WISCONSIN UNIVERSITY OF WISCONSIN–MADISON
UW Extension University of Wisconsin-Extension

Wisconsin Fruit News

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Highlights

Promalin, a frost rescue alternative for apples

By: Amaya Atucha-Fruit Crop Specialist UW-Madison

As spring temperatures continue to fluctuate, orchards across the state may have had a light frost this spring, while others could be worried about one in the future. We would like to remind you about an article we wrote last spring at around this time, discussing the use of Promalin as a frost rescue option for apple production. You can access the article on our website, under "Newsletters" and "Volume 1, Issue 1" at the very bottom of the page. Hopefully you have not had any frost damage, but if you have, this can provide you with information about how to still get the best crop possible this summer.

Here's hoping the cool spring weather is behind us soon!

Home Fruit Cultivars for Southern Wisconsin- updated publication

Now available at the learning store, this UW Extension publication compiles information on fruit cultivars that can successfully be established in Southern Wisconsin. First published in 1998 and updated in 2017, this comprehensive publications provides information on tree fruit (apple, pear, peach, apricot, plums, cherries), grape (wine and table), and small fruit (strawberries, raspberries, blueberries) cultivars including fruit quality, growth habit, cold resistance and disease susceptibility.

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Home Fruit Cultivars for Southern Wisconsin

A. Atucha, B.R. Smith, and J. van Zoeren

Gardeners can successfully grow many kinds of fruit in southern Wisconsin. However, prospective home fruit growers should consider carefully the space, time, and costs involved before investing in plants. Those without sufficient time and commitment to properly care for a planting will be disappointed in the result.

Choosing a cultivar is one of the most important decisions in establishing a fruit crop. Planting unproven and untested cultivars can be both discouraging and expensive. Relatively rare cultivars must be ordered from specialized nurseries. Cultivars listed in this publication are generally available from reputable local garden centers and nurseries, as well as mail-order nurseries. A list of some local and

An Integrated Approach to Pest Management

By: Annie Deutsch, Door County Agriculture Agent UW-Extension, and Christelle Guédot, UW-Extension

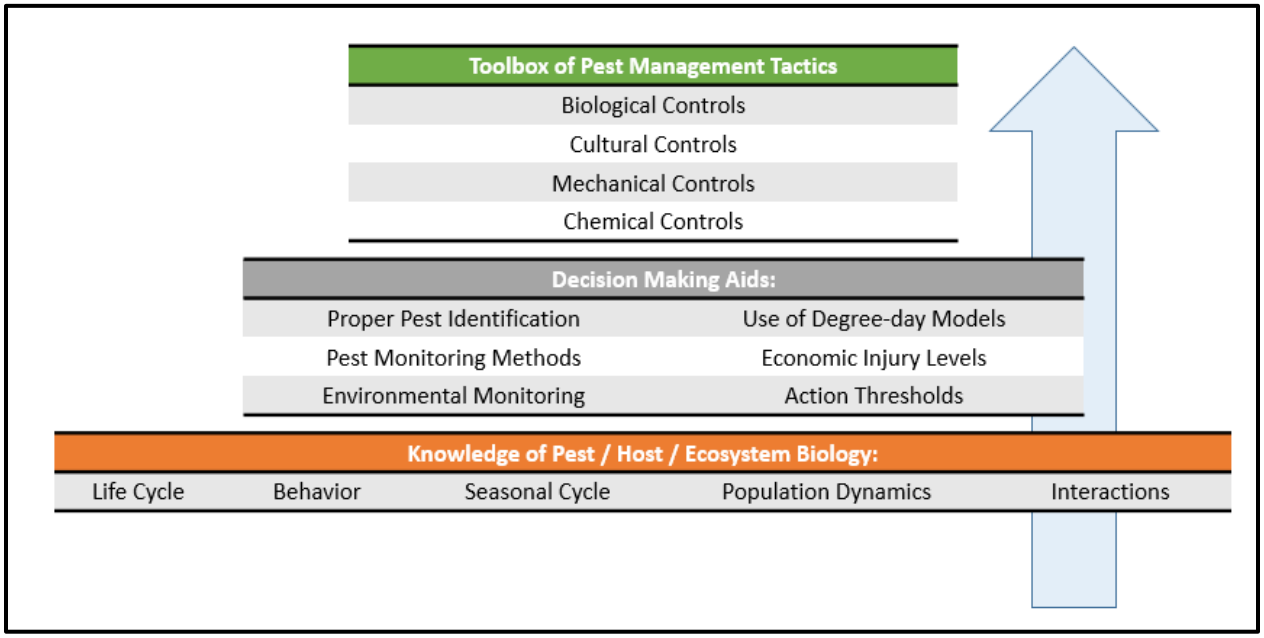
This summer we will discuss some of the different methods of integrated pest management, and how best to apply these to protecting fruit crops.

