



Cranberry Crop Management Journal

IN THIS ISSUE:

- Observations from the Field1
- Reduced Risk Insecticide: Entrust2
- Red Headed Flea Beetles are Back.....3
- Plant Disease Diagnostics Clinic.....4
- Growing Degree.....6
- Summer Field Day Mini-Clinics Schedule...6
- Fond Farewell.....7
- Cranberry Research Station Update7
- Grower Updates8

OBSERVATIONS FROM THE FIELD

*by Pam Verhulst
Lady Bug IPM, LLC*

This week, July 29, 2019, we are finding more flea beetle. We are reaching thresholds just under two weeks later than in 2018 (July 18, 2018 FB threshold). Again, they are feeding on the vines, pinheads and peas.

Sparganthis Fruitworm (Sparg) have also started webbing. They are feeding on the new growth now but we know they will enter the fruit just before pupating.

Tipworm populations are high. A few more growers are trying Movento, now that the bees have left.

Berry Scarring is very obvious against the green berries. We are also seeing it in larger areas than in the past. Berry Scarring is most likely a result of a virus but growers would have to send samples to the diagnostic clinic to be certain.

**Tired of seeing in
BLACK & WHITE?**

Receive the CCMJ in
COLOR by e-mail!

Sign up by calling
715-421-8440 or
emailing us at
matthew.lippert@wisc.edu

Editor:
MATTHEW LIPPERT
Agriculture Agent
Extension Wood County
400 Market Street
Wisconsin Rapids, WI
54495
(715) 421-8440
matthew.lippert@wisc.edu



Sparg Web



Sparg



Large Area Berry Scarring

REDUCED RISK INSECTICIDE:

ENTRUST

by *Christelle Guédot*

UW-Madison, Department of Entomology

Insecticide: Entrust

- Available as 80WP (80% AI, Wettable Powder) and 2SC (2 lb AI, Soluble Concentrate)
- Restricted re-entry interval (**REI**): 4hours
- Pre-harvest interval (**PHI**) of 21 days for 80WP and 1 day for 2SC
- No more than 6 applications per year
- Do not exceed a total of 9 oz. of 80WP and 29 fl. oz. of 2SC
- Rate of use per acre: 1.25- 3 oz. for 80WP and 4-6 fl. oz. for 2SC

Entrust is registered for use in Wisconsin on many crops, including cranberry. It is marketed by Dow AgroSciences® under the formulations 80WP (80% active ingredient as a Wettable Powder) and 2SC (2 lb. of active ingredient per gallon as a Soluble Concentrate). Entrust is a Naturalyte insect control product that is OMRI approved and contains the active ingredient Spinosad. Spinosad is biologically derived from the fermentation of *Saccharopolyspora spinosa*, naturally occurring soil bacteria. Entrust is in the class of the Spinosyns (IRAC code 5). Its mode of action is primarily on the nicotinic acetylcholine receptors, causing excitation of the insect nervous system which leads to muscle contractions, paralysis, and eventually death. Entrust is most effective through ingestion of treated plants but also has effective contact activity.

In cranberry, Entrust is registered for insect suppression (not control) of armyworms, fireworms, leafrollers, looper, sparganthis fruitworm, and thrips, as well as currant fruitfly, European grapevine moth, and light brown apple moth.

The timing of application should coincide with egg hatch or the appearance of small instar larvae of the pest to be controlled for optimal results. Thus scouting of life stages and monitoring of degree day will improve the efficacy of Entrust. In our previous trials, Entrust has performed well particularly in organic production and this article is primarily intended for organic growers. In conventional production, Entrust does not perform as well as commonly used conventional insecticides and could be considered in a rotation manner to delay resistance to these more commonly used insecticides. From Jack's experience, a tight application schedule of the highest rate combined with several applications will provide the best control on fruitworms and loopers.

Entrust may be applied by ground equipment, chemigation, and by air (see label for specific application regulations). Dilute sprays should be sprayed to the point of runoff.

