roots to ensure good contact. Irrigation after planting is recommended to get rid of air pockets and to keep roots moist.

5) Do not place any fertilizer in the planting hole, as it could burn the new roots. You can apply a small dose of N fertilizer (1/4 lb, of calcium nitrate), starting two weeks after planting, by placing the fertilizer in a doughnut shaped band around each tree.

San Jose scale

By: Christelle Guédot, UW–Madison Fruit Crop Entomology and Extension

Common Name: San Jose scale
Order: Hemiptera
Family: Diaspididae
Scientific Name: *Quadraspidiotus perniciosus* (Comstock)

Figure 1. San Jose scale. Photo from: United States National Collection of Scale Insects Photographs, USDA Agricultural Research Service, Bugwood.org

San Jose scale (SJS; Fig. 1) is a pest of fruit trees and may occur in most fruit growing regions of the United States. Native to China, it was introduced to the United States in the late 1800s. In well managed orchards, populations are generally too low to cause economic damage. Once established, they may be difficult and expensive to control, and severe infestations may cause tree and fruit injury.

Appearance and life cycle

SJS is a tiny insect that attaches to a limb, fruit or leaf and sucks plant sap. Males can fly while nymphs and females remain on the tree with low mobility. Female scales (Fig. 2), about 1/12 inch, can lay approximately 400 nymphs in a 6-week period, and populations can reach high numbers within a couple of growing seasons if left uncontrolled. The nymphs go through different molts per stage with three different stages: crawler, white cap, and black cap. As nymphs feed, they secrete a white, waxy scale cap which will gradually turn black and then gray as the nymphs molt.

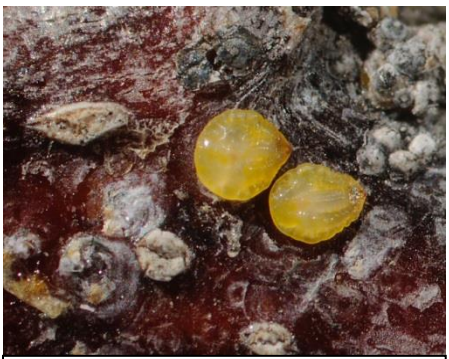


Figure 2. Female scales (covering removed). Photo by E. Beers, Washington State University

There are two generations of SJS each year. They overwinter as nymphs protected under a blackcap covering. Overwintering nymphs resume development when temperatures in the spring exceed 51°F. Adults emerge and mate around petal fall. The first generation of crawlers appear at the beginning to middle of June and continue for about a month. The second generation of adults occurs from late July to early September. A third generation may occur in late October to early November. The life cycle is completed in about 37 days, but generations overlap with all stages occurring at the same time during summer.

Plant hosts and damage

SJS feeds on several hosts including apple, pear, plum, cherry, peach, apricot, nut trees, berries, and ornamental trees and shrubs.

Figure 3. San Jose scale damage on apple. Photo credit: M. Louadfel, Bugwood.org

Figure 4. Apple fruit infested with San Jose scale. Photo credit: E.E. Nelson, Bugwood.org

SJS feeding on twigs and limbs of hosts may cause overall decline in tree vigor, growth, and yield, ultimately killing the tree if left uncontrolled. When feeding on fruit, SJS cause a slight depression and a red to purple spot will appear around the feeding site (Fig. 3), decreasing the cosmetic quality of the crop. During mild infestations on fruit, the damage is usually concentrated on the calyx of the fruit (Fig. 4). When infestations occur early in the season, fruit may become small, deformed, and poorly colored.

Figure 5. San Jose scale adult male in pheromone trap (wings nearly invisible due to sticky surface). Photo by S. Schoof, North Carolina State University.

Monitoring

First signs of SJS infestations can be detected when infested fruit (Fig 3-4) is found at harvest or packing, or by finding infested tree limbs (Fig. 1). If a SJS infestation is detected, careful scouting of the orchard during dormancy can help determine the spread and the level of infestation. Look for trees that have retained leaves during winter (good indication of SJS infestation) and check tree tops and around tree trunks, then flag infested trees for concentrating sprays to these problem areas.

Pheromone traps can be used in the spring and summer to detect the presence of flying males. These are pheromone-baited sticky traps that are effective for 4- to 6-weeks. Traps should be placed at pink stage of apple fruit bud development. Place traps where infestations have been detected, on the northern or eastern side of the tree, and at 6-7 feet height. Check traps at least weekly. Crawlers can be monitored by wrapping two-sided sticky electrical tape (with a thin layer of petroleum jelly on the tape) around the limbs of infested trees on either end of the infestation to catch crawlers. Start checking tape about 4- to 6-weeks after bloom for the presence of crawlers. Once the first adults are caught in traps or crawlers are caught on the tape, the first sprays should be initiated.

