Wisconsin Fruit News

Volume 2, Issue 2 – Apr 28, 2017

In This Issue:

Highlights

Photo guide for disease ID on cold-climate grapes

By: Patty McManus

If you are reading this newsletter, then you are probably aware of the Wisconsin Fruit web site (fruit.wisc.edu). If not, be sure to visit the site for links to dozens of useful publications and presentations. For instance, we have just posted a guide to identifying the most common diseases affecting cold-climate grapes. From the home page, click on "Grapes," then "Disease Management," then "Photo Guide to Disease Management of Cold Climate Grapes." Former graduate student David Jones took hundreds of photos to document disease development on 11 different cultivars throughout the growing season, and the online guide includes a small subset of those photos.

Disease symptoms can look different on different varieties and throughout the growing season. Most existing extension literature is based on *Vitis vinifera*, but we have noted that disease symptoms on some cold-hardy hybrids look different from "textbook" symptoms. This is especially true for downy mildew, and I know firsthand that some growers have confused late-season downy mildew with anthracnose and black rot. Powdery mildew on leaves is common, but do you know what it looks like on shoots, rachises, and berries? Do you know what Rupestris speckle looks like or which cold climate varieties get it? Check out the photo guide for answers to these questions and other hints on identifying diseases in the field.

In severe cases, rupestris speckle lesions can coalesce, leading to larger patches of dead leaf tissue.
Picture from the Photo Guide for Disease ID on Cold-Climate Grapes.

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 April 8, 2017 through April 21, 2017.

PLANT/ SAMPLE TYPE	***DISEASE/ DISORDER***	***PATHOGEN***	***COUNTY***
FRUIT CROPS			
Cherry ('Montmorency')	*White Rot*	*Irpex lacteus*	*Sauk*

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

There's not much to report this week for fruit insect pests. Things are starting to pick up around the Insect Diagnostic Lab, but are still quiet so far this spring; the caseload will probably double in the next few weeks. However, some insect fruit pests that have been reported so far this year and discussed below.

Tent Caterpillars. Enough growing degree days have accumulated in the southern part of the state for egg hatch, and small tents have been reported in some locations. Control is easiest when tents and caterpillars are small.

Plum curculio. No confirmed reports have come in to the UW Insect Diagnostic Lab yet this year, but warmer temperatures might have caused overwintering adults to wander towards host fruit trees in the southern portion of the state. Growers should keep an eye out for this pest in the near future.

Brown Marmorated Stink Bug. Reports continue to come in at the rate of 1-2 reports per week from southern and eastern counties in the state. Brown marmorated stink bug was found in apple orchards last year, and has been covered many times in this newsletter, including in the previous issue. We will keep you informed as we track the movement of this invasive pest this summer.

Eastern tent caterpillars. Photo from: Phil Sloderbeck, Kansas State University, Bugwood.org

Pest alert: Strawberry mites

By: Christelle Guédot

Mites are not insects, but are closely related to ticks and spiders and belong to the group arthropods that do include insects, spiders, and crustaceans. While insects have three body parts and three pairs of legs, mites have two major body parts and four pairs of legs. Mites can barely be seen with the naked eye but their damage can exert effects disproportionate to their miniscule size. Indeed, when populations of mites build up, they can become significant pests of fruit crops.

Two-spotted spider mites *Tetranychus urticae* (Acari: Tetranychidae)

Two-spotted spider mites are the most common mites that can damage strawberry plantings in Wisconsin. Two-spotted spider mite adults are 1/50" long and are barely visible without a hand lens. They vary in color from pale yellow, green, to red with two large dark spots on the back (see picture at right). They have many generations per season and overwinter as mated adult females around buds or in plant debris on strawberry, but also on a wide range of other plants. They will come out of overwintering and begin to feed in the spring when temperatures start rising and stay active throughout the strawberry season. The life cycle may be completed in as little as 5-7 days during warm summer conditions. Two-spotted spider mites make webs on the underside of leaves.

Two-spotted spider mite on leaf surface. Photo credit: D. Cappaert, Bugwood.org

Damage is caused by mites feeding on plant sap on the underside of leaves, in a fine tangle of webbing. Feeding can cause discoloration of the leaves, which can turn coppery-bronze, starting on the underside of leaves. Severely damaged leaves will die and drop, resulting in reduced plant vigor, fruit size, and yield. Mite populations tend to increase in prolonged periods of hot, dry weather.

