

# CRANBERRY CROP MANAGEMENT JOURNAL

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## Stresses Can Stack: A Cranberry Case Study

*By Allison Jonjak*

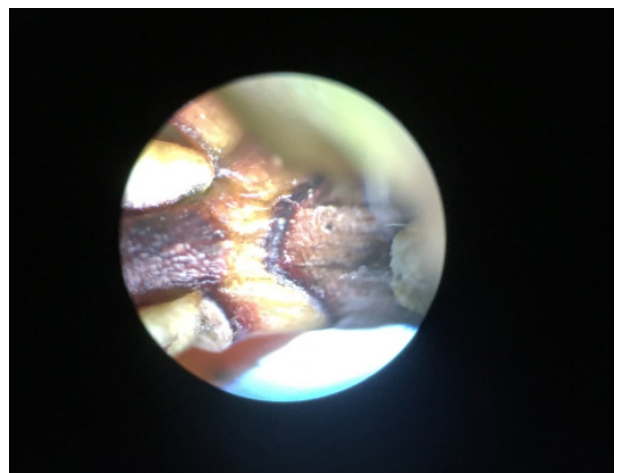
Agronomy is extremely local—but often a common thread connects one problem to another. I got to help a grower solve a ‘new growth death mystery’ recently, and since the outcome carries lessons that might be useful to all of us, he allowed me to share the story with you.



You have flooded four times this spring: for trash removal, frost protection, and finally a frost/bug flood on May 29-June 1. Your vines had progressed out of dormancy nicely, and new growth on the uprights was right on schedule—but as you lowered your bug flood, you see your new growth has dried up and died in the downwind corner. What happened? How do we recover?



The damage we see is very uniform and very complete. All the new growth in this section has died. Taking some upright samples under the microscope at home, you can see necrotic tissue continues right up to the “scar”, which is the delineation between last year’s growth and this year’s growth. So everything tender died, and everything hardy survived.



The obvious straight line and location of the damaged patch makes us pretty certain that this isn’t an application issue—checking chemical and fertilizer history confirms that. These Mullica Queens were planted in 2011, and were sanded in 2013, 2014, and 2015—but not since.

We know a few things before we arrive at the bed. Being under water is stressful for a growing plant. Being too hot is stressful, too, and shallow water warms quickly. This bug flood saw daytime temperatures at 70F with no clouds, which means several degrees warmer in the water. So we know the vines were stressed by lack of air, and by heat—but why did the majority of the bed come out

fine, and the downwind corner die? Was there floating trash during the flood, that also prevented the vines from catching sunlight?

When we got to the bed, we found something fairly dramatic that we hadn't predicted. When I went to take a root sample—the whole plant came up in my hand with almost no effort. We checked around throughout the area with death, and the healthy area, and we found that the areas with death all came up entirely too easily. In the healthy areas, the roots anchored the vines as usual.

Poking into the soil where the plant had come from, I found several inches of accumulated leaves. It was easy to understand why the roots didn't "hold on" to anything—they were basically in a cranberry leaf trash substrate. Amaya phrased it "it's almost like they were hydroponic".

Consider the difficulty of growing hydroponic plants—you have to keep a very consistent nutrient supply, temperature, pH, everything. A plant's root system and its interactions with the soil often work like a buffer when the plant experiences stressful conditions. Even when air temperatures are too hot, a plant can survive without losing yield if it has a strong root system and a cool soil temperature. (Good soil temperature is maintained by a good canopy, good soil moisture, and, ironically enough, SOME residue from prior crops). With no root/soil interaction to buffer for over or under supply, these cranberry plants needed to be spoon fed and maintained in a perfect band.

Diagnosis:

We were stressing the vines in several ways. Being underwater once they're out of dormancy is a stress. Being hot (and being in standing water on a sunny day gets hot) is a stress. Having sunlight blocked by leaf trash prevents photosynthesis to provide quick energy for sustaining life is a stress. And while the vines throughout most of the bed had strong roots and the ability to withstand a bit more stress—our vines in the trashy corner of the bed, where the roots had no soil to anchor them—couldn't live to fight another day.