The whole concept of pest management took a turn in the mid-1950s. Up to that time, pest management mostly relied on synthetic chemicals, but there was a growing awareness of potential environmental and health concerns as well as problems with pests becoming resistant to pesticides (i.e. the pests were able to survive after being sprayed). From there the idea of a multi-faceted approach to pest management- Integrated Pest Management- was born.

Integrated Pest Management (IPM) is now a common form of pest control for both the large scale and backyard grower. IPM is an ecosystem-based strategy focusing on long-term reduction of pest damage through a combination of strategies. The foundation of IPM is the justified use of pesticides based on monitoring and identifying the pest and following established guidelines to reduce populations of that target organism. These methods are then combined with other forms of pest control.

Before implementing any type of plan for managing pests, it is critical to know exactly what pest(s) are present. UW-Extension offers free insect and weed identification and a plant disease diagnostic clinic that charges a small fee depending on the type of test that needs to be done. Once the pest is identified, it is important to note how many/how much of the pest there is. Plants can tolerate a certain amount of damage, so it isn't always worth the time or money to treat for everything. Lastly, if a treatment is warranted, spending time to research the pest lifecycle to determine when the pest is most susceptible to a treatment can dictate whether the treatment works or not. The right product applied at the wrong time could have no effect.

When the time comes to choose what to do to control the pest there are a number of options. Thinking through each option BEFORE acting is foundational for IPM and regardless is likely the most effective method of pest control. There are many options, and depending on the particular pest and crop, some of these methods will work better than others. Some examples are listed below. We will go into more depth on these topics in future articles.



Some pest control options available in the IPM toolbox:

- Physical/mechanical controls: tillage, physical barriers, row covers, mulching and trapping.
- Biological controls: making the environment favorable for natural enemies of the pest or releasing natural enemies into the crop.
- Cultural controls: crop rotation when possible, sanitation (removing infested plant material), changing the timing of harvest, maintaining crop health so it can better fight off pests, and choosing disease resistant plant varieties.
- Chemical controls: using the most appropriate product that directly kills the pest or prevents its development while minimizing the impact on beneficial organisms and the environment. Make sure to carefully follow all label requirements.

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 21, 2017 through May 5, 2017.

PLANT/ SAMPLE TYPE	DISEASE/ DISORDER	PATHOGEN	COUNTY
FRUIT CROPS			
Apple	Black Rot	Sphaeropsis sp.	Rock
	Cytospora Canker	Cytospora sp.	Rock
	Phomopsis Canker	Phomopsis sp.	Rock
	Root Rot	Pythium sp., Fusarium sp.	Rock
Blackberry	Cane Blight	Coniothyrium fuckelii	Taylor

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

Reports of the following fruit pests have come in to the Insect Diagnostic Lab over the past two weeks:

Brown Marmorated Stink Bug. Reports continue to come in to UW Insect Diagnostic Lab.

Spring Caterpillars are becoming quite active and a number of species are of interest to fruit crops. The tent caterpillars have been active for a few weeks in the southern part of the state. Several leafroller species are becoming active as well as our common fruitworm species (speckled and humped fruitworms), which can feed on a variety of fruit crops.

Treehopper Damage. A sample recently came in of leafhopper oviposition damage on apple. This damage would have occurred last year when female treehoppers sliced into to twigs and small branches to lay eggs. The damage appears as small amounts of twig dieback. Upon closer inspection, small slits can be found on the twigs and eggs could be seen under the microscope. This type of damage usually isn't extensive and pruning out affected twigs is a common management practice.

Eastern Flower Thrips

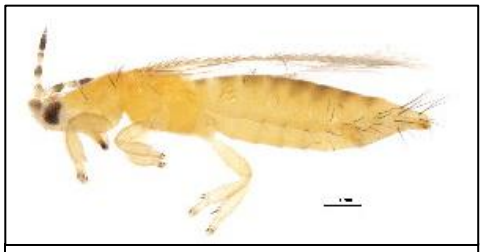
By: Christelle Guédot and Janet van Zoeren, UW – Madison Fruit Crop Entomology and Extension

Common Name: Eastern Flower Thrips

Order: Thysanoptera

Family: Thripidae

Scientific Name: *Frankliniella tritici* (Fitch)



Frankliniella tritici. Photo by BIOUG03211-B05CBG, Photography Group, Centre for Biodiversity Genomics. Creative Commons.

Eastern flower thrips (EFT) are small insects less than 1/16" long (1.5 mm) yellow to brown with feathery wings. They feed with rasping mouthparts on many different plants and plant parts, piercing and sucking plant juices from the outer layer of plant tissue. The rasping does not seriously damage strawberry leaves but can cause premature wilting of flower parts and blossom drop, leading to misshapen blossoms and fruit. Thrips feeding on fruit can lead to seedy berries that do not size or color. Berries may be tough, small, and turn brown (bronzing or russeting) with little flavor.

Although often thought of as arriving in Wisconsin later in the season, thrips have already been reported this year by an apple grower in Fond du Lac County near wooded areas. Although that incidence was not identified to species level, it would be good to be aware of the possibility of finding early-season thrips in your fruit crops already this season!

