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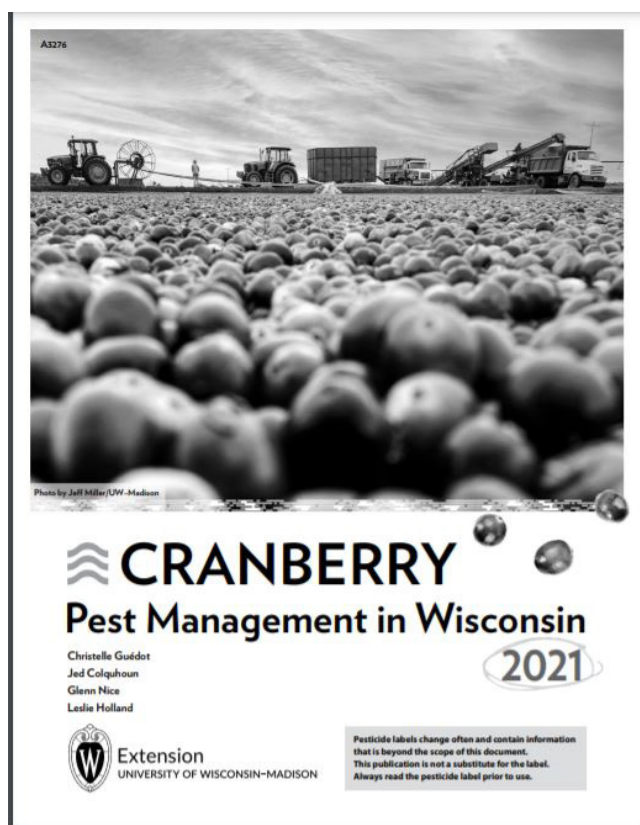
Cranberry Fungicide Update 2021

By *Leslie Holland*

This article provides some recent updates on fungicides currently registered for fungal disease control in cranberries. Specific usage instructions such as rates, timing, and precautions can be found on the fungicide labels, the 2021 Cranberry Pesticide Chart from the Cranberry Institute, and the 2021 Wisconsin Cranberry Pest Management Guide. Please make sure you have the most up-to-date versions of these documents and get rid of older versions. If you notice an inconsistency between the product label and the UW spray guide or Cranberry Institute chart, always follow the instructions on the label. Check with your handler about rule changes and restrictions. **REMEMBER**, the label is the law, read and follow the directions on the label.

Mancozeb (FRAC M5) - In cranberry, mancozeb offers broad-spectrum control against fruit rot pathogens (efficacy comparable to chlorothalonil), however mancozeb can result in reduced fruit color if applied during bloom and/or fruit set stages, critical application timing for fruit rot control. Announced at the end of 2020, the European Union will be conducting a risk based maximum residue limit (MRL) review of mancozeb. At this time, no decisions have been made regarding changes and/or withdrawal of the MRL. As more updates become available, I will share them here in the Cranberry Crop Management Journal.

Propiconazole (FRAC 3) - In cranberry, propiconazole is found as a stand-alone fungicide (ex. Orbit/Tilt) and in a pre-mixture (ex. Quilt Xcel is azoxystrobin + propiconazole). Propiconazole fungicide is an option for cottonball control in cranberry. However, UW field trials over the years have demonstrated that Indar (FRAC 3) is just as effective if not more effective at controlling cottonball than propiconazole fungicides. Recently, the European Union made the decision to withdraw the MRL for propiconazole, this will go into effect on September 2, 2021. Fortunately, due to the infrequent use of products containing propiconazole in Wisconsin marshes and the availability of other effective



control options for cottonball (i.e. Indar), this does not appear to be a major concern for Wisconsin cranberries.

What is FRAC?

The Fungicide Resistance Action Committee or FRAC works to prolong the effectiveness of fungicides prone to resistance issues and minimize crop losses in the event of resistance. A FRAC group is a number and/or letter combination used to distinguish different fungicides based on their mode of action.

Update from the Wisconsin Cranberry Research Station

By Wade Brockman

Just pulled the flood on Sunday and starting to frost protect everything. The Sundance and BGs were a couple weeks ahead of the Steven's.

Posting Pesticide Use

By Suzanne Arendt

TIPS TO PREVENT HUMAN EXPOSURE:

Please post area BEFORE you spray.

Please remove posts shortly after the REI is expired.

The EPA holds employer-owners responsible for correct posting. The Quick Reference Guide <http://pesticideresources.org/wps/hosted/quickrefguide.pdf> outlines the responsibilities of employer-owners and of the employee performing the work.

