

Cranberry Crop Management Journal



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THE IMPORTANCE OF DEGREE DAY MODELING IN CRANBERRY

Elissa Chasen and Shawn Steffan
USDA-ARS and UW Entomology

In this section we will include information relevant to cranberry production. In particular, in each issue we will include information about the degree day accumulation for the cranberry plant and for *Sparganothis* fruitworm.

Degree days accumulate differently depending on your individual microclimate, so the best prediction will come from monitoring your own marsh temperatures and calculating degree days accordingly. However, this is of course often unrealistic, and the next best thing is to use weather data from nearby weather stations.

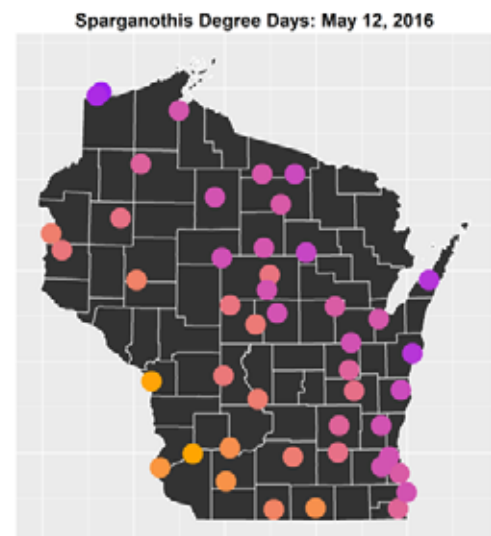
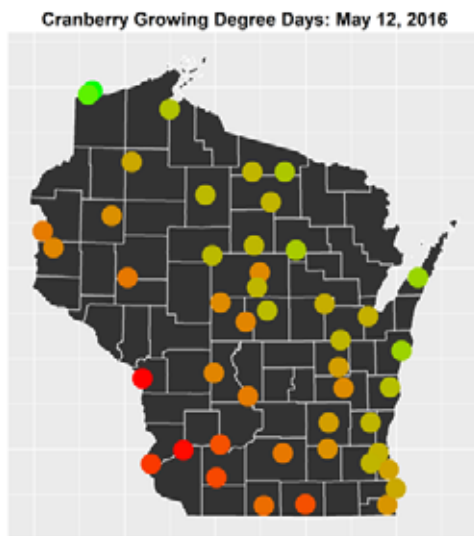
The maps below show degree day accumulations for cranberry plants and *Sparganothis* fruitworm across Wisconsin up through May 12, 2016. The weather data used for these degree day accumulations are retrieved from public weather stations and can vary from the degree-day accumulations specific to your marsh. Throughout WI, plant degree-days ranged from a low accumulation of 123 DD to a high of 666, while *Sparganothis* degree-days ranged from a low of 50 DD to a high of 311 DD.

ADDRESS CORRECTION

Contact us if you have any address corrections, additions, or deletions.

If you prefer to receive the CCMJ newsletter by e-mail, please call 715-421-8440 or e-mail mlippert@co.wood.wi.us

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COTTONBALL CONTROL

Patty McManus

UWEX Fruit Crops Specialist & Plant Pathologist

I've covered the topic of cottonball control in past newsletters, School Proceedings, and in an extension bulletin. Google "cottonball uw extension" and the first hit will likely be bulletin A3194, which describes the biology and management of cottonball. In those previous articles, I emphasized the importance of spraying during bloom and suggest that spraying during the shoot elongation stages is necessary only in serious cases. In this article, I will focus on the "serious cases" that require the early spring sprays in addition to bloom sprays.



The best products for cottonball control are the sterol demethylation inhibitor fungicides, also known as "group 3" fungicides: Tilt/Orbit, PropiMax (propiconazole), Indar (fenbuconazole), and Proline (prothioconazole). Of these, propiconazole and fenbuconazole are permitted during early shoot elongation, and to use Indar, you need to have the supplemental Indar label on hand (attached). Propiconazole and fenbuconazole are equal in performance, so I'd go with which ever is easier to use or cheaper. Cottonball spores are being released, and shoots are susceptible to infection when about 50% of shoots show 1/2" new growth, so that would be the time for the first spray. A second application can be made in 10-14 days (Indar label) or 14 days (Tilt/Orbit label). Then you need to wait until early bloom for the third spray, and full bloom for the fourth spray. Be sure to follow the spray intervals permitted on product labels. For the two bloom sprays, you could stick with Indar or Tilt/Orbit, or switch to Proline for one or both bloom sprays. The advantage of Proline is that it is really good on the other fruit rot pathogens, whereas Indar alone misses *Colletotrichum*, and Tilt/Orbit is also less effective. However, if fruit rot is not an issue, then it really doesn't matter which of these is used. Sprays for cottonball MUST go on during bloom. The cottonball fungus infects flowers, following the same path as germinating pollen grains. Unlike the other fruit rot pathogens, it does not infect young fruit.