Entrust is toxic to bees exposed to treatments for 3 hrs. following treatment. As a precaution, avoid applying any pesticide during bloom when bees are flying.

Entrust is toxic to aquatic invertebrates and must not be applied directly to water.

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

You can find the labels of Entrust at the following links:

Entrust 80WP www.cdms.net/ldat/ld62B024.pdf

Entrust 2SC https://s3-us-west-1.amazonaws.com/www.agrian.com/pdfs/Entrust_SC_Label1t.pdf

RED HEADED FLEA BEETLES ARE BACK!

by *Christelle Guédot*
UW-Madison, Department of Entomology

As of last week, red-headed flea beetle adults, also known as cranberry flea beetle (CFB; *Systema frontalis*), have emerged on cranberry marshes (Figure 1). Adults feed on leaves (Figure 2) and occasionally fruit, while larvae feed on plant roots. CFB overwinter as eggs in and around cranberry marshes and there is only generation per year. Experiments led by Ben Jaffe showed that eggs are found at depths of 6-12". Though populations are patchy and this is not a full representation of the presence of eggs in cranberry marshes, we found overwintering eggs in mid-June and the next generation of eggs in mid-August until mid-September. Larvae were collected from mid-June to mid-August (Figure 3).

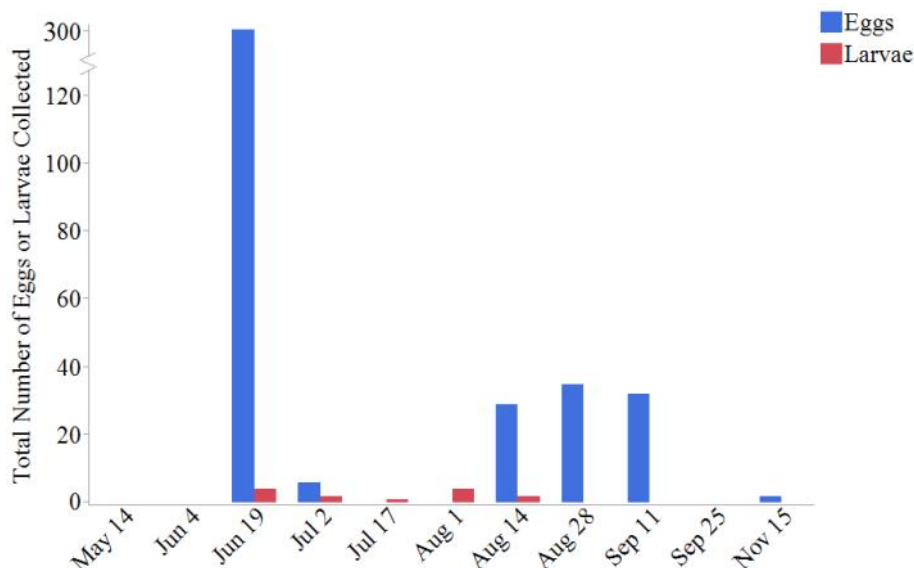


Figure 3. Total number of flea beetle eggs and larvae collected from cranberry beds over the season.



Figure 1. Flea beetle adults. Photo credit: Pam Verhulst, LadyBug IPM.



Figure 2. Flea beetle damage on leaves (yellow arrow). Photo credit: Pam Verhulst, LadyBug IPM.

Most of the damage by adults occurs on leaves but they can also feed on berries. Most damage occurs toward the top 1-2 inches of the uprights and increases with increased beetle density, as expected. More work needs to be done to determine the impact CFB have on cranberry yield and establish an economic threshold that can be used to determine at which density of CFB adults chemical control should be applied.