No matter when you think people outside your operation will be on your marsh, the LAW states that you must post each entrance to your property prior to certain pesticide applications. Notifying businesses that you know will be on your marsh is crucial to preventing unwanted exposures. Having a central posting area is extremely beneficial to all those who may enter property. Flip signs that go from Private Property to Danger Pesticide-Do Not Enter is a really easy way to accomplish entrance postings. Ensuring the safety of your employees, families and all those who enter your farm just makes good sense.



Please comply with the Worker Protection Standard for Agricultural Pesticides.

Watching For Leafhoppers This Spring and Summer

By *Christelle Guédot*

Leafhoppers are common insects throughout the landscape and several species may be found in cranberry, including the blunt nosed leafhopper (BNLH, figure 1), the sharp-nosed leafhopper, the cranberry vinehopper (Averill and Sylvia, 1998), and potato leafhoppers that may blow in with the wind from southern states. The primary concern with many species of leafhoppers, and particularly the BNLH in cranberry, is their ability to vector disease through feeding on sap from the phloem, usually on the underside of leaves.



Figure 1. Nymph (left) and adult (right) blunt nosed leafhopper. Photo credit: Elvira de Lange, Rutgers

As we discussed at the miniclinic, the BNLH is native to the Eastern US, including Wisconsin, feeds on Ericaceae, and is the only known vector to date of the phytoplasma responsible for the false blossom disease (FBD). Patty McManus discussed FBD in a previous issue of CCMJ (1) and in this publication (2). If you are interested in learning more about BNLH, see this publication from Rutgers University (3).

In general, leafhoppers (except for BNLH) do not warrant the use of an insecticide as their feeding does not, by itself, usually result in economic damage. According to the University of Maine, very high numbers of 100 to 200 leafhoppers per 25 sweeps have been reported to drain the water and sugar out of cranberry vines significantly.

When it comes to BNLH, the tentative thresholds established in New Jersey are 20 BNLH nymphs per sweep set in young beds, new varieties, and/or with FBD incidence or 40 BNLH nymphs per sweep set in older beds, older varieties, and no FBD incidence.

It is thus really important to monitor for the immature nymphs at prebloom and identify the nymphs to species to determine which threshold to use before implementing chemical controls. When it comes to identifying the nymphs, PJ Liesch at the UW-Madison Insect Diagnostic Lab, private scouts and Ocean Spray can help with identification.

It is recommended to monitor starting around mid-May using sweep nets. If you detect leafhoppers and reach one of the different thresholds discussed above for BNLH or other species, you should apply an insecticide at pre-bloom. The most efficacious insecticides for leafhoppers nymphs are the broad spectrum organophosphates (e.g., Lorsban, Orthene, Imidan, Diazinon), carbamates (e.g., Sevin), or pyrethroids (e.g., Danitol, though Danitol is not allowed this year by some handlers). Neonicotinoids are also efficacious against leafhopper nymphs but are not recommended prebloom as the active ingredients accumulate in nectar and pollen and can affect bees foraging on flowers. For organic growers, while we did not assess organically-approved insecticides against leafhoppers, Pyganic is likely to be the most efficacious pre-bloom.

After bloom in mid-July or so, you may start seeing adults in beds. For BNLH, there is only one generation per year. Eggs are laid in July-August and these eggs will be overwintering, so while targeting the adults is not the best option and insecticides tend not be as efficacious on adults, it may still be warranted to spray an insecticide if numbers are high. At that time, organophosphates, pyrethroids, and neonicotinoids (e.g., Venom) will provide some control and Pyganic for organic growers remains an option.

Happy growing season!

2021 Spring Mini-Clinic Recap

By Allison Jonjak

On April 13, 122 of you joined us for the annual WSCGA and UW-Madison Division of Extension Spring Mini-Clinic. Intended to kick off the growing season with research updates and tactical information, as well as to give growers a forum to discuss urgent questions, we were glad to have participation from all counties and all aspects of the cranberry industry.

For those who weren't able to virtually join us, a recap is offered here. If you would like to view the video, send a message to allison.jonjak@wisc.edu. Recordings are made and kept for grower access, so you can receive a personal link to watch the recording.

Jed Colquhoun-NR 151 on Nitrates and Groundwater

Jed Colquhoun is a member of the Technical Advisory Committee during the development of the DNR's proposed revisions to NR 151.

NR 151 establishes a goal for performance standards focused on water quality, and is coupled with ATCP 50, which outlines technical methods for achieving the goal. The proposed revisions will establish a targeted nitrate standard.