Monitoring and control. Annual renovation of strawberry beds helps in reducing potential mite outbreaks the following season. Predatory mites are often effective at keeping two-spotted spider mite populations under control. Predatory mites move around much faster than two-spotted spider mites, and a ratio of one predatory mite to 10 two-spotted spider mites is adequate for biological control. Excessive nitrogen fertilization should be avoided, as it may cause spider mite population to build up. Early season insecticide applications can reduce natural enemy populations such as predatory mites, minute pirate bugs (*Orius* spp.) and lady beetles, and so should be avoided when possible. If two-spotted spider mite populations reach infestations of 25% or more of leaflets sampled (1 or more mites on 15 out of 60 leaflets sampled), the use of a miticide may be warranted. Products that have shown excellent control on spider mites include Abamectin (e.g. Agri-Mek), etoxazole (e.g. Zeal), hexythiazox (e.g. Savey), bifenazate (e.g. Acramite), and fenpyroximate (e.g. Portal). Please, check the [2017 Midwest Fruit Pest Management Guide] for product recommendations and follow the label directions.

Cyclamen mites *Phytonemus pallidus* (Acari: Tarsonemidae)

Cyclamen mites are smaller than two-spotted spider mites, only 1/100" long, and are almost not visible with the naked eye. Adult cyclamen mites vary in color from pinkish-orange to white or green. Damage symptoms consist of discolored distorted leaves, blossoms, and fruit, and result from feeding by cyclamen mites on young unfolding leaves in the plant crown and on blossoms. Cyclamen mites are more often found on greenhouse plants and can be seriously damaging when infested plants are transplanted to new plantings. During bloom, cyclamen mite populations increase and reach a peak during fruit development. Severe infestations will result in small, leathery, off-color fruit.

Monitoring and Control. Cyclamen mites are difficult to control once established. The best approach is to insure that mite-free transplants are planted. When an infestation is detected, use a registered pesticide one to two days prior to bloom and again 10-14 days later. Fenpyroximate (e.g. Portal) should provide excellent control on cyclamen mites. Please, check the 2017 Midwest Fruit Pest Management Guide for further product recommendations and follow the label directions.

Happy Spring!

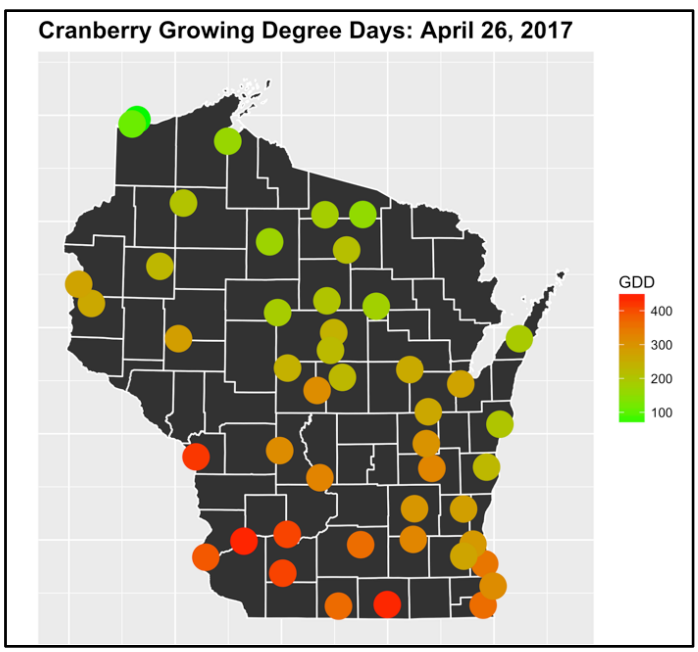
Cranberries

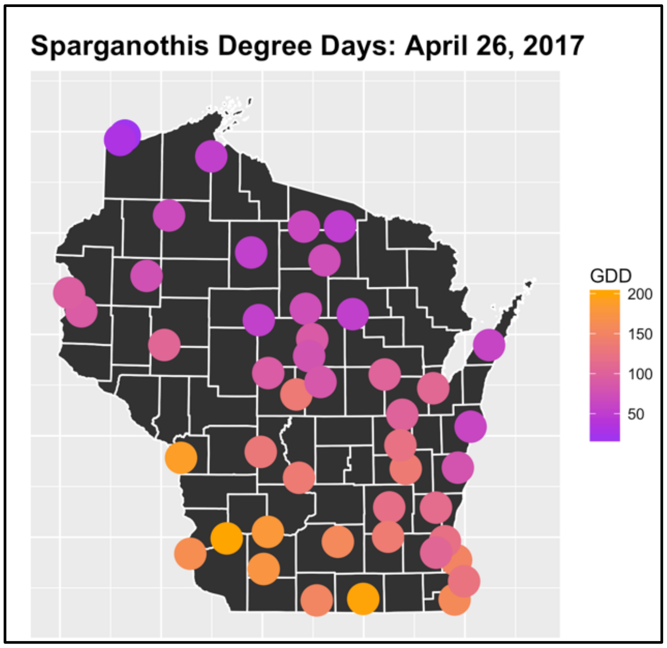
Cranberry plant and pest degree-day update: April 26, 2017