Best path to recovery:

-Improve root growth. I believe the best path to this is sanding, and I would go further into the bed than the crisp line where we saw the damage, since I assume there is more leaf trash than usual throughout the leeward side of the large bed. Sanding the entire bed should be a priority.

-Minimize other stresses to these vines. For herbicide apps the rest of this year, skip the damaged area. I would turn off the 2021 Casoron here. When harvesting, get the water off of that bed as quickly as possible. Also if you can suction off leaves a few times that might be a benefit.

We do have a happy ending—in addition to finding out the cause so we can protect them better in the future, the vines have new growth recovering:



# Consider Buying Harvest PPE Now

*By Allison Jonjak*

We are lucky that we work outdoors to feed our community, our country, and our world—so PPE for a respiratory pandemic may not be on your radar yet. But because of global supply chains, it might be wise to consider your harvest needs now.

In September, schools and universities will be reopening, and mandating mask usage. (See University of Wisconsin's Smart Restart plan as an example.) While global mask production has caught up to use for medical professionals, the new demands from the education sector might be another strain on supply.

I don't know yet whether supplying masks for your harvest crew will be legally required, or whether it may simply be a good idea for keeping your crew healthy when they need to work in close quarters. But if you intend to supply masks during harvest, you might want to consider buying them now.

There are 3 principle kinds of face coverings.

- cloth or homemade face coverings deflect sneezes and exhalation so that most flugge droplets don't leave the mask. Washable and reusable. My mom ran many A-B tests, so if you are interested in making your own, I can give you the template she uses, for each of the 3 head sizes in our family.
- OR masks (operating room masks / surgical masks) deflect sneezes and exhalation, and filter out large particles and protect against droplets and splashes. Disposable.
- N95 and KN95 masks (respirators) provide filtration of 95% of large and small particles, in addition to deflecting sneezes and exhalation. They are intended to be disposable, but research is being done to see if they can be reused, for example after resting in a closed paper bag for 10 days. N95 is the American standard, and KN95 is an international standard. While regulations (for example hospital policy) may require one kind or the other for employees, the air filtration is equivalent.

Note: 'easy-breathe' masks with an exhale valve do not protect people other than the wearer. We recommend against using these.

Extension does not recommend any one brand or supplier over another. I do want to let you know about two suppliers I have used personally.

Armbrust are designed and manufactured in the USA. They are still ramping up production so they have limited styles, but their wait times have been accurate so far. Genesee Scientific is a supplier I've used for various lab supplies, and their KN95 masks have shipped quickly and are available in large quantities. Gempler's has KN95s in stock as well, and they've always been great to work with.

In case supply is under pressure in the fall—if you expect to provide masks to your harvest workers, whether by regulation or in the interest of safety—you may want to buy that PPE now.

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## Update from the Wisconsin Cranberry Research Station

*By Wade Brockman*

The weather has really helped this year's new plantings take off. Starting to put small ditches in and shape the dikes. Hopefully there are no torrential rains with the storms coming.

# Hungry Nematodes in Wisconsin Cranberry Marshes

By Shawn Steffan and Pam Verhulst

The native Wisconsin nematode species, *Oscheius onirici* (pronounced OSS-key-us on-a-REACH-ē), also known as just “Oskie,” is a highly virulent bio-control agent for control of cranberry pests of all kinds. This nematode was originally found in the wild marshlands of central Wisconsin, and it kills everything we’ve thrown at it. To-date, any insect we’ve screened against Oskie has been killed. Importantly, the nematode readily kills flea beetle, sparg, and girdler larvae. It also kills white grubs, various caterpillars, fruit flies, and mosquitoes.



The way the nematode kills is by entering the host insect through the various openings in the insect larva’s body. Then the nematode deploys its payload, which is a mass of bacteria. The bacteria then start a massive infection, killing the insect. The bacteria continue to propagate and basically liquify the insides of the insect cadaver. This liquified, bacteria-rich goo is the nematode’s favorite food. Literally, the nematode “farms” the bacteria within the body of the insect, and when the insect is dead and the bacteria have eaten the insides of the cadaver, the nematodes squirm through and eat up the bacteria. The nematodes turn a few generations within the cadaver and then emerge to hunt new insect hosts. In the past, we’ve seen 60+% mortality of flea beetles in August, following a nematode soil-soak in late June. So, this native WI animal represents a promising bio-control agent—it’s a broad-spectrum bio-insecticide. A slurry of the nematodes can be thrown into the spray tank and applied through a boom-sprayer system.