The rule is currently being put into draft form, and will open for public comment in summer 2021. We will encourage all growers to get involved in discussions during this public comment period, and WSCGA will offer more details as they become available.

Christelle Guédot-Leafhoppers and Early Scouting

Many growers have been asking questions about Blunt Nosed Leafhoppers as we begin the 2021 growing season. It is important to sweep net pre-bloom, in May and June, to check your nymph pressure. Many species of leafhopper are found in Wisconsin, and Blunt Nosed are not the most common—but they are important for cranberry growers to monitor, as they are the only known species to vector the pathogen of false blossom disease.

Telling the difference between Blunt Nosed Leafhoppers and other, more common, and non-disease-transmitting leafhoppers requires a microscope and lots of experience. Luckily Ocean Spray, Lady Bug IPM, Red Forest IPM, and UW-Madison Extension (via the Insect Diagnostic Lab, <https://insectlab.russell.wisc.edu/samples/>) are able to make these identifications. For control options, see Christelle's article in this issue of the CCMJ.

Allison Jonjak-Phenocams

New research spearheaded by Jyostna Devi Mura's lab for 2021 will give cranberry farmers precise foundational information that farmers from other crops have pioneered. Understanding the phenological progression of each popular variety, plus new varieties, through the growing season will help growers time nutrient applications and make more informed frost-protection decisions to exactly suit the varieties they grow.

Cameras, connected to affordable Raspberry Pi computers, will monitor upright status of many varieties throughout the 2021 season. Pilot systems were designed and trialed during part of 2020, so research can cover the full growing season for 2021.

Amaya Atucha-Anoxic Stress

All plants need oxygen for the process of respiration, which involves using sugars produced through photosynthesis plus oxygen to produce energy. Most of this oxygen enters the plants through the stomata in leaves, but also through lenticels in stems, or through diffusion in roots. When cranberry plants are flooded, oxygen may enter the plant through diffusion if the concentration of oxygen in the flood water is higher than inside the plant. However, when plants are submerged for an extended period of time, they will continue to respire and use the sugars they have stored and, in the process, consume oxygen. The combination of low levels of oxygen in the flood water plus the consumption of reserve sugars will cause substantial stress to the plants.

There are three critical factors when it comes to oxygen availability during a flood: the amount of dissolved oxygen and temperature of the water during the flood, and the length of time the water is held. Muddy water or water with lots of algae will have less available oxygen than clear water, when used for a flood. The colder the water temperature is, there will be less consumption of oxygen by the plants. (Think of a trout stream—colder water means more oxygen, and thus more and healthier trout.) Finally, as water is held across several days, the cranberry plants use the existing oxygen, and without turbulence, there's no way for new oxygen to be introduced. Keep floods short when temperatures are high or when your source water is cloudy to avoid anoxic stress.

Shawn Steffan-Nematode Spring Update

Work on the two native nematodes, *Oscheius onirici* and *Heterorhabditis georgiana*, will continue in 2021. These microscopic predators have been shown to kill several important cranberry pests, such as cranberry fruit worm and sparganothis fruit worm, without harming natural predators like spiders.

Work for 2021 will include tests against additional pests, including timing and monitoring for flea beetle and for CFW larvae; scaled-up production to enable full bed applications; and safe application so that nematodes arrive at the bed's soil ready to hunt prey.

A workshop will be hosted May 6, beginning at 1pm, by Shawn's student Brandon Gominho. The workshop will be hosted at a marsh in Warrens. Please email allison.jonjak@wisc.edu or contact Pam Verhulst to RSVP so we can give location information and have enough supplies available.

Pam Verhulst-Observations from the Field and Looking Ahead

Unseasonably warm weather the week before the Mini-Clinic was followed by colder than usual overnight temps, causing many growers to wonder about frost protection. Pam led a series of grower polls, using photos from the day before the mini-clinic, showing different varieties at different stages of bud progression about frost protection the for week of April 12 across Wisconsin's three growing regions.

The interactive polls generated lively discussion, and helped growers to understand what factors influence neighbors to protect or not protect, and, if protecting, whether to flood or irrigate.

Pam also discussed leafhoppers and early weeds, echoing Christelle Guédot's comments about early scouting and relying on assistance for identifying leafhoppers to the species level.