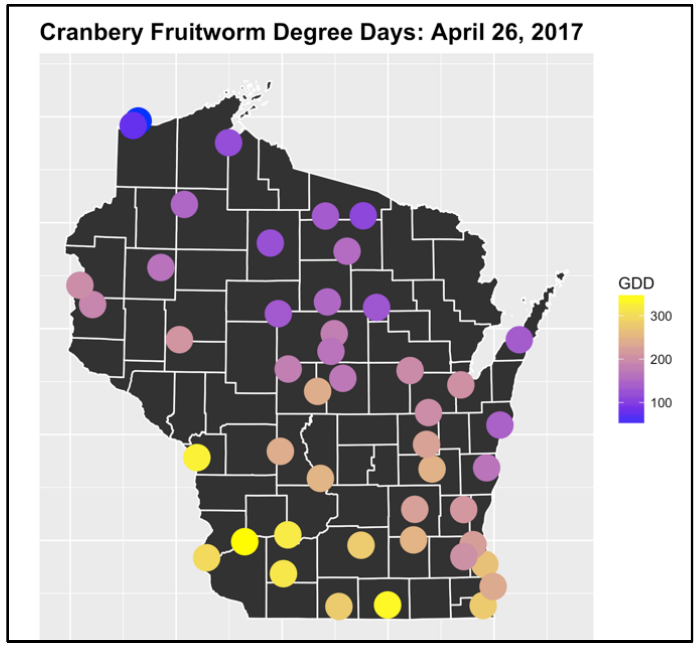
By: Elissa Chasen and Shawn Steffan, USDA-ARS and UW Entomology

The maps below show how spring is progressing across Wisconsin. In addition to these maps, we have posted interactive maps online. The interactive feature allows you to click on the map locations and this prompts a pop-up that names the location and gives exact degree-days. These are available through the Steffan lab website (http://labs.russell.wisc.edu/steffan/cranberry-growing-degree-days/). Once on the website, follow the link to the interactive maps.

Again, note that each of these three organisms 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. We see that we are still right on track with the last couple of years.

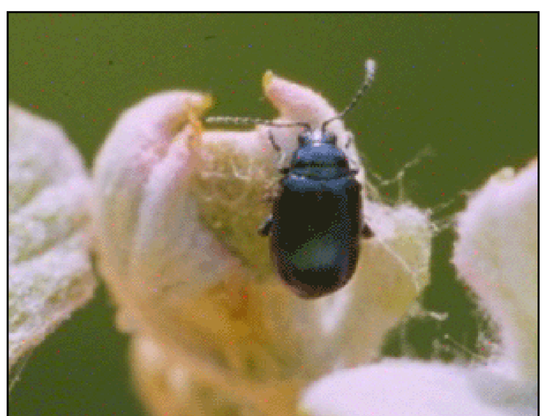
April 26	Cranberry degree-days			Sparganothis degree-days		
	2015	2016	2017	2015	2016	2017
Northern WI (Minocqua)	177.7	198.1	183.2	63.2	76.4	64.1
Central WI (Wisconsin Rapids)	290.8	311.3	310.5	123.5	131	135.2

Grapes

Grape insect scouting report: flea beetle vs. cutworm damage

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

As buds are swelling in the southern regions of the state, and soon will be in the northern growing regions, it's time to begin scouting for flea beetle and cutworm damage. These two insects are similar in that they are rarely seen themselves, but most often are known to be in the vineyard from the damage symptoms evident on the buds. Damage symptoms look similar, as both burrow into and hollow out developing buds around bud swell until bud break. However, it is important to determine which is causing damage, as control measures differ depending on which pest is present in your vineyard. The following article outlines how to determine if you have a problem with either of these insects, which is causing the damage, and how to manage them.