Management. Management of flea beetle is now focused on CFB adults as soil soaks to target the larvae still need to be refined and Jack and I are still working on this. Belay, our best product for pre-bloom soil soak applications, is no longer allowed as Valent did not renew its registration on cranberry. Postbloom, CFB adults can be managed with insecticides, including Altacor, Actara, Assail, Diazinon, Exirel, Imidan, Lorsban, and Rimon (though Rimon is less effective than others in our trials). The timing of application depends on the PHI of the product you plan to apply as well as what handlers allow to be sprayed after bloom. At this time (postbloom), the best options for flea beetle management are Assail, Actara, Altacor, Exirel and Rimon but please make sure to check with your handler before applying any pesticide to make sure the products and PHIs are in compliance with handlers' restrictions.

Research conducted in the Steffan Lab with entomopathogenic nematodes for controlling CFB is still underway and more is to come on this very promising management method.

Thank you to Pam Verhulst for the scouting report and the pictures.

Happy growing season!

PLANT DISEASE DIAGNOSTICS CLINIC

Providing plant disease identification
and control recommendations to
homeowners, businesses and
agricultural producers

Plant Disease Diagnostics Clinic (PDDC)
Department of Plant Pathology
University of Wisconsin-Madison
1630 Linden Drive
Madison, WI 53706-1598
Director: Brian Hudelson
Phone: (608) 262-2863
E-mail: pddc@wisc.edu
Web: pddc.wisc.edu
Follow on Twitter @UWPDDC
Follow on Facebook @UWPDDC



Crop Consultants have seen scattered dieback in cranberry this season. The Plant Disease Diagnostics Clinic at UW-Madison is available to identify possible causes. Growers are able to take their own samples through the Plant Disease Diagnostics Clinic. Information from their brochure can be found below:

HOW TO COLLECT A SAMPLE

Collect whole plants when possible. Often growers first realize that they have a plant disease problem when they notice abnormalities in their plants' growth above ground. However many times, symptoms observed above ground are an indication of something going wrong below the soil surface. Therefore, samples that include whole plants are more likely to provide the information needed for PDDC staff to make a proper diagnosis

Always dig, never pull plants. Often diseased root tissue or pathogen structures associated with roots are very delicate. Pulling plants from the soil may shear diseased tissue or pathogens away, making diagnosis more difficult.

Collect more than one plant. Diagnosis of a plant disease often involves performing several tests on a sample. Sending more than one symptomatic plant ensures that there is enough tissue for all of the required tests.

Collect plants that show a range of symptoms. Diagnosis may involve looking for pathogen structures that may be formed only at certain stages of disease development. Providing a sample of plants showing a range of symptoms may speed diagnosis by providing tissue with these structures. Including healthy plants with your diseased plants can help in detecting subtle symptoms in diseased plants.

Keep collected plants as fresh as possible. Disease problems on fresh plants are more easily diagnosed than those on plants that have wilted or rotted prior to their arrival at the PDDC. If possible, collect plants immediately before they are to be submitted to the PDDC. If there will be a delay between the time that plants are collected and their arrival at the PDDC, keep the plants cool. Plants collected from home gardens can be kept in your refrigerator. Plants collected in a remote location should be placed in a cooler with ice. DO NOT place samples on your car or truck dashboard as they can overheat and deteriorate very rapidly.

Keep foliage from becoming contaminated with soil. Wash roots gently to remove soil unless the sample is to be tested for nematodes or you are submitting a potted plant. Soil contains many microorganisms that can readily colonize dead or dying tissue. These microorganisms can interfere with recovery of pathogens from diseased tissue. When removing soil from roots, DO NOT scrub the roots as this can lead to the loss of root tissue that may be important in disease diagnosis.

Collect other important information. The diagnosis process often involves piecing together many different clues. Background information is crucial. When submitting a sample, include information about THE PLANT (name, variety, age); SYMPTOMS (unusual plant color, size or shape, severity of the disease); THE ENVIRONMENT (weather patterns just prior to the onset of symptoms, soil type where the plants are growing, amount of water that the plants have received, the amount of sun or shade that the plants receive); MANAGEMENT FACTORS [previous crops, fertilizers and pesticides that you have used, pesticides used by your neighbors (if known)]

HOW TO PACKAGE A SAMPLE

Potted plants. Place the pot in a plastic bag and LOOSELY tie the top of the bag around the stem of the plant using string or a wire twist tie. This will keep the soil from contaminating the leaves. Place the wrapped plant in a sturdy box. Use packing material to ensure that the sample won't shift during shipment.