Life Cycle

Females insert eggs into the leaf or flower tissue of host plants. The small yellow or white larvae (<1mm) hatch 2-14 days later. Larval development may decrease to 3-5 days with warmer temperatures and the presence of pollen. Fully mature larvae will go to the soil to pupate and new adults will return to feed and reproduce on the plants. Multiple generations of EFT occur in Wisconsin and hot and dry conditions will favor population increases in summer leading to more damage to other crops such as brambles.

Thrips damage to a strawberry. Photo by Dr. Elizabeth Wahle, University of Illinois Extension.

EFT adults are presumed to be carried over, possibly each year, as a result of long distance migrations on high-level frontal wind systems from Southern states, along with other insects such as potato leafhopper, black cutworm, corn earworm, aster leaf hopper, among others. Indeed, EFTs have been trapped at altitudes of 10,000 feet! The timing and magnitude of each spring's introductions is thought to determine the severity of injury in strawberries. ***However,*** recent collections in wheat by Russ Groves, UW-Madison Vegetable Entomologist, is suggesting that EFT may be overintering in Wisconsin. Russ and colleagues are finding large numbers of EFTs in wheat in late April and early Spring and more research should be conducted to determine if some populations are indeed overwintering in Wisconsin.

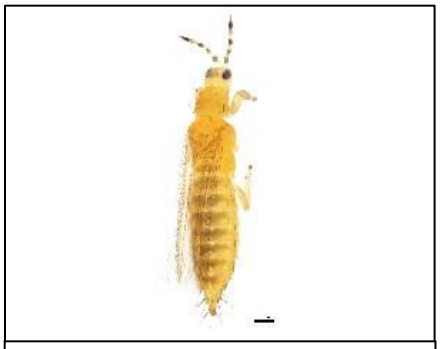
Monitoring

Monitor when the earliest flowers of earliest varieties begin to open and continue sampling all varieties as they begin to bloom. Look at 10 blossoms per site, with 5 or more sites per variety. Shake/tap blossoms in white bowl or tray. Alternatively, you can also place flower blossoms inside a zip-lock bag, shake them to dislodge thrips and allow counting (you could add 2 drops nail polish remover / ethyl acetate to kill them). Yellow sticky cards can be used to detect the presence of thrips. Although no formal threshold has been established for EFT, chemical control is warranted when populations exceed 2-10 thrips per blossom or small berry. This is a broad range of densities and other states that do not see

a lot of thrips damage recommend 10 thrips per blossom. More research is needed to establish the correlation between densities and damage to establish a formal action threshold.

Biological control

Some natural enemies, such as minute pirate bugs, feed readily on flower thrips. Thus, protecting naturally occurring populations of predators could help in reducing thrips populations.



Frankliniella tritici. Photo by BIOUG03211-C01, Photography Group, Centre for Biodiversity Genomics. Creative Commons.

Chemical control

If warranted, insecticides should be applied prebloom or before 10% of plants are in bloom to avoid exposure to pollinators. If necessary, continue at 5- to 6-day intervals until 4 days before first harvest. Spray applications can be discontinued after all harvestable berries have reached dime size.

A list of available insecticides to control EFT in strawberry is provided in the following table. For other fruit crops, be sure to read the label to make sure they are registered for that specific crop in Wisconsin. There are many other 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 and follow the label before spraying any pesticide.

Class (IRAC code)	Tradename	Active ingredient	PHI (days)	Effectiveness
Spynosins (5)	Entrust	Spinosad	1	**EFT**: Good
	SpinTor	Spinosad	1	**EFT**: Good
	Radiant	Spinetoram	1	**EFT**: Good
Pyrethroids (3A)	Danitol	Fenpropathrin	2	**EFT**: Excellent **Tarnished plant bug**: Excellent **Clipper**: Excellent
	Brigade	Bifenthrin	0	**EFT**: Excellent **Tarnished plant bug**: Excellent **Clipper**: Excellent
Neonicotinoids (4A)	Assail	Acetamiprid	1	**EFT**: Good **Tarnished plant bug**: Good
Organophosphate (1B)	Lorsban	Chlorpyrifos	21	**EFT**: Excellent **Clipper**: Excellent