Grape flea beetle. Photo by Ric Bessin, University of Kentucky.

	Cutworms	Flea Beetles
Timing of activity	Larval damage at night	Adult damage during day
Developmental stage affected	Bud swell through bud burst	Bud swell through bud burst
Where they may be most prevalent	Sandy soils, weedy areas	Near forested edges
Threshold	2% bud damage	2% bud damage
Chemical controls	See chart below, or see spray guide for more specific recommendations!	See chart below, or see spray guide for more specific recommendations!

Damage symptoms

Both cutworms and flea beetles burrow into swelling buds and feed on the young tissues inside. Each bud fed upon can destroy 1 to 2 clusters of grapes.

Cutworm larvae climb up the grape stem each evening and feed on the buds at night, then return by morning to hide in the leaf litter or in the soil under the vine during the day. These caterpillars will feed not only on grape buds, but also on weeds in the vineyard. Because they burrow into the ground during the day, and feed on alternate hosts, cutworm larvae are most prevalent in weedy vineyards on sandy soil.

To determine if cutworms are the culprit causing your bud damage, go into the vineyard at night with a flashlight, into an area with a lot of damage, and look for the thick brown caterpillars feeding on the buds.

Flea Beetle adults feed on swelling grape buds during the day in the spring, and then the larvae and summer-generation adults feed on grape leaves during the summer. However, the spring generation feeding on the buds is the only to cause economically-significant damage. These adults can sometimes be found sunning themselves on the vines and buds, and are easy to spot and distinguish since they are an iridescent-black/blue.

Control measures

Cutworm cultural control measures include removing weeds from the vineyard. This can be somewhat effective, since it removes alternate hosts for the cutworm as well as hiding places. However, if 2-4% or more buds have damage, and you are able to go out at night with a flashlight to determine that a cutworm is the culprit, we recommend you consider an insecticide application. Cutworm damage is often spotty and highly localized because female moths lay eggs in clutches, so it may be possible to spot treat areas of the vineyard showing higher damage levels, instead of spraying the entire vineyard.

Flea beetle at the Peninsular Agricultural Research Station. Photo by Annie Deutsch.

The following table contains information on some of the insecticide options available to use for cutworms in grapes in Wisconsin. We do not recommend these chemistries above other options, and all product recommendations can be found in the 2017 Midwest Fruit Pest Management Guide. As always, it is necessary to read and follow the label.

Class (IRAC code)	Tradename	Active ingredient	PHI (days)	Effectiveness
Spinosyns (5)	Delegate WG (**Reduced risk)**	Spinetoram	7	Good
Pyrethroids (3A)	Baythroid	Beta-cyfluthrin	3	Good
	Danitol	Fenpropathrin	21	Excellent
	Brigade	Bifenthrin	30	Excellent
Diamides (28)	Belt (**Reduced risk)**	Flubendiamide	14	
	Altacor (**Reduced risk)**	Chlorantraniliprole	5	Good
Neonicotinoids (4A)	Scorpion (foliar)	Dinotefuran	1	
	Scorpion (soil)	Dinotefuran	28	

Flea Beetle cultural control can include the removal of brushy overwintering sites on the edges of the vineyards. Additionally, discing the aisles in June or July, during pupation, can damage or desiccate the delicate pupae. However, early season damage to 2-5% of buds warrants an insecticide application, especially during a cool spring growing season such as we saw last spring, when buds remained at bud swell for a prolonged period of time.

The following table contains information on some of the insecticide options available for use on flea beetle on grapes in Wisconsin. We do not recommend these chemistries above other options, and all product recommendations can be found in the 2017 Midwest Fruit Pest Management Guide. As always, it is necessary to read and follow the label.

Class (IRAC code)	Tradename	Active ingredient	PHI (days)	Effectiveness
Pyrethroids (3A)	Baythroid	Beta-cyfluthrin	3	Excellent
	Danitol	Fenpropathrin	21	Excellent
Neonicotinoids (4A)	Scorpion (foliar)	Dinotefuran	1	
	Scorpion (soil)	Dinotefuran	28	
Carbamates (1A)	Sevin XLR Plus	Carbaryl	7	Excellent

Wine and Table Grape Developmental Stages

By: Janet van Zoeren, Annie Deutsch, Jean Riesterer-loper and Amaya Atucha, UW-Extension

At the West Madison Agricultural Research Station (WMARS) buds are just about to break, with development spans from E-L* developmental number 2 (bud scales opening) to 3 (wooly bud). You can expect budburst on all cultivars by the next newsletter! At the Peninsular Agricultural Research Station (PARS) buds are still at winter bud stage, with all cultivars showing E-L* developmental number 1 (winter bud). Work in the vineyard this time of year centers around scouting for flea beetle and cutworm (see following article), finishing up winter pruning, and hoping a late frost doesn't come along and damage any of the sensitive developing grape buds!