Warning about the program outlined above: it involves four applications of fungicides in the same resistance group (group 3). Based on work we did in the late 1990s, I am not too worried about fungicide resistance developing if you use this four-spray program once every few years. But you should not use four sprays of group 3 fungicides for cottonball control year after year. If you need a four-spray program in consecutive years, then I'd suggest plugging in either Abound or Evito (group 7) during bloom. They are not as consistently good as the group 3 fungicides for cottonball control, but they are usually pretty good, and it will take some resistance selection pressure off the valuable group 3 fungicides.

Rates? I don't have much data on this, but in general, higher rates give better control of diseases, especially if there's a lot of new growth, such as we have during shoot elongation. The group 3 fungicides are all systemic, so wash off in rain/irrigation isn't a great worry, but when you get new growth, the fungicide gets diluted by the water in the new tissue.

Oso and Regalia, two softer fungicides covered in the last issue of CCMJ, have shown promise for cottonball control in some recent trials, but I'm not ready to enthusiastically recommend them for the "serious case" of cottonball.

Finally, when you harvest the crop, most, but not all cottonball berries get harvested as well, and that reduces the amount of fungus remaining to cause disease the following year. Additional fall or spring "trash" floods are recommended to clean up even more stray cottonball berries/mummies that escaped harvest.

Here is the link to the label for Indar: <http://www.cdms.net/ldat/ld7UB004.pdf>. The label is also printed on the next page for your reference.

Supplemental Labeling



Dow AgroSciences LLC

9330 Zionsville Road

Indianapolis, IN 46268-1054 USA

Indar[®] 2F

EPA Reg. No. 62719-416

Disease Control in Cranberry

ATTENTION

- It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
- This labeling must be in the possession of the user at the time of application.
- Read the label affixed to the container for Indar[®] 2F fungicide before applying. Carefully follow all precautionary statements and applicable use directions.
- Use of Indar 2F according to this supplemental labeling is subject to all use precautions and limitations imposed by the label affixed to the container for Indar 2F.

Directions for Use

Refer to product label for Indar 2F for Mixing and Application Instructions.

Apply aerially in a recommended minimum of 5 gallons of water per acre or by ground in a recommended minimum of 20 gallons of water per acre. For optimum disease control, it is recommended to use an agriculturally registered non-polymer non-ionic surfactant at the manufacturer's recommended rate.

Disease	Indar 2F (fl oz/acre)	Use Directions	Restrictions
cottonball tip blight (<i>Monilinia oxycocci</i>)	6 - 12 (0.094 – 0.188 lb active)	Begin applications when 50% of the shoots have begun to elongate. Refer to your local spray recommendation guides for more specific application timing information.	<ul style="list-style-type: none"> • Do not make more than 4 applications or apply more than 48 fl oz of Indar 2F (0.75 lb active) per acre per year. • Preharvest Interval: Do not apply within 30 days of harvest.
cranberry fruit rot complex (1)		Begin applications prior to bloom at the onset of disease. Continue on a 10- to 14-day spray schedule depending upon local conditions. Refer to your local recommendation guides for more specific application information.	

1. Cranberry fruit rot disease complex may contain one or more of the following fungal pathogens: *Allantophomopsis lycopodina*, *Botryosphaeria vaccinii*, *Coleophoma empetri*, *Diaporthe vaccinii*, *Glomerella cingulata-vaccinii*, *Godronia cassandrae*, *Phyllosticta vaccinii*, *Physalospora vaccinii*, *Colletotrichum* spp., *Phomopsis vaccinii* and *Strasseria geniculata*.

Resistance Management

Indar 2F belongs to the sterol demethylation inhibitor (DMI) class of fungicides or target site of action Group 3 fungicide. Since certain fungi can develop resistance to this class of products, the use of Indar 2F should be part of a resistance management strategy that includes alternation and/or mixing with fungicides of different target site of action. Consult your local or state agricultural authorities for resistance management strategies that are appropriate for your disease management program.

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Initial printing.