Whole plants. If you have removed the soil from the roots of the plant, wrap the roots in moist (NOT WET) paper towels. Place the wrapped roots in a plastic bag and LOOSELY tie the top of the bag around the stem of the plant using string or a wire twist tie. DO NOT punch holes in the bag. If you need to leave soil attached to the root system (e.g., because you believe a nematode is causing your disease problem), place the root system directly in the bag and LOOSELY tie the top of the bag around the stem of the plant using string or a wire twist tie. DO NOT punch holes in the bag. Place the wrapped plant in a sturdy box. Use packing material to ensure that the sample won't shift during shipment.

Leaves. Place six to 12 leaves loosely in a plastic bag. DO NOT wrap them in moistened paper towels, but place a wad of moist (NOT WET) paper toweling in the bottom corner of the plastic bag. Tie or otherwise seal the bag closed. DO NOT punch holes in the bag. Place the bagged leaves in a sturdy box. Use packing material to ensure that the sample won't shift during shipment.

Fleshy fruits and vegetables. Wrap fruits and vegetables in dry newspaper. Place the wrapped fruit/vegetable in a plastic bag and tie or otherwise seal the bag closed. DO NOT punch holes in the bag. Place the bagged material in a sturdy box. Use packing material to ensure that the sample won't shift during shipment.

Seedlings. Remove seedlings from the soil and GENTLY wash them. Lay them on a moist (NOT WET) paper towel; cover them with another moist paper towel. Place the seedlings and toweling between two pieces of cardboard and put the sandwiched seedlings into a plastic bag. Tie or otherwise seal the bag closed. DO NOT punch holes in the bag. Place the wrapped seedlings in a sturdy box. Use packing material to ensure that the sample won't shift during shipment.

Deciduous woody branches. Cut branches into sections if necessary. Place the branches/branch pieces in a plastic bag and tie or otherwise seal the bag closed. If sending more than one branch (we typically recommend sending at least three), put branch pieces from different branches in different bags. Place the bagged branches in a sturdy box. Use packing material to ensure that the sample won't shift during shipment.

Evergreen branches. Cut branches into sections if necessary. Place the branches/branch pieces in a plastic bag and tie or otherwise seal the bag closed. If sending more than one branch (we typically recommend sending at least three), put branch pieces from different branches in different bags. Place the bagged branches in a sturdy box. Use packing material to ensure that the sample won't shift during shipment.

Roots. GENTLY wash roots to remove excess soil. Wrap roots in moist (NOT WET) paper towels and place them in a plastic bag. Tie or otherwise seal the bag closed. DO NOT punch holes in the bag. Place the wrapped roots in a sturdy box. Use packing material to ensure that the sample won't shift during shipment.

- **MAIL SAMPLES TO:**

Plant Disease Diagnostics Clinic (PDDC)
Department of Plant Pathology
University of Wisconsin– Madison
1630 Linden Drive
Madison, WI 53706-1598

*Please enclose a cover letter with your sample(s) that includes your complete mailing address, your telephone number and/or email address, and a brief description of the problem you have been having with your plant(s).

- **DROP SAMPLES OFF:**

Plant Disease Diagnostics Clinic (address listed above)

*Samples can be dropped off at the PDDC whenever Russell Labs is open (weekdays 6am-6pm, except for UW-Madison Holidays). Clinic staff are typically available most weekdays between 8:30am-4:00pm. Parking is available in front of Babcock Hall.