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

Following photos taken on April 24th at West Madison Agricultural Research Station.

Brianna at WMARS; "wooly bud"
E-L number = 3

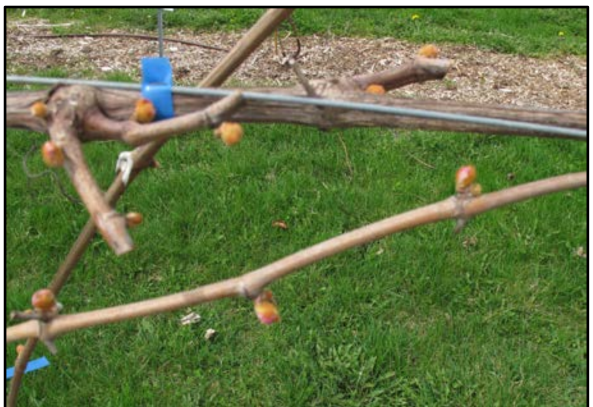
La Crescent at WMARS; "wooly bud"
E-L number = 3

La Crosse at WMARS; "bud scales opening"
E-L number = 2

Marquette at WMARS; "bud scales opening"
E-L number = 2

Frontenac at WMARS; "wooly bud"
E-L number = 3

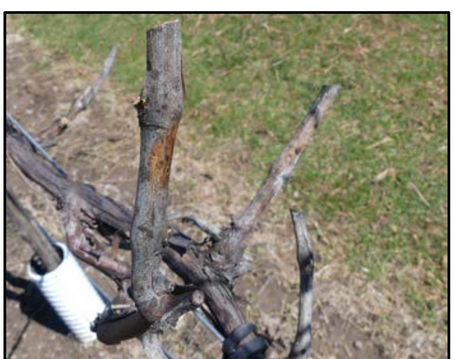
Leon Millot at WMARS; "bud scales opening" E-L number = 2



Somerset at WMARS; "wooly bud"
E-L number = 3

Einset at WMARS; "wooly bud"
E-L number = 3

Following photos taken on April 21st at the Peninsular Agricultural Research Station.



Brianna at PARS; "winter bud" E-L number = 1

La Crescent at PARS; "winter bud" E-L number = 1

La Crosse at PARS; "winter bud" E-L number = 1

Marquette at PARS; "winter bud" E-L number = 1

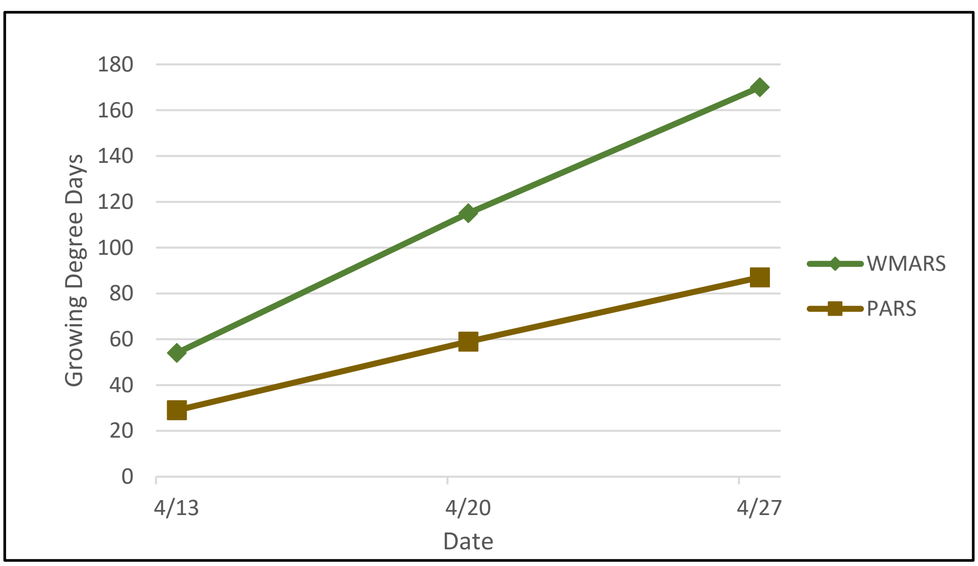
Frontenac at PARS; "winter bud" E-L number = 1

The growing degree day accumulations as of April 27th for this year are: 170 GDD at WMARS and 87 GDD at PARS. We are a little bit ahead of the degree day accumulation from last year. Degree days are calculated using a base of 50°F.