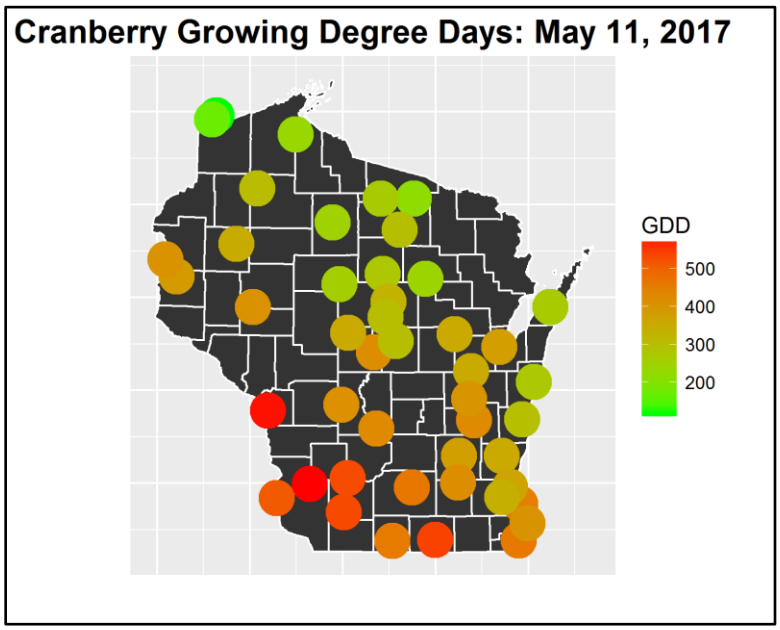
Cranberries

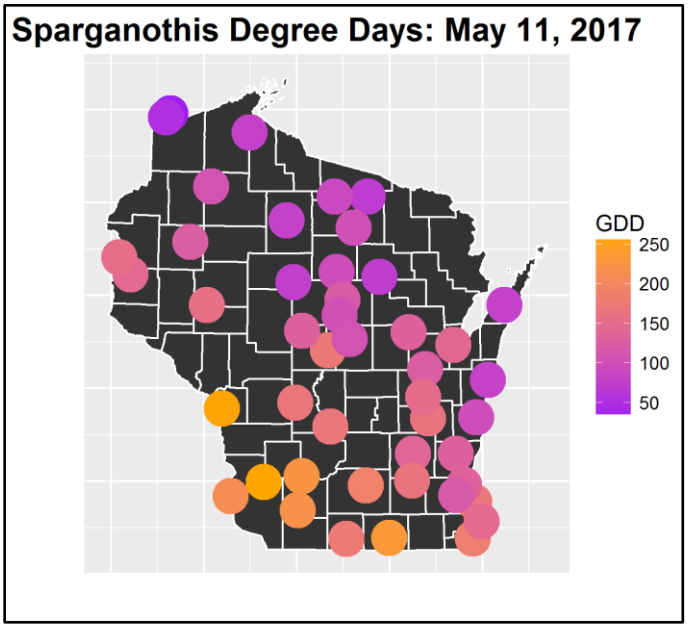
Cranberry plant and pest degree-days: May 11, 2017

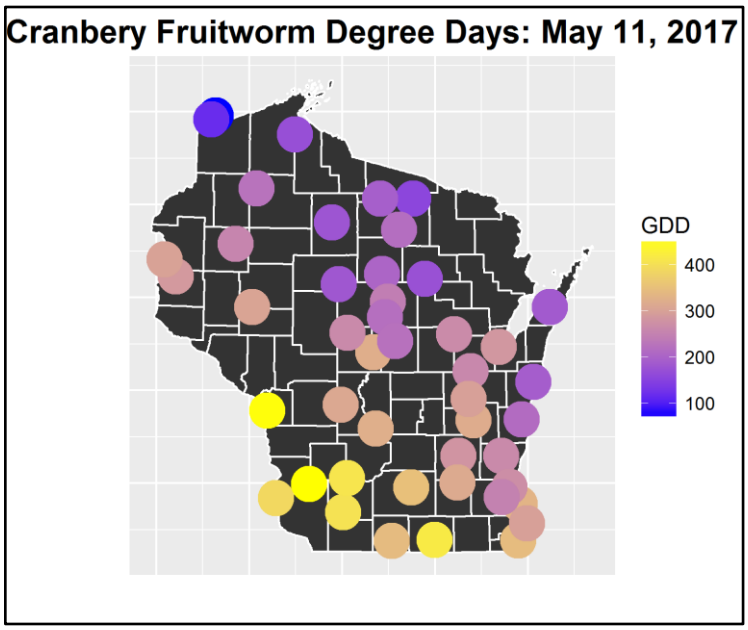
By: Elissa Chasen and Shawn Steffan, USDA-ARS and UW Entomology

The maps below show how spring is progressing across Wisconsin. Each of these three organisms has accumulated different amounts of degree-days 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.

Don't forget to check out the interactive maps we have posted 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.







The table below allows for comparison of degree-days over the last three years. We see that this year, spring is just a little slower to develop than the previous couple of years. This should delay the first flight of each of the major moth pests, as well as the development of the plant in relation to the last couple of years. Sparganothis flight should begin around 600 Sparg DDs and observations from last year show that CFW flight should begin around 960 CFW DDs.