FEE SCHEDULE—Effective January 1, 2019 (*Fees subject to change without notice*)

STANDARD DIAGNOSTIC TESTS

- *Digital Analysis Fee*—None
Examination of digital photos of diseased plants submitted via email
- *Base Fee*—\$20.00
Charged for all physical samples submitted from a single plant. Includes visual and microscopic examination, and incubation in a moist/humid chamber where needed.
- *Culturing Fee*—\$5.00 (per plant part/growth medium combination)
Charged when fungal or bacterial pathogens need to be grown from samples. Typically these fees would not exceed \$10 per plant (e.g. roots or branches) tested.
- *Dip stick serological test fee*—\$8.00 per test
Includes (but is not limited to) tests for arabis mosaic, cucumber mosaic, fire blight, impatiens necrotic spot, Phytophthora diseases (e.g. root rot), potyvirus diseases, powdery scab, tobacco mosaic, tomato spotted wilt.
- *ELISA serological test fee*—\$35.00
Includes (but is not limited to) the test for Apple mosaic.
- *DNA-based (PCR) test fee*—\$35.00 for the first test + \$15.00 per each additional test
Includes (but is not limited to) tests for crown gall, hops downy mildew and powdery mildew, oak wilt, phytoplasma diseases, powdery scab, soft rots (caused by *Dickeya* spp. and *Pectobacterium* spp.), *Xanthomonas* diseases.
- *RNA-based (PCR) test fee*—\$35.00 for the first test + \$15.00 per each additional test
Includes (but is not limited to) tests for varlavirus diseases, corky ringspot, tobacco rattle.
- *DNA-sequencing fee*—\$35.00
Used when other tests are inconclusive. Fees for culturing and/or PCR would also apply for samples requiring sequencing.

*Please do not enclose a payment with your sample. You will be billed for any work after your analysis has been completed and at the time your report is sent to you.

For more information on Plant Disease Diagnostics Clinic, please visit pddc.wisc.edu

2019 HAS BEEN COOL & WET

In Southern Wisconsin and adjoining areas this season is near-normal for heat accumulation. In Central and Northern Wisconsin cranberry growing areas the season is one of the coolest and wettest in 30 years. The graph plots the cumulative season trend, a straight line being average to date for the season, 2019 is in bold compared to the most extreme wet, dry, cool and warm seasons in the last 30 years at Marshfield Ag Research Station.

Growing Degree Days January 1-July 24, 2019

LOCATION	50°F	2018	NORMAL	40°F
Dubuque, IA	1751	1949	1644	2808
Lone Rock	1588	1742	—	2594
Beloit	1620	1701	1666	2632
Sullivan	1482	1593	1568	2445
Madison	1588	1696	1589	2602
Juneau	1420	1622	—	2363
Racine	1328	1464	—	2273
Waukesha	1446	1517	—	2407
Milwaukee	1378	1519	1462	2331
Hartford	1396	1563	—	2335
Appleton	1374	1637	—	2299
Green Bay	1329	1588	1400	2248
Bia Flats	1389	1647	—	2338
Hancock	1331	1528	1541	2257
Port Edwards	1327	1550	1506	2243
La Crosse	1532	1833	1739	2538
Eau Claire	1451	1742	1559	2399
Cumberland	1235	1437	1448	2085
Bayfield	1042	1239	—	1832
Wausau	1160	1407	1416	1998
Medford	1140	1360	1292	1969
Crivitz	1245	1472	—	2110
Crandon	1140	1333	1108	1950

Method: modified B50°F, sine B48°F, mod B50°F as of Jan 1, 2019.
Normals based on 30-year average daily temps, 1981-2010.

