

# CRANBERRY CROP MANAGEMENT JOURNAL

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## Red-Headed Flea Beetle

By *Christelle Guédot and Hanna McIntosh*

The red-headed flea beetle (RHFB), *Systema frontalis*, also known as the cranberry flea beetle has been emerging in the last week. RHFB is native to the United States with a range from Maine to Florida to Texas and Montana. It is an important pest in nurseries, greenhouses and agricultural crops, including cranberry and, in the last decade or so, it has become more of a problem in these systems.

In cranberry, RHFB larvae feed on cranberry roots and adults feed on foliage and occasionally fruit. RHFB has likely always been present in cranberry marshes in Wisconsin but was probably historically controlled by broad-spectrum insecticides. The pest is now reappearing in higher numbers, which we suspect is due to the use of more selective insecticides.

**Appearance.** Adult RHFB are shiny, black beetles with a reddish head. They are about 1/10" - 1/4" long with antennae nearly half as long as their body and enlarged hind legs used for jumping when disturbed. Adult females are slightly larger than males. Larvae are 1/5" - 1/4" long with a fleshy projection at the tip of the last abdominal segment.

**Life Cycle.** Female RHFB deposit single eggs into the soil in late summer to early fall. RHFB overwinters in the egg stage which requires a cold period for optimal egg hatch. In the laboratory optimal hatch occurs following a 15-week period at 41 °F (Jaffe et al. 2021). Eggs are found predominantly at 15-30 cm from the soil surface (Jaffe et al. 2021). Eggs will hatch into white larvae in the spring and larvae will develop through three instars before pupating approximately three weeks later. Larvae feed on roots from June through August in Wisconsin. RHFB pupae have not been formally described but are likely present in Wisconsin from late June to early August. Adults begin to emerge in early to mid-July and are present through September in Wisconsin. There is one generation of RHFB per year in Wisconsin.



Cranberry flea beetle adult. Photo courtesy of Maryland Biodiversity Project, Rutgers University.

**Host Range.** RHFB is an occasional pest of cranberry and is also found on cranberry weeds including marsh St. John's wort, Joe-pye weed, smartweed, jewelweed, and hardhack. Overall, it has a very broad host range of over 50 plant species that include many woody and herbaceous plants. RHFB is shown to prefer feeding on weeds near cranberry beds but will switch to feeding on cranberry foliage and sometimes fruits if weeds aren't present or are mowed. RHFB is also an occasional pest of other commercial crops, including alfalfa, beans, beets, blueberries, cruciferous vegetables, eggplant, horseradish, potato, grapes, and sweet potatoes.



**Cranberry flea beetle larvae.** Note the fleshy projection on the last abdominal segment of the larvae (white arrow). Photo courtesy of Maryland Biodiversity Project, Rutgers University.