May 11	Cranberry DDs			Sparg DDs			CFW DDs		
	2015	2016	2017	2015	2016	2017	2015	2016	2017
Northern WI (Minocqua)	383.1	346.3	265.1	167.5	139.2	90.6	298.2	261.8	192.8
Central WI (Wisconsin Rapids)	559.5	475.4	418.5	276.4	206.5	175.2	451.7	366	321.9

Grapes

Planting and caring for young grapevines

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

Upon arrival of your planting stock, the first thing you need to do is to inspect the planting material. In general the vines should be between 3/8 to 1/2 inches in diameter, and the roots should be moist. If there are any problems with the vines you should document it with pictures, and contact the nursery immediately.

Ideally the vines should be planted immediately upon arrival, however because it is not always possible to plant right away (e.g. too wet to plant, the site is not fully prepared) you should take the vines out of box and unpacked them. The best way to store them is to dig a shallow trench and cover them with soil or mulch in a shaded spot until you are ready to plant them. This is called to heel-in, and vines can stay like this for several weeks until you are ready to plant. It is important though to water the heel bed so that the roots will stay moist (not wet) – if roots dry out vines will die.

Once you are ready to plant the vines, trim the roots that are damaged and cut back the canes to 4-5 buds. I don't recommend cutting the vines to less than 3 buds because this encourages the growth of shoots that will develop into "bull canes" which are very vigorous shoots that will not be a good material to develop the frame of the grapevines as they tend to experience more cold damage.

Planting can be done using an 8-10 inch hand-held or tractor-mounted auger, and some growers have also used modified tree planters. It is critical that the planting hole is not glazed on the sides, because this will restrict the growth of new roots. To break up glazed areas in the planting hole you can chip off the surface with a shovel. Regardless of the planting method you are using, make sure you dig a hole large enough to fit all the roots so you don't have to prune them (unless they are damaged). Most of the reserves to help support new growth are in the roots, so you don't want to have to reduce the root system more than necessary. Again, during this planting process remember to keep the roots moist you can do so by keeping then in buckets with water while planting.

Place the vines in the holes, spreading the roots evenly, and then pack the soil into the hole and around the vine, and gently pull the vines upward so that the roots are oriented vertically. It is critical to water the vines immediately after planting with 3 to 4 gallons of water per vine, this will ensure a good contact between the soil and the roots and will get rid of any air pockets. Make sure to eliminate the depression that can be left around the vine after planting because herbicide could accumulate and damage the vines. Fertilization of newly planted cold-hardy grapes is not a common practice in

Wisconsin, unless the site has poor soils and shoot growth is poor. In general, cold-hardy grapes are very vigorous and if water is not a limitation, good growth will be achieved during the first years.

I know there is quite a bit of controversy when it comes to using growth tubes for grapes. There is no doubt that growth tubes can have several benefits on protecting new vines from animal damage and herbicide drift, it also provides a "greenhouse" effect that enhances early season growth. However, there are also some limitations to their use: it is an extra cost and requires labor to install and remove them; it promotes the dominance of one shoot which makes it very difficult to establish multiple trunks; shoot growing in growth tubes tend to twist which can affect the long term viability of the trunks; it can significantly delay the hardening of the wood in the fall, because of the same greenhouse effect that promotes growth, and thus jeopardize the survival of the new vines; because of the warmer condition in the growth tubes it is possible to have more insect and disease pressure.

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) all cultivars are around budburst, with development spanning from E-L* developmental number 4 (budburst) to 5 (first leaf separated from shoot). Some vineyards experienced frost events over the past few weeks, but damage seems to be relatively limited, and likely most vines will show no sign of damage within a few weeks. At WMARS, some buds show frost symptoms, but I expect they will all recover soon. At the Peninsular Agricultural Research Station (PARS) buds are a couple weeks behind, with cultivars ranging from E-L* developmental number 2 (bud scales opening) to 3 (wooly bud).

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

Following photos taken on May 10th at West Madison Agricultural Research Station.

Brianna at WMARS; "budburst" E-L number = 4

La Crescent at WMARS; "first leaf separated from shoot" E-L number = 5

La Crosse at WMARS; "budburst" E-L number = 4

Marquette at WMARS; "first leaf separated from shoot" E-L number = 5

Frontenac at WMARS; "first leaf separated from shoot" E-L number = 5

St. Croix at WMARS; "budburst" E-L number = 4

Somerset at WMARS; "budburst" E-L number = 4

Einset at WMARS; "budburst" E-L number = 4

Following photos taken on May 10th at the Peninsular Agricultural Research Station.