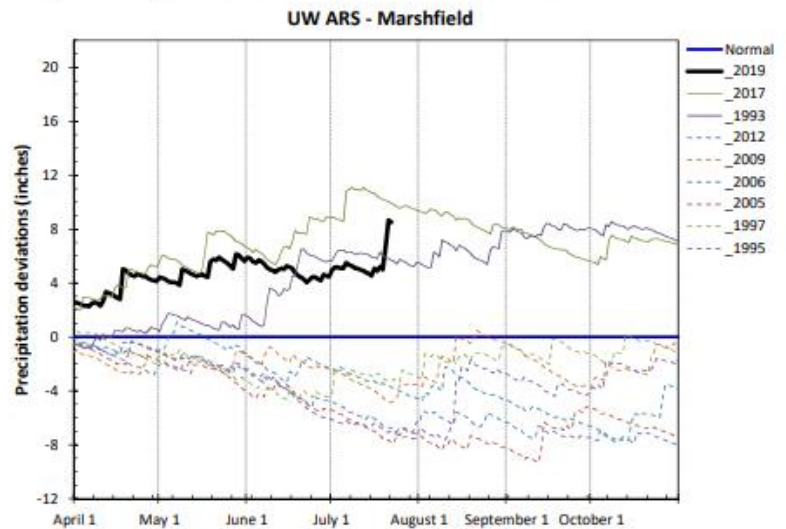
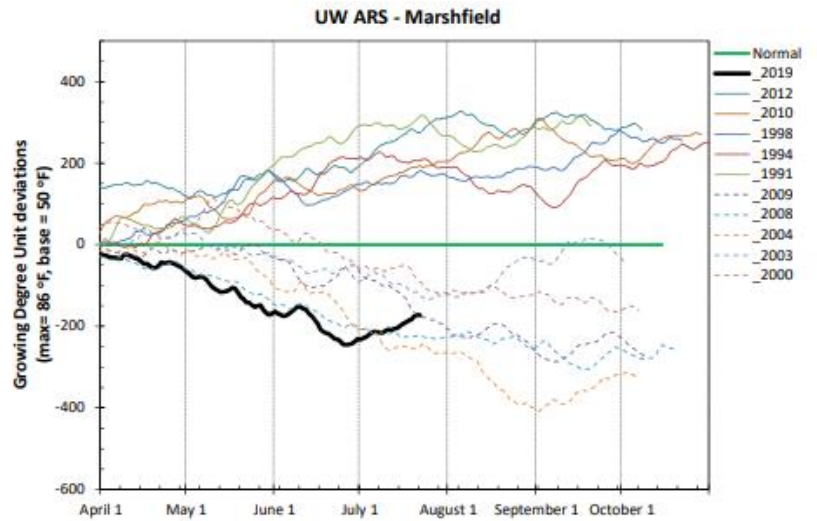


Figure 1. Courtesy of WI DATCP Pest Bulletin, July 25

Figure 2. Courtesy of Joe Lauer, UW- Agronomy

2019 WSCGA SUMMER FIELD DAY MINI-CLINICS SCHEDULE

Wednesday, August 14, 2019

DuBay Cranberry Co.

4040D County Hwy E | Junction City, WI 54443

- **9:15am—Overview of 2019 Growing Season**
Crop Consultants
- **9:45am—Mating Disruption, Lure Quality and use of nematodes for pest control**
Shawn Steffan and Elissa Chasen
- **10:05am—Plant Nutrition Guidelines for Management Decisions**
Amaya Atucha
- **10:30am—Trip to DuBay Pollinator Garden**
Dave Hansen and Christelle Guedot
- **11:00-1:00pm—Lunch**

FOND FAREWELL

Dear Cranberry Community,

By the time you read this, I will have retired from my 24-year career in fruit pathology at UW-Madison. Wow, has time flown by! When I started my job in 1995, it was all beaters and no harrows, Searles was still considered a respectable variety, and growers were proud of 200 barrels per acre. Fast forward to 2019. Kids who were in diapers when I started my job are now taking over the cranberry marsh from their parents. There are also a lot more women managing marshes and doing research and extension now than in the mid 1990s. It truly has been a privilege to have had a front row seat to observe so many exciting, positive changes in the industry. While I am relinquishing my front row seat, I stand by eager to see what will come next for the progressive cranberry industry.

I am extremely grateful for the support that the cranberry community has provided for my research and extension programs over the years. I will fondly remember the kindness and good humor shown in good times and bad, like when I buried a car to its axle, requiring the biggest truck in the county to pull me out. Regarding cranberry diseases, I know that I leave many important questions unanswered, but I am confident that the next generation of researchers will rise to the challenge.