Grape Growing Degree Days

April 1 - April 26, 2017

	2107	2016
WMARS	170	132
PARS	87	64



Timing of Thinner Application for Apples

By: Amaya Atucha UW-Extension Fruit Specialist

It's that time of the year once again, when we have to start considering our thinning strategies. During 2016, after the late frost, there was a lot of talk about how and when would be the best time for thinning. Hopefully this year things will be more straightforward. I will summarize here all the thinning windows we have available and the different products available for the respective phenological stages.

<u>Blossom thinning</u>: This is the first thinning opportunity we have available during early spring. It is a great opportunity to reduce number of blossoms in a year with heavy number of flowers, and might be the case for a lot of growers that were affected by the frost last year and are expecting a heavy crop for this year. Blossom thinning presents several advantages compared to other thinning times. Early flower/fruit removal usually results in the largest fruit at harvest and the greatest return bloom the following year. Another advantage of blossom thinner is that their efficiency is not as depend on weather, like the hormone-based thinner user later in the season. Most of the products used for bloom thinning are caustic products that are applied after the king flower has been pollinized. The best timing to apply these products is at 70-80% bloom, and later application will not be as effective and could potentially cause russet to fruit.
Products that can be use:

1) LSO (lime sulfur and oil)
2) ATS (ammonium thiosulfate)

<u>Petal fall to 6 mm fruit</u>: From a chemical thinning point of view, petal fall would be consider once the bees have been removed from the orchard. This is commonly the earliest growers usually thin, as blossom thinner might not be a widespread practice. Early thinning will produce the biggest fruit, and it is especially important for biennial cultivars. There are several thinners that can be use during petal fall. Carbaryl/Sevin has been traditionally used during petal fall because it can thin during a longer period. NAA sprays at petal fall can also be used, but the results may be less consistent than with Carbaryl/Sevin, it is also possible to cause leaf damage. If a heavy crop is forecasted, an application of NAA plus Carbaryl/Sevin will result in a much more aggressive thinning. Napthalene acetamide (NAD) is the amide salt of NAA, and is a milder thinner than NAA, and it also has less negative effect on vegetative growth. Application of 6-BA (MaxCel; Exilis Plus; RiteWay) is a milder thinner that also has the advantage of increasing fruit size by promoting cell division, and can be an aggressive thinner when combined with Carbaryl/Sevin.

<u>7 to 14 mm</u>: This has been the traditional time when most chemical thinners are applied, probably because at this time fruits are most sensitive to chemical thinner. During this period, there is high demand and competition for carbohydrates from fast growing shoots and fruits. Chemical thinners work during this period by intensifying competition for carbohydrates between fruits, so smaller fruit that set later will have less strength to compete and will end up dropping. Traditional chemical thinner applied during these periods are NAA, Carbaryl/Sevin, and 6-BA.

<u>15 to 18 mm</u>: This is considered a late thinner application, and will probably be less efficient because, as fruit becomes bigger, it is harder to thin. In addition, by this point some fruit has naturally dropped. A combination of ethephon and carbaryl during this time could be successful at thinning some fruit, and it can be more effective if applied in warm weather.

<u>≥20 mm</u>: The only effective product at this stage is ethephon (Ethrel), and the effects are dose dependent.

Mass trapping of Codling Moth in apple orchards

By: Benjamin Jaffe and Christelle Guédot

Figure 1: Adult codling moth.

Codling moth (CM) is a major pest of apples, pears and walnuts worldwide (Figure 1). Commercial orchards generally have low tolerance for any CM damage, with expectations of less than 3% crop injury[1]. Once CM larvae get inside the fruit, they are very difficult to manage and result in a "wormy apple" (Figure 2). The current insect pest management (IPM) program for CM includes the physical removal of damaged fruit, insecticides, and mating disruption. When used appropriately, IPM practices are generally effective in keeping CM populations below the economic threshold. However, there are instances when these methods are not practical. For example, traditional IPM strategies are not effective in organic orchards, orchards smaller than 4 acres, or in backyard apple trees. The difficulty in managing these issues depends on the situation; in general, mating disruption is not effective in small orchards or when moths are in high densities, and the appropriate IPM method can be cost prohibitive in backyard apple trees and is limited for organic orchards[2]. Since everyone benefits when CM populations are not spreading from unmanaged areas, this summer we are investigating another management strategy to augment our current CM IPM toolbox.