A Citizen Science project has been initiated in which growers and pest management consultants are working on a new, viable way to mass-propagate the nematodes. This work has been spearheaded by Pam Verhulst, of LadyBug IPM.

It’s easy to grow hundreds of thousands of nematodes on the countertop, but it’s a very different proposition to grow hundreds of millions. It’s also difficult to store and transport the nematodes without seeing significant mortality. The nematodes like to live in the soil, and they are killed easily in the sunlight or when they dry up. So, we need to get them from the fermentation tank to the soil without causing them much trauma. That has been very difficult. Our mass-propagation system is still in development, as described by Pam below:

We have come a long way from a seeing our very first nematode under the microscope to having too many to count!

To start our populations Shawn left each of us with a small vial of infected mealworms. From that we separated them into petri dishes and waited. Only a couple of the petri dishes were able to produce more nematodes. Shawn sent each of us more vials full of mealworms and nematodes. We learned a few lessons on how to better package vials with live nematodes and the cooperators finally received some viable samples. Those were separated into petri dishes as well.

One of the goals of this project was to develop a rearing technique that could work for the “average grower”. A grower that is busy with planting, frost protecting and everyday marsh life. All 4 Cooperators dove into the rearing, taking notes as we went. Some populations died and some survived.

For Lady Bug IPM our first Nematode boom application went on BL vines on June 22. The vines were around 30-35% in bloom. We were able to harvest around 3.5 million nematodes for the 2 acre section. The grower cooperater, FMS Wood U prepared their boom by removing the screens/filters and nozzles. They irrigated the application site for 1 hour, applied with the boom then irrigation the site for another 2 hours. The application was made at 10 pm to avoid the sun's UV rays (that could kill the nematodes) and while it was still warm (Soil temp 52 degrees). One of the growers collected the nematode water mixture that came out of the boom and we examined it under a microscope the next morning. We were thrilled to see the nematodes made it through alive!

One week later we did a second harvest for a supplemental application of just under 500,000 nematodes. The smaller harvest was applied 7/3 with watering cans just before the sun came up in the morning. WoodU irrigated for 30 mins, applied the nematodes and followed the applications with 2.5 hours of irrigation. Plans for a final harvest and adding a two species nematode harvest from Shawn Steffan are for the second week in July.



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## New Reduced Risk Insecticide, Verdepryn

*By Christelle Guédot*

Verdepryn is a new insecticide registered for use in Wisconsin on several crops including pome fruit, grape, berries and small fruit, which include cranberry. It was registered in late 2019 and available for use starting this summer 2020. It is marketed by SummitAgroUSA™ under the formulation 100SL (100 grams of active ingredient per liter as a Soluble Liquid concentrate). Verdepryn, similar to Altacor and Exirel, is in the class of the anthranilic diamides (IRAC group 28), with a mode of action targeting the insect ryanodine receptors in the muscles, causing an uncontrolled release of calcium in the cells. Verdepryn contains the active ingredient cyclaniliprole. Verdepryn is an insecticide with foliar activity that is fast acting on contact or by ingestion of treated plant surfaces. Affected insects will rapidly stop

feeding, become paralyzed, and eventually die. Verdepryn will kill both larvae and adults and has broad spectrum activity on many insect species. Verdepryn, Exirel and Altacor have the same mode of action and should NOT be used together in rotation to delay insecticide resistance, but rather insecticides from other IRAC groups (other than IRAC group 28) should be used in rotation with Verdepryn.

Under Berries and small fruits where cranberry is under, Verdepryn is registered to control a long list of insects and we are working with the company to add more cranberry insects to the label. As the label stands, for pests in Wisconsin cranberry specifically, it is registered for control of cranberry fruitworm and Japanese beetle, and suppression of tipworm (aka blueberry gall midge on the label). We have included this product in Jack Perry's trials for about five years now and have found it to provide great control of our lepidopteran pests, including cranberry fruitworm, sparganothis fruitworm, blackheaded fireworm, the spanworm common Eupithecia, as well as flea beetle. Our trials did not show efficacy of Verdepryn against tipworm, similar to other diamides such as Altacor and Exirel, and the label lists suppression only for tipworm, so we do not recommend using it for tipworm. Overall, Verdepryn performs similar to Altacor and Exirel, and could be used to replace an application of Altacor or Exirel.