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

La Crescent at PARS; "bud scales opening" E-L number = 2

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

Marquette at PARS; "wooly bud" E-L number = 3

Frontenac at PARS; "bud scales opening" E-L number = 2

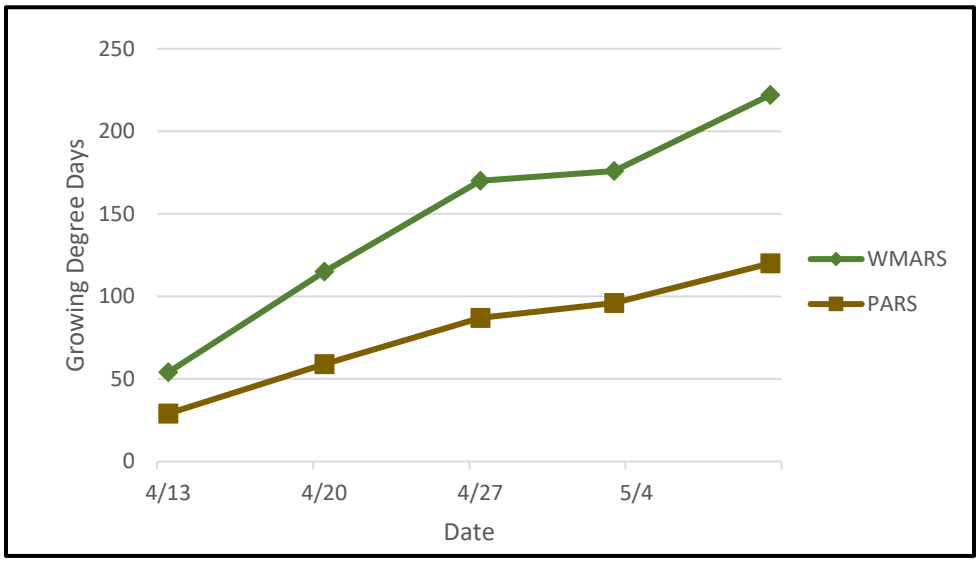
St Croix at PARS; "bud scales opening" E-L number = 2

The growing degree day accumulations as of April 27th for this year are: 170 GDD at WMARS and 87 GDD at PARS. Two weeks ago, when temperatures were cool both during the days and at night, degree day accumulation leveled off for a week. Now it is rising again, and we can all hope that spring has finally truly arrived! With the cooler temperatures for a week, we are now almost exactly at the same degree day accumulation as at this time last year. Degree days are calculated using a base of 50°F.

Grape Growing Degree Days

April 1 - May 10, 2017

	2107	2016
WMARS	222	215
PARS	120	122



Insect pest scouting report

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

We have begun scouting for insect pests at both the West Madison Agricultural Research Station (WMARS) and the Peninsular Agricultural Research Station (PARS). As discussed in the previous issue of this newsletter, the main pests you may see at this time, as buds are just nearing budburst, are grape flea beetles and cutworms. Both flea beetles and cutworms feed on the buds and the differences in scouting and management were discussed in the previous issue of this newsletter. At PARS, it may be a little early for insect damage still, and no insects or damage symptoms have been seen in the past two weeks. However, at WMARS, this seems to be a relatively heavy year for grape flea beetle: both this week and last week we saw up to two flea beetles per vine, although damage symptoms are not yet at the 3% threshold to necessitate an insecticide application.

Grape flea beetle on a Brianna wine grape at the West Madison Agricultural Research Station.

To calculate the percent damage on your vineyard, and determine if an insecticide application is necessary, you can check a random 10 buds on each of 10 vines (100 buds total) for damage, and if two to three or more buds have been hollowed out, control measures may be worthwhile. It is worth remembering that once all buds have burst, and two to three leaves are unfurled, flea beetles no longer cause significant damage to the vine. Flea beetle damage has probably been especially heavy due to the cool spring temperatures, which prolong the period of bud-break (and therefore the period during which flea beetle is able to feed and cause damage).

Just observationally, Brianna and Frontenac seem to have more flea beetles at WMARS. This may be due to these buds opening slightly earlier than other cultivars, chance distribution at the time or observations, or may signify a feeding preference by the flea beetles. Although this is an interesting observation, more research would be needed to determine cultivar preference by flea beetle and associated damage.

Tree Fruits

Using NEWA weather stations to predict spray timings: an example from plum curculio

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

As apples near petal-fall, we're reaching a critical time for several insecticide applications. One insect that you should be mindful of, and may need to spray for in the coming weeks, is plum curculio (PC). We will briefly discuss their life history, monitoring, and control at the end of the article. First, however, we will use PC as an example to demonstrate how to use a website developed by Cornell University to predict insect life stages and spray timings.

The weather stations attached to NEWA (the Network for Environment and Weather Applications) can be used to help calculate insect pest life stages and when to time your insecticide applications. Through the NEWA website at Cornell University (see Figure 1), you can simply click on "apple pests" under the "pest forecasts" tab, and plug in your closest

weather station to find local information about many of the key apple pests in the region. To date we have five NEWA stations set up in Wisconsin (two in the Madison area and three along the western edge of the state), and we hope to set more up across the state soon.