We are testing a mass trapping design to see if we can reduce CM population and apple damage. The basic premise is to place a large number of attractive traps in apple orchards during CM flight. Food based lures, also called kairomonal lures, are expected to be better for mass trapping than pheromone lures, because they are attractive to both male and female moths. Since female CM can lay up to 100 eggs, and these eggs hatch into the larvae that cause apple damage, we want to target female CM for removal. The traps consist of white delta traps with a sticky liner and lures (Figure 3) developed by collaborators in Washington state from apple and pear odors[3]. We will be conducting the mass trapping experiment this summer, where we will place 50 traps / acre, in two different 2-4 acre plots and measure the number of moths trapped and any reduction in apple damage. We will send out the results of this experiment in a newsletter later this summer.

Figure 2: Apple showing codling moth larval damage. Photo by Dane Elmquist, USDA-TTFVR.

Figure 3: Delta trap with chemical lures. Photo by Dane Elmquist, USDA-TTFVR.

References cited

[1]Grigg-McGuffin, K., Scott, I.M., Bellerose, S., Chouinard, G., Cormier, D., Scott-Dupree, C. 2015. Susceptibility in field populations of codling moth, *Cydia pomonella* (L.) (Lepidoptera: Tortricidae), in Ontario and Quebec apple orchards to a selection of insecticides. Pest. Manag. Sci., 71: 234–242.

[2]El-Sayed, A.M., Sucklin, D.M., Byers, J.A., Jang, E.B, Wearing, C.H. 2009. Potential of "Lure and Kill" in long term pest management and eradication of invasive species. Journal of Economic Entomology 102(3): 815-835.

[3]Landolt, P.J., Ohler, B., Lo, P., Cha, D., Davis, T.S., Suckling, D.M., Brunner, J., 2014. N-butyl sulfide as an attractant and coattractant for male and female codling moth (Lepidoptera: Tortricidae). Environmental entomology, 43(2), 291-297

Apple pest report – spring caterpillars

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

There are a number of caterpillar species that you should be on the lookout for this time of year in apple orchards. These include the oblique-banded leafroller (OBLR), red-banded leafroller (RBLR), spotted tentiform leaf-miner (STLM), and the green fruitworm complex (GFW). These are similar in that they feed on leaves during the period immediately pre-bloom through fruit-set, and are most likely to cause significant damage during early fruit-set, when they may feed on the skin or flesh of the developing fruit.

Oblique-banded leafroller (OBLR) is a native pest of many fruit crops grown in Wisconsin, including apple, pear, peach, cherry, raspberry, strawberry, blueberry, and currant. OBLR overwinters as a larva in the orchard, and these overwintering caterpillars have now emerged and begun feeding on the very first leaves. As the caterpillars grow, they begin to web up the leaves into a roll, leading to their name. They also may feed on the skin of the developing fruit, causing it to become corky and unappetizing. Although there are several species of leaf-rolling caterpillars found in apples in Wisconsin, OBLR can be distinguished from the others by its light green body combined with the brown/black coloring on both the head capsule and the prothoracic shield (the body segment behind the head capsule).

Oblique-banded leafroller caterpillar. Photo by Todd M. Gilligan and Marc E. Epstein, TortAI, USDA APHIS ITP, Bugwood.org

The overwintering caterpillars begin feeding in early spring, and continue until shortly after fruit-set. OBLR generally has two generations per year in Wisconsin, with the second generation of caterpillars feeding in June or July. A second spray may be necessary at that time – if you have had damage with OBLR in previous years, consider monitoring for adults in May using pheromone-baited traps, to determine if and when to spray the second insecticide cover for OBLR. Additionally, it is best to watch for rolled up leaves in the orchard, and to open up the leaf-rolls to determine which species of caterpillar is inside.