In retirement I look forward to vacations without checking email or phone messages (for starters, sailing Lakes Michigan and Huron with my husband in August; visiting Ireland with my family in October), reading in bed on rainy mornings, and doing something about my home's 1961 bathrooms. After that, I'm not sure, but I suspect I won't be able to resist the beauty of a Wisconsin cranberry harvest.

I wish you all a safe and bountiful harvest this fall!

With warmest regards,

Patty McManus

WISCONSIN CRANBERRY RESEARCH STATION UPDATE

*by Wade Brockman
Wisconsin Cranberry Research Station*

Mother Nature finally gave me enough of a window to get the 16 acres planted at the research station.

We also helped Juan Zalapa plant his test plot vines on part of a 2 acre bed which he hopes to have filled by next year.

At this moment I don't have much bug pressure, so now it's on to fertilizing the new plantings and maintaining the new dikes.



GROWER UPDATES

GARDNER CRANBERRY

These last couple weeks, 7/8, 7/15 and 7/22 have been huge for us. We lost bloom and gained berry size very quickly.

All of our properties were busy with fertilizer applications as well as fruitworm sprays.

Our honey bees have been picked up on most of the properties.

A crazy storm hit most of our central marshes on 7/19 and 7/20 with an accumulation of about four inches of rainfall, no power and many trees down.

I did find the start of flea beetle feeding on weeds the week of 7/22. Some properties haven't had much history with flea beetle or tipworm, and may not need to control again.

July has flown by- harvest will be here before we know it!

Willow Eastling

RUSSELL REZIN & SON INC.

We have all been asked the question, "so what do cranberry growers do all year besides stand in water during harvest?" Well, the past few weeks would be a perfect response! It seemed that every 12-hour workday was being spent on applying fertilizer, then fungicide then back to fertilizer. Once the blossoms started falling, it seemed like we had blushing, marble sized fruit in the blink of an eye. With the combination of the fertilizer, hot days, and excess of storms, we have some lush vines and healthy looking fruit.

With the fruit setting, we said goodbye to our honeybees around the middle of July. With the slow start to spring/summer, we haven't seen as many native bumble bees as previous years, but there does seem to be an abundance of Monarch butterflies.

We are currently keeping a daily watch for flea beetle spots and any signs of fruit worm. We are also digging deeper ditches on last year's plantings and cleaning older ditches. We are crossing all our fingers and toes that the worst of the storms are behind us, and we can coast into harvest (a farmer can dream, right?).

Amber Bristow



References to products in this publication are for your convenience and are not an endorsement of one product over similar products. You are responsible for using pesticides according to the manufacturer's current label directions. Follow directions exactly to protect the environment and people from pesticide exposure. Failure to do so violates the law.

Extension Cranberry Specialists

Jed Colquhoun
Extension Fruit Crops Weed Scientist
1575 Linden Drive
Madison, WI 53706
(608) 852-4513
jed.colquhoun@wisc.edu

Patty McManus
Extension Fruit Crops Specialist & Plant Pathologist
319B Russell Labs
1630 Linden Drive
Madison WI 53706
(608) 265-2047
pmcmanus@wisc.edu

Christelle Guédot
Extension Fruit Crops Entomologist/ Pollination Ecologist
Department of Entomology
546 Russell Laboratories
1630 Linden Drive
Madison WI 53706
(608) 262-0899
guedot@wisc.edu

Amaya Atucha
Extension Fruit Crop Specialist
UW-Madison
297 Horticulture Building
1575 Linden Drive
Madison, WI 53706
(608) 262-6452
atucha@wisc.edu

Shawn Steffan
Research Entomologist
USDA-ARS
UW Madison, Department of Entomology
1630 Linden Drive
Madison, WI 53706-1598
(608) 262-1598
steffan2@wisc.edu

Juan E. Zalapa
Research Geneticist
299 Horticulture
1575 Linden Drive
USDA-ARS Vegetable Crops Research
Madison, WI 53706
(608) 890-3997