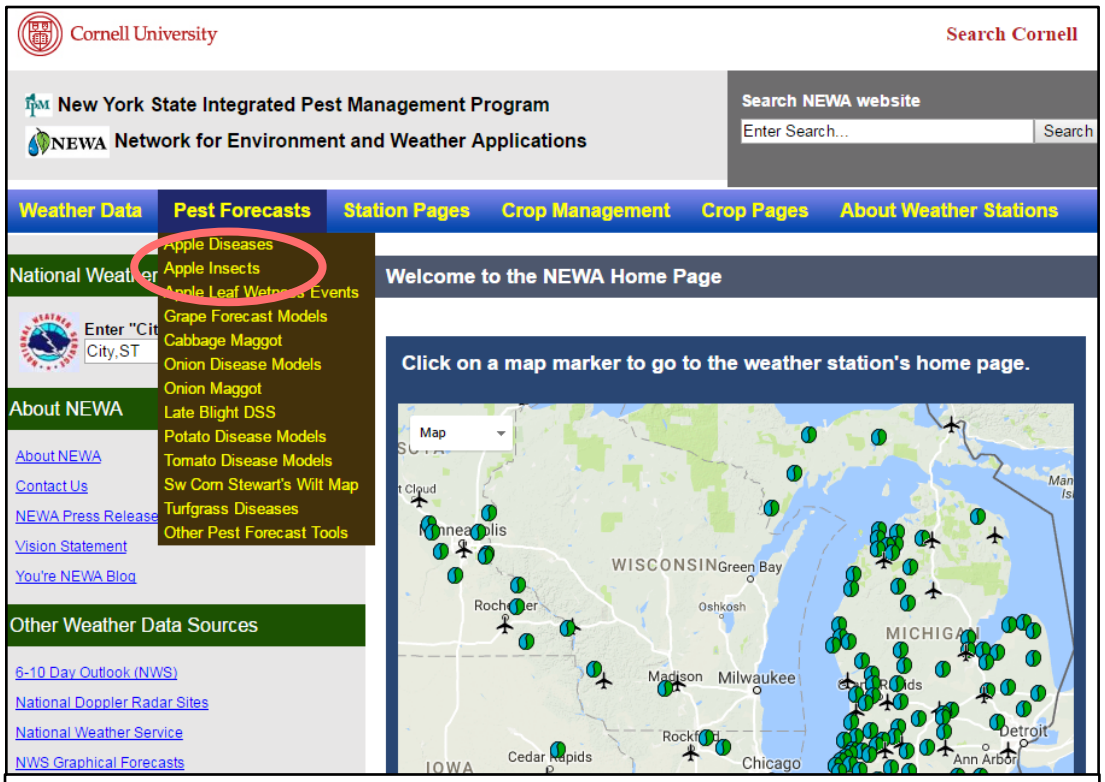


Figure 1: Main page of the NEWA website at Cornell University, with "apple insects" link circled in pink.

As an example, after following the "apple insects" link, you could then select "Plum Curculio" as the pest of interest, "Wisconsin" as the state, and the "Verona West Mad Ag Sta" for the West Madison Agricultural Research Station (see red arrows on left side of Fig. 2). There is no need to change the date unless you want to look at previous dates, otherwise, the default is set for the current day. After clicking "Calculate", the model will give you information about the life stage and management recommendations for PC specific to your region (see Figure 2).

In this example, as of May 8th, you can see that we had accumulated 199 Degree Days for PC to date (green oval), which puts us 111 Degree Days (underlined in blue) away from the management target for this pest. As soon as degree days in your region reach that target (approx. 300 degree days, or just after petal-fall), the management recommendation will change (bottom table with "Pest Status" and "Pest Management"). As we install more NEWA weather stations across the state, this website will be increasingly useful for informing growers at a more local scale when making a wide range of management decisions in the orchard.