Red-banded leafroller (RBLR), similarly to the OBLR, is a native pest that feeds on a wide range of fruit crops, including apple, pear, peach and cherry. RBLR overwinters as a pupa, with the first generation adults flying around green-tip. We have been catching RBLR moths in Wisconsin this spring for a couple weeks now, and you can expect the first caterpillars to begin to emerge around 10-14 days after adult flight begins. They complete 2 to 3 overlapping generations per year in Wisconsin, and caterpillars can be present in the orchard from petal-fall through September. RBLR caterpillars are entirely light green in color, lacking the dark head capsule of OBLR. Similarly to OBLR, caterpillars initially feed on leaves, and then may begin feeding on the skin of fruit as it begins to develop, causing flesh to become corky. Pheromone-baited traps are available for monitoring the adults, and should be used in orchards with a history of RBLR damage.

Spotted tentiform leafminer larva. Photo by Susan Mahr.

The ***Spotted tentiform leafminer (STLM)*** is non-native, and was first found in Wisconsin in the mid-1900s, although it was not considered a significant pest in apples until the 1970s. STLM feeds only on leaves, and instead of rolling the leaf up to create a safe space, it burrows into and feeds from within the leaf tissue. Although not causing direct damage to the fruit, STLM decreases yield by feeding on chlorophyll, therefore reducing the tree's photosynthetic capacity.

STLM overwinters as a pupa, inside fallen apples leaves. Moth flight began this year in early-April. STLM completes 3 to 4 generations per year in Wisconsin. Of these, it is most important to catch populations and control for caterpillars in the earlier generation, when damage to leaves has a greater effect on season-long fruit maturation. Monitoring for STLM can include a combination of pheromone-baited traps, red sticky cards, and visual inspection of the leaves for the mining tunnels. Monitoring for adults pre-bloom can help determine if an insecticide is warranted to control for STLM at petal-fall – a threshold of 12 moths per trap has been suggested for this first spring flight.

A cultural method to control STLM, especially effective on a smaller scale, is to remove apple leaves in the fall, either by raking them up or removing them using a leaf blower, or by applying urea to speed up the rate at which the leaves decompose.

Green fruitworm refers to several species of similar-looking caterpillar pests present in Wisconsin, including the speckled green fruitworm, humped green fruitworm, and Sparganothis fruitworm. These caterpillars can feed on the young leaves, buds and fruit of apple, pear, cherry, peach and other tree fruit. Damage to flower buds and fruits can cause the fruit to abort, or if the fruit develops to maturity, it will have corky scars similar to those found from OBLR or RBLR damage.

Green fruitworm damage.

Chemical control measures

Historically, many of these spring caterpillars were not a significant problem in apple production. However, a combination of pesticide resistance, the use of selective insecticides, and/or removal of beneficial predators through broad-spectrum insecticide applications has caused these pests to be increasingly problematic in many orchards in recent years. To help combat resistance and conserve natural enemies, it is best to monitor for adult moths or to scout for caterpillars, and to apply insecticides for these pests only when necessary.

Luckily, often these caterpillars can be controlled together using a spray **at petal fall**. Some insecticides available for use against these pests in Wisconsin are in the chart on the following page. There are many tradenames available, and we do not recommend these that are listed above other options. All product recommendations can be found in the 2017 Midwest Fruit Pest Management Guide. Additionally, you should always fully read the label before spraying any pesticide.

If populations are high, it may be necessary to spray another cover later in the season. Monitoring and watching for damage will help to make that decision.

Class (IRAC code)	Tradename	Active ingredient	PHI (days)	Effectiveness for OBRL, STLM, and other leafrollers (including RBLR and GFW)
Spinosyns (5)	Delegate WG (**Reduced risk)**	Spinetoram	7	OBLR – excellent STLM – good Others – excellent
	Entrust **(OMRI organic certified)**	Spinosad	7	OBLR – excellent Others – excellent
Diamides (28)	Altacor (**Reduced risk)**	Chlorantraniliprole	5	OBLR – excellent STLM – good Others – excellent
Glutamate-Gated Channel (GLUCL) Modulator (6)	Proclaim	Emamectin benzoate	14	OBLR – excellent Others – excellent
Benzoylureas (15)	Rimon EC (**Reduced risk)**	Novaluron	14	OBLR – excellent STLM – excellent Others – excellent
Carbamates (1A)	Lannate SP	Methomyl	14	OBLR – fair to good STLM – excellent Others – excellent

Calendar of Events

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

Aug 3, 2017 – PARS Vineyard Walk
Peninsular Agricultural Research Station, 4312 Hwy 42 North, Sturgeon Bay, 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: https://pddc.wisc.edu/
Soil and Forage Analysis Lab: https://uwlab.soils.wisc.edu/
Weed Identification Tool: http://weedid.wisc.edu/weedid.php

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