TIMING OF SPRING NITROGEN FERTILIZER APPLICATION

Amaya Atucha
UW Fruit Crop Specialist

Nitrogen is one of the 13 essential nutrients that all plants need to complete their growth cycle. Nitrogen is considered a macro nutrient because plants need it in relatively large amounts (compared to most other nutrients); it is a major component of amino acids, the basic unit of proteins, as well as part of the chlorophyll molecule.

The highest demand of nitrogen by cranberry vines is concentrated during 3 periods: early growth, fruit set, and bud set, which covers most of the growing season. During early growth there is rapid expansion of stems and leaves, and most of the nitrogen comes from reserves (in stems and old roots) rather than nitrogen uptake by roots. Research at UW-Madison during 2015 season has shown that there are very few new roots being produced by cranberry vines during the period from bud break to bloom, which means that cranberry vines are using reserve nitrogen from last season to support early growth. During fruit set nitrogen is in high demand when seeds and fruit flesh are developing, approximately 10-14 days after pollination, and after this period the demand for nitrogen by developing fruits declines substantially. However, flower buds for next year are starting to develop right after fruit set, and nitrogen is required for their formation. Still, excessive nitrogen during this period can lead to too much vegetative growth and a reduction in floral bud induction and differentiation.

Although cranberry vines need nitrogen through all the growth stages, the most critical period for fertilizer application is during early growth and fruit set. As we approach bud break and we plan our fertility program for this season take in consideration the following points:

- New white roots are responsible for nitrogen uptake, and recent research in Wisconsin shows the first flush of new roots in cranberries happens around bloom time.
- N fertilizer applied to the soil becomes plant available rapidly after application. If there are no new roots to uptake the N or soil temperature are too cool (less than 50F) for root activity, then N will be lost.
- When adjusting the rate of N fertilizer take into account last season's tissue N levels, N fertilizer applications, and growth of uprights, as well as sanding and pruning history.

“GENERIC” VERSIONS OF CALLISTO NOW AVAILABLE IN WISCONSIN CRANBERRIES

Jed Colquhoun
UWEX Fruit Crops Weed Scientist

“Generic” or “third-party” products with the same active ingredient (mesotrione) as the original product Callisto are now available for use in Wisconsin cranberries. According to Wisconsin DATCP, the following products have paid state registrations through the 2016 calendar year and include cranberries as an allowable use site, in addition to Callisto:

- Bellum (from Rotam North America)
- Explorer (from Syngenta Crop Protection)
- Incinerate (from Winfield Solutions)
- Sotrion (from Growmark)
- Willowood Mesotrione 4SC (from Willowood)

An important qualifier, though! These are recent changes, so make sure that the commercial label on the products allow use in cranberries. As always, the label is the law, so be sure to read it prior to use and follow it!

REVISITING THE INSECTICIDE CONFIRM

Christelle Guédot
University of Wisconsin, Entomology

Confirm 2F is not a new insecticide for cranberry. It has been registered on cranberry since the late 1990's. It is marketed by Gowan Company under the formulation 2F (2 lbs of active ingredient per gallon, Flowable). Confirm is an Insect Growth Regulator (IGR) with the active ingredient tebufenozide. It mimics the action of a natural insect hormone (20-hydroxyecdysone) that induces molting and metamorphosis in insects. It is highly active against most lepidopterous larvae by inducing premature lethal molt primarily after ingestion from treated crop surfaces. Larvae may take several days to die, but feeding generally ceases within 24 hrs of ingestion.

Confirm 2F is registered for control of blackheaded fireworm, sparganothis fruitworm, cranberry fruitworm, spanworms, blossom worm, gypsy moth, false armyworm, and spotted fireworm.

We have had Confirm 2F in our insecticide trials for about a decade now and it has shown great activity against sparganothis fruitworm, blackheaded fireworm, cranberry fruitworm and.

Confirm 2F may be applied by ground equipment, by chemigation, and by air (see label for specific application regulations). For ground applications, conventional ground sprayers need to be calibrated to deliver a minimum of 20 gallons per acre.

A chemical is considered toxic to bees if its toxicity (measured as the LD50 or Lethal Dose required to kill 50% of the test population) is below 11 µg/bee. Confirm 2F has an LD50 of 234µg/bee, thus it is not considered toxic to bees. In addition, research reports no effect on adult bees and low to no effect on bee brood and queens (Thompson et al. 2005. *Ecotoxicology* 14: 757-769). While Confirm is safe to spray during bloom, as a general rule, avoid spraying when the bees are actively foraging and concentrate your spraying earlier or later in the day.