Leslie Holland-Fungicide Resistance and Lab Work

Indar and Abound are frequently used, economic, and effective fungicides. However, since we have no other FRAC groups in common use, there is concern that repeated use could result in fungicide

resistance over time. Leslie's lab will perform tests using spiral plate technology in 2021 to establish baseline sensitivities of different fruit rot pathogens. This work will support our fundamental understanding of fungicide efficacy and sensitivity, and help identify fungicide resistant isolates. Along with trials focused on assessing effectiveness of new chemistries and new biological controls, Leslie will focus on finding new tools that will allow functional group rotations so that Indar and Abound don't lose their efficacy.

Allison Jonjak-Field Trials for 2021

Following the retirement of Jack Perry, Allison will be conducting field trials to assist the specialists' inquiries into the best products, timings, and management controls to produce profitable cranberry crops. This year, three trials will be done in the pathology realm, three trials in the entomology realm, and three trials in the weed science realm.

Disease trials will include:

1. Candidate Fungicides for Fruit Rot at early bloom and late bloom.
 - 9 chemistries, Indar+Abound, control to broaden FRAC groups
2. Reduced Risk/Biologicals for Fruit Rot at early bloom and late bloom.
 - 4 products, Indar+Abound, control to explore biologicals & organics
3. Use Patterns for Fruit Rot at 20% bloom and 80% bloom, vs 1 at 50% bloom.
 - 3 chemistries, Indar+Abound, control to explore differences in control at different spray timings. Will be tested on newer varieties.

Insect trials will include:

1. Leaf Hopper trials pre-bloom (nymph) and post-bloom (adult).
 - 8 chemistries, control to ensure control against new-old pest
 - Observing: insects in sweeps at 7, 14, and 21 days after application
2. Flea Beetle Adult Trials
 - 8 chemistries, control to explore reg & non-reg chemistries
 - Observing: FB in sweeps at 3, 7, and 10 days after application
3. Degree Day Model targeting egg hatch of Sparg & Cran Fruit Worm.
 - Spray timing: Altacor at 10%, 25%, and 40% sparganothis hatch
 - Spray timing: Altacor at 10%, 25%, and 40% cranberry fruit worm hatch
 - Observing: insects in sweeps at 7, 14, and 21 days after application

Weed science trials will include:

1. Pre-Emerge Herbicides pre and post bloom.
 - 3 experimental herbicides to establish crop safety & spectrum of control and tank-mixed growth regulators to trick weeds into growing when herbicides are present
 - Observing: visual eval of weed control, crop injury, yield, and quality
2. Post-Emerge Herbicide
 - broadleaf active with grass/sedge/rush tank mix to refine rates and timings
 - Observing: visual eval of weed control, crop injury, yield, and quality
3. Plant Growth Regulators
 - commercially available but not reg. for cranberry, naturally occurring hormones to close canopy faster after renovations
 - Observing: vine length; canopy cover (digital measurement)

Actionable Information

At the end of the mini-clinic, 18% of respondents reported learning 6 or more things, 93% learned 2 or more things, with all respondents learning at least 1 thing. 53% of respondents will use something they learned immediately, and 47% will use something they learned over the course of the growing season.

Grower Updates

Flying Dollar Cranberry

By Seth Rice

Another year means another opportunity for us to grow another crop of the Wisconsin state fruit! As we start to see the vines turn gradually from their deep purple color to green and the buds start to wake up and swell, so does the cold nights of frost watch start. Everybody is always hoping for cloudy nights and warm south winds, but usually get cold and clear calm nights and that always ends up with being woke up to our frost alarms telling us to start the pumps.

After getting the irrigation systems up and running we always seem to find out just what Mother Nature has in store for us to fix what frost damage is done to the marsh. Most years we can get away with little stuff out of place but sometimes you can find out that it can be much more. Frost can cause tubes to wash out and move them out of place. Mainline that runs from your pump to your pipe that actually does the frost protection can be cracked or split. Over time, I'm learning that nothing is safe from the grasp of the awesome power of Mother Nature. You know it's spring in Wisconsin when one day it's sunny and 75 degrees and the next it snows on you. That's what a lot of us woke up to early to mid April.

Overall it's we are looking forward to this year's crop and are looking to always apply what we learned from years of experience to improve our stewardship. Take care and good luck everybody!

Cranberry Lake

By Karl Pippenger

Most growers in northern Wisconsin flooded for a good portion of late April as temps were in the single digits and low teens a few nights. Growers are just beginning to protect with irrigation, starting pumps anywhere from 26 to 32, depending on variety. Sedge and grasses are greening up, beggarstick is emerging in areas of thin canopy. Granular herbicides will likely start early next week. Buds on Stevens are still tight, a small percent of hybrid buds are greening up and moving.