Verdepryn may be applied by ground equipment, chemigation, sprinkler irrigation and air. Spray volumes ranging from 20 to 100 gallons per acre for dilute sprays and 5 to 10 gallons for concentrate ground foliar applications are recommended. For more information on mixing and spraying, and all other considerations, please see the product label.

Verdepryn is highly toxic to bees exposed to direct treatment or residues on blooming plants. Do not apply Verdepryn when bees are foraging and until flowering is complete. Verdepryn is toxic to aquatic invertebrates and oysters and must not be applied directly to water.

Please check with your handlers before using a new product as PHI may vary from the one stated in the label. For example, in 2019, Ocean Spray had a 50-day PHI for Exirel on domestic as well as export processed and fresh fruit, which was different from the 3-day PHI stated in the label.

As always, make sure to read the label before using any pesticide. You can find the label of Verdepryn at the following link: <http://www.cdms.net/ldat/ldEDF000.pdf>

Happy growing season!

Insecticide: Verdepryn

Available as 100SL (100 grams of AI per liter, Soluble Liquid)

Restricted re-entry interval (REI): 4hrs

Pre-harvest interval (PHI): 1 day\*

No more than 3 applications per year

Do not exceed a total of 0.22 lb AI (33 fl. oz.) per acre per year

Rate of use per acre: 8.2 - 11 fl. oz.

Minimum interval between applications is 5 days

# Observations from the Field

*By Pam Verhulst*

In 2019 Cranmoor's Stevens (ST) were peak bloom by the 4th of July. This year (2020) Cranmoor's ST are 50% out of bloom. The recent warm weather had the vines progressing 10% a day. The Plainfield area will be reaching 50% out of bloom on their ST a few days after July 4th. The Tomah area is much further along reaching 50% out of bloom on most of their ST by July 1st. The Hybrids in all areas are coming out of bloom fast with fruit setting.

Everyone wants to know what the crop potential looks like and each year my answer is the same. Some people look amazing and others not so much.

First the bad, we have major "black frost/ dew point frost" damage across the growing regions. The weekend of June 12-14 growers experienced bizarre temperature fluctuations. Many growers explained how their frost alarms went off (or did not) but as they checked the temperatures the numbers increased rapidly. This is a learning opportunity for the industry to continue to use all the tools around you, especially the "old school" ways.

More than one grower shared that they were on the fence but simply feeling the vines helped them make the decision to start protecting. Dry vines translates to low dew point. The plants are more vulnerable to frost the lower the dew point is. The severity of the damage ranges from only leaf margins, new vegetative growth completely damaged and hooks damaged. In general, the stems are still green and viable and the plants will recover with a reduced crop.

Moving forward, growers will have to fertilize appropriately depending on their crop potential. Now for the good, we have had amazing growing and pollinating weather. 80-90 degrees F are not ideal for humans, but the plants and bees have been responding positively.

Our scouts and I have been conducting WiBee observations and we are shocked to see over 100 flower visits in a 3X3' area in 5 mins. All the potential is there-we will see if growers can manage the emerging pinheads and peas to carry through to harvest.



# Grower Updates

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## Flying Dollar Cranberry

*By Seth Rice*

Hot Hot Hot! As if this time of year is not already busy enough. While our early varieties are getting more fruit on them and with most of the crop following. We will be saying goodbye and see you next year to our honey bees.

As always we try to get our fungicides on in time and deal with some pest as well right now. We sure getting a lot of seat time in the tractor I'm the boom between or wet and dry applications. Stay safe everybody!

## Gardner Cranberry

*By Willow Eastling*

I hope everyone had a great holiday weekend!

We are moving out of bloom fast! We are busy with fruitworm and fertilizer applications.

As of 7/6, we have a wide range of % out's and everyday it changes with good pollination and this heat.

The crews are juggling irrigating, mowing and ditching in between boom applications.

We are enjoying the combination of bumblebees and honeybees, they make a great team!

God Bless America!