Figure 6. San Jose Scale pheromone trap. Photo credit: S. Schoof, North Carolina State University.

Management

The best management approach for SJS is to prevent establishment of infestations, as a tree carrying a few SJS-damaged fruits last season may well become a major fruit infestation next season when left unmanaged. To manage for an infestation of SJS, apply a 2% horticultural Superior oil with or whitout an insecticide at the dormant period, from silver tip to ½ inch green, to smother the insects as they resume development.

The following products are registered for use in apple in Wisconsin. This list is not inclusive of all chemistries that can be used against San Jose scale, and does not signify that we recommend these insecticides above others. As always, be sure to read and follow label directions for the most up-to-date legal requirements and recommendations.

Class (IRAC code)	Trade name	Active ingredient	PHI (days)	Comments
Oils	BioCover Superior spray oil	Mineral oil	None	
Organo-phosphate (1A)	Lorsban	Chlorpyrifos	Post bloom applications prohibited	Many restrictions apply, check the label
Other (23)	Movento	Spirotetramat	7	Do not apply until after petal fall
Insect growth regulator (7)	Esteem	Pyriproxyfen Reduced Risk *Excellent*	45	
Insect growth regulator (16)	Centaur	Buprofezin Reduced Risk *Excellent*	14	No more than one application per season

Resources
http://extension.usu.edu/files/publications/publication/san-jose-scale'97.pdf
http://extension.psu.edu/plants/tree-fruit/insects-mites/factsheets/san-jose-scale
http://jenny.tfrec.wsu.edu/opm/displaySpecies.php?pn=490

Apple thread blight

By: Brian Hudelson, Director of the PDDC

After almost 20 years at the Plant Disease Diagnostics Clinic (PDDC), it is somewhat unusual for me to see a new disease. This spring, however, I received an apple branch sample that was covered with small (up to ⅛ inch diameter), somewhat fuzzy, brown bumps (see Figure 1). At first, I thought these structures might be scale insects of some kind. PJ Liesch, the UW-Madison/Extension insect diagnostician, dispelled that theory, and further microscopic examination revealed that the bumps were masses of fungal hyphae (i.e., fungal threads). Some additional detective work led me to determine that the bumps were sclerotia (i.e., resting structures) of *Corticium stevensii*, which causes thread blight of apple and pear. This disease is more common in warmer climates and is typically seen in the southeastern US in wetter environments (e.g., valleys where there is a lot of fog). The disease can lead to leaf-loss and branch tip dieback. Management of the disease relies on proper site selection for trees (e.g., avoid wet, foggy, or humid areas with a lot of shade) and proper tree pruning to provide good airflow and rapid drying of foliage and branches. In addition, fungicides routinely used to control other apple diseases seem to help keep thread blight in check.

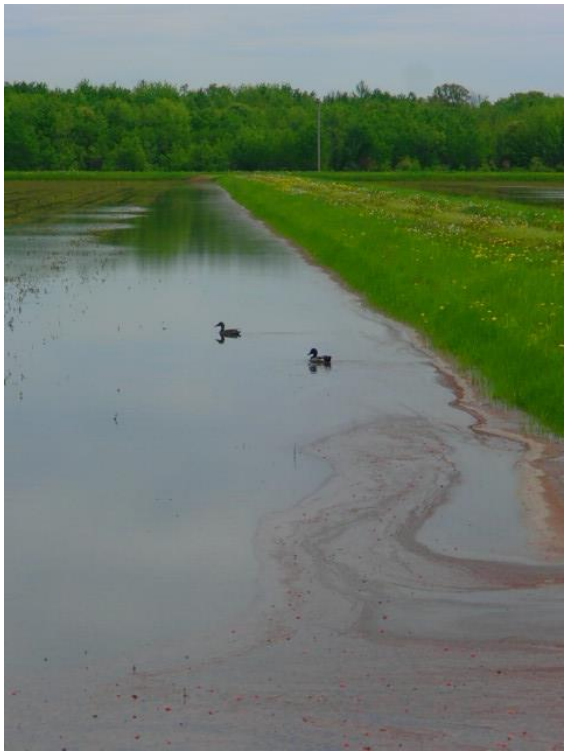
Figure 1: Brown, fuzzy sclerotia (i.e., resting structures) of *Coticium stevensii*, the thread blight fungus, on apple branches.

For more information on fruit (and other) diseases, feel free to contact the PDDC at pddc@wisc.edu or (608) 262-2863. Also check out the PDDC website at https://pddc.wisc.edu/ and feel free to follow the clinic on Facebook and Twitter @UWPDDC.

Calendar of Events

June 1, 2017 – Berry Summer Field Day
Arnold's Strawberries, Rudolph, WI

July 11-13, 2017 – Wisconsin Farm Technology Days
Ebert Enterprises, E5083 Co Rd K, Algoma, WI



Useful Links:

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

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

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

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

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

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

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