Confirm 2F is toxic to aquatic invertebrates and must be kept out of water.

Restrictions on maximum residue limits may be applied by some handlers and you are encouraged to check with your handler before using this or any other product.

And as always, make sure to read the label before using any pesticide. Here is the link to the label of Confirm 2F: www.agrian.com/pdfs/Confirm_2F_Label4g.pdf

INSECTICIDE: CONFIRM

- Available as 2F (2 lbs. of Flowable = liquid AI per gallon; 23% AI)
- Restricted re-entry interval (**REI**): 4hours
- Pre-harvest interval (**PHI**) on cranberry: 30 days
- No more than 4 applications per season
- Do not exceed a total of 64 fl. oz. per acre per season
- Rate of use per acre: 16 fl. oz.

SPRING THOUGHTS AS WE START OUR GROWING SEASON

Jayne Sojka
Lady Bug IPM, LLC

The Cranberry Institute has sent out the 2016 Pesticide Charts so if you have not received one please contact John Wilson at jwilson@cranberryinstitute.org and ask for one. This chart is an awesome reference but keep in mind that it is NOT a replacement for the actual label. Let me point out again the gray shaded areas of your chart. This gray area should jump out at you saying, “Hey there IS a RESTRICTION on this product” please check with your own individual handler to find out exactly what it is.

As another reminder, the Worker Protection Standard (WPS) for Agricultural Pesticides is the LAW. Its’ purpose it to reduce the risk of employee exposure to pesticides. YOU are REQUIRED to:

- Display pesticide safety information in a central area.
- Train workers on general pesticide safety principles and document that training. Have employees sign and date a training documentation.
- Provide personal protective clothing and equipment to employees
- Provide a decontamination site (water, towels, soap, and clothing when necessary)
- Provide transportation to an emergency medical facility for employees who are poisoned
- Post and/or verbally tell all employees about pesticide applications.

When in doubt **Post, Post and Post!**

By the way Casoron is a pesticide as well as Round-Up. POST

- We have generic products for Callisto. Be careful when you purchase the product making sure it has Cranberry on the label and is for use in Wisconsin. Check the Agrian web site under the label search section for products that are available as that list is changing daily. The last time I searched Agrian’s website I discovered three products Bellum, Sotriion and Explorer.
- As you are cleaning up your shops and storage areas please make a mental note as to when the Clean Sweep Program is available in your specific County. Visit the WDATCP website (datcp.state.wi.us) and search for Clean Sweep. Do it soon so that you don’t miss the opportunity.

We have been out spot checking the early varieties looking at bud development as well as early insect hatch. After Friday May 6th with temperatures soaring above 80 degrees I expect to see more movement next week when we check again. So far we are finding early Black spanworm, Blueberry loopers, ½ wing loopers, and Blackheaded Fireworm (BHFw) but nothing was at economic levels. When there isn’t much to eat I truly believe that these early pests perish from starvation or FREEZE to death. Stay tuned as things happen fast in Wisconsin.

Happy Spring!

DEGREE DAY MODELING (CONTINUED FROM PAGE 1)

The table below allows for comparison of degree-days over the last three years. Plant stages at this level of DD accumulation are likely ranging from tight bud to cabbage head. Sparganothis flight does not begin until nearly 600 DD.

May 12	Cranberry Growing Degree Days			Sparganothis Degree Days		
	2014	2015	2016	2014	2015	2016
Central WI (Wisconsin Rapids)	320	566	498	128	278	219
Northern WI (Minocqua)	222	384	366	82	168	147

CRANBERRY JUICE CAN BOOST HEART HEALTH

Dennis O'Brien
ARS Office of Communications



Source: *AgResearch magazine*

Drinking two glasses of cranberry juice a day may lead to significant heart health benefits, according to a study led by Janet Novotny, an Agricultural Research Service (ARS) physiologist at the Beltsville [Maryland] Human Nutrition Research Center.

Novotny gave 56 people either low-calorie cranberry juice or a similar-tasting placebo twice a day, and after 8 weeks, she found that the juice lowered several risk factors for cardiovascular disease (CVD), diabetes, and stroke. The 30 women and 26 men were given the 8-ounce servings at breakfast and dinner in a double-blind study in which they ate only foods provided as part of the study. Diet

amounts were tailored so that no one gained or lost weight. Weekday breakfasts, dinners, and juice consumption were all supervised at the center, and lunches were packed for eating at home. Weekend meals were also packed for eating at home, and volunteers were required to return empty juice containers every Monday to encourage compliance.