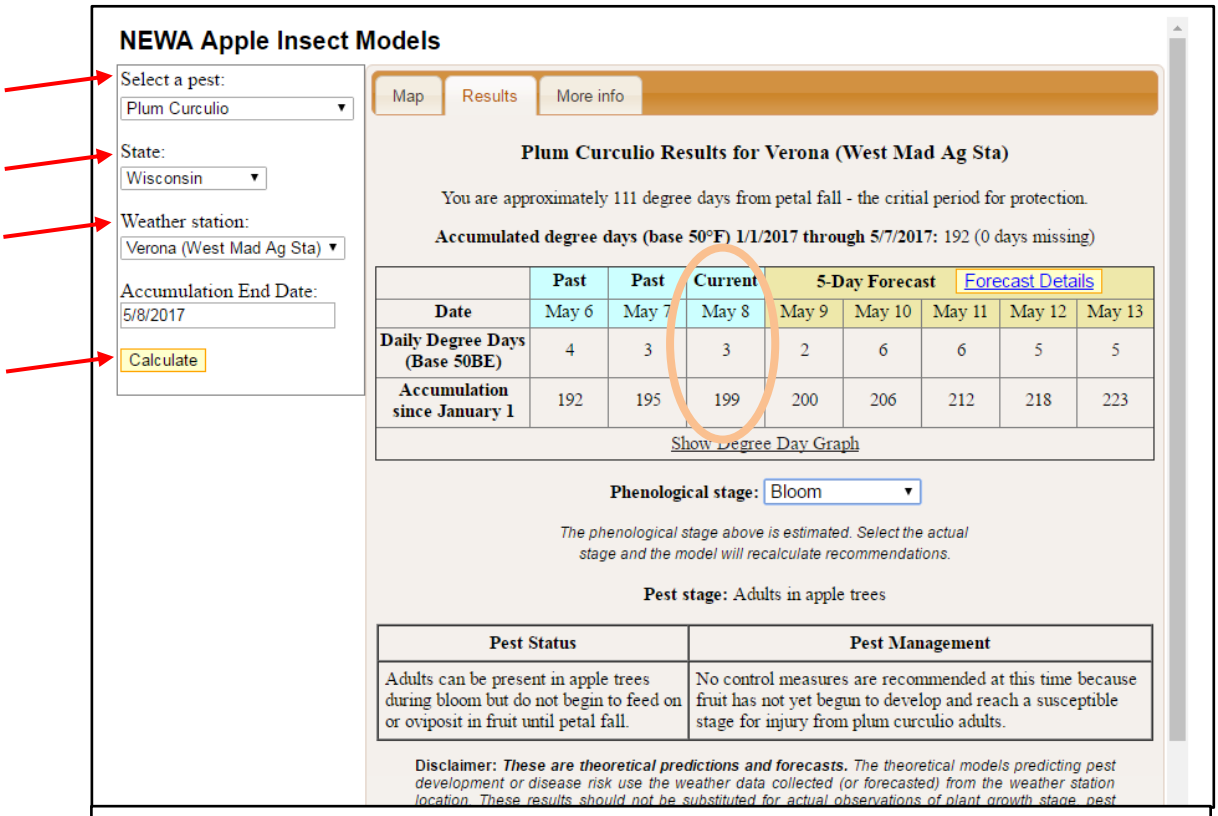


Figure 2: Insect pest model for plum curculio. Degree days are calculated using the NEWA weather station at the West Madison Agricultural Research Station. Plum curculio degree day accumulation to date is 192 DDs, and no control measures are recommended at this time. These numbers and recommendations will change throughout the summer and depending on the weather station being used.

Plum Curculio

Life Cycle

Plum curculio overwinters as an adult in woods and hedgerows near the orchard. They move into the orchard when temperatures are above 60°, and so, depending where in the state you live, they either have recently or will soon be arriving. Damage begins on the first warm days following fruit-set, and occurs due to both feeding punctures as well as the characteristic crescent-shaped oviposition (egg-laying) scars. Because PC lays only one egg at a time, each adult female can damage up to 100 fruit. Larvae are unable to develop inside living apples, but do develop both in stone fruits such as cherries and plums, as well as in apples that drop to the ground and cease to develop or expand. Pupation takes place in the soil, and the emerging adults may feed on the surface of apple fruit causing circular holes before returning to nearby woods and hedgerows to wait out the next winter. Adults spend over 300 days overwintering in protected areas, primarily outside orchards.

Monitoring

There aren't currently any effective traps for PC, but you can monitor for them by shaking or beating a branch with a white sheet underneath it, then looking for the small, brown, snouted beetles on the sheet. This strategy works best in the morning, since cool weather prevents the beetles from flying away when disturbed.

Management

A first insecticide application could take place around petal-fall, and then additional cover(s) may be necessary every 10 days or after 1.5 inches of rainfall, whichever comes first. At 308 degree days out from petal-fall, PC will no longer be

laying eggs and entering orchards, so additional sprays are no longer necessary. You can calculate the degree days past petal-fall on your own, or visit the Cornell NEWA website, as described above, to find DD calculations and PC management recommendation for the Madison and western WI regions.

A list of available insecticides to control PC in apple, peach, or tart cherry is provided in the following table. For other fruit crops, be sure to read the label to make sure they are registered for that specific crop in Wisconsin. There are many other 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 and follow the label before spraying any pesticide.

Class (IRAC code)	Tradename	Active ingredient	PHI (days)	Effectiveness for PC
Physical deterrent (n/a)	Surround **(OMRI organic certified)**	Kaolin clay	0	Apple- fair/good Cherry- good Peach- good
Diamides (28)	Exirel (**Reduced risk)**	Cyantraniliprole	3	Apple- good Cherry- good Peach- good
Neonicotinoids (4A)	Actara	Thiamethoxam	14-35	Apple- excellent Cherry- excellent Peach- excellent
	Assail	Acetamiprid	7	Apple- excellent Cherry- excellent Peach- excellent
Oxadiazines (22A)	Avaunt	Indoxacarb	14	Apple- excellent Cherry- excellent Peach- excellent
Organophosphate (1B)	Imidan	Phosmet	7-14	Apple- excellent Cherry- excellent Peach- excellent

Calendar of Events

May 24-25, 2017 – Northern Wisconsin Specialty Crop Field Days
Bayfield, WI

June 1, 2017 – Berry Summer Field Day
Arnold's Strawberries, 343 County Hwy PP, Rudolph, WI

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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