The cranberry juice was sweetened with sucralose and had the same juice content (27 percent) and nutrients as most sugar-sweetened cranberry juice available in stores. The placebo was a flavor-matched, calorie-matched, artificially colored beverage.

The research was funded by Ocean Spray Cranberries Inc., and the company provided the juice, but it was not involved in conducting the study, the analysis, or interpretation of the results.

At the end of the 8-week feeding regimen, researchers measured levels of 22 indicators of “cardiometabolic risk” in the volunteers’ blood. Cardiometabolic risk is the combined risk of cardiovascular disease (CVD), diabetes, and stroke, which together are leading causes of death in the developed world. CVD alone causes 930,000 deaths in the United States each year. Risks of developing CVD, diabetes, and stroke can all be modified with diet and exercise.

The results showed that volunteers given the juice had lower levels of 5 of 22 risk factors compared to volunteers on the placebo. “Finding differences in 5 of 22 factors is a notable result,” Novotny says.

The effects included lower levels of triglycerides (8 percent), C-reactive protein (44 percent), diastolic blood pressure (3 percent), glucose (2 percent), and a health indicator known as “homeostasis model assessment of insulin resistance,” or HOMA-IR (3 percent). Triglycerides are type of fat in the blood, and high levels increase the risk of heart disease. Higher levels of C-reactive protein may be associated with increased risk of CVD. High blood pressure can lead to stroke and high glucose. HOMA-IR levels increase the risk of diabetes.

Previous studies have shown that cranberries are rich in the types of polyphenols (a group of chemicals found in plants) associated with a reduced risk of heart disease, diabetes, and stroke. But Novotny’s study is the first to show that cranberry juice confers such health benefits in a controlled-diet, double-blind, clinical trial, which is considered the gold standard in health and medical research.

ARS is the U.S. Department of Agriculture’s chief intramural scientific research agency.

Reprinted from the May 2016 issue of *AgResearch* magazine, a monthly magazine printed by the USDA.

Key Facts:

- Drinking cranberry juice may benefit heart health.
- Volunteers given cranberry juice had lower levels of several heart-related risk factors.
- This clinical trial showed cranberry juice’s heart-related health benefits.

GROWER UPDATES

Adams 73 Cranberry

The crew at Adams 73 is ready for some well deserved sleep. Between our day schedule and frost watch almost every night, we have been burning the candle at both ends.

The hard work has paid off though. We wrapped up our first rounds of grass herbicides, along with Callisto applications this week. With good weather and a little extra time on our hands, we were also able to get a application of sulphur on this past week also. Our motto for applying sulphur is "early and often". With an extremely high soil pH at Adams 73 we apply 500 pounds of sulphur per year. I like to have 250-300 pounds of sulphur applied prior to the bee's showing up in June.

With bud break and new growth starting to appear across the marsh, we will focus on Cal-Sul applications followed by a round of potash over the next week. A few less frost nights over the next week wouldn't hurt my feelings at all.

Happy Mothers Day to all the mom's reading this.

Jeff Hopkins

Adams 73 Cranberry

RETRACTION/CORRECTION ON FUNGICIDE UPDATE

Patty McManus

UWEX Fruit Crops Specialist & Plant Pathologist

In the last issue of CCMJ, I described a newer “soft” fungicide, Regalia, which has as its active ingredient extract of *Reynoutria sachalinensis*, giant knotweed. While the exact mode of action is not fully known, it is believed that Regalia turns on plant defenses. I went on to write that Regalia “provided good to very good control of fruit rot and cottonball in many trials, but then failed miserably in others.” In the interest of accuracy and fairness, I need to retract that statement. In fact, Regalia has performed very well in all four of the fruit rot trials in which we’ve included it and had good disease pressure, and it failed in just one of four cottonball trials. I apologize for the incorrect assessment published in the last issue.

Habelman Bros. Tunnel City

Temperatures have been fluctuating quite a bit. The vines are greening up and coming out of dormancy. The soil temperatures are averaging around 52 degrees. We need more warm nights. We are at 507 growing degree days thus far. Based on our growing degree days we are expecting to put the “bug flood” on in the near future. Pretty boring around here and not much to say. Go Brewers!!!

Steve Schoonover

Team Habelman

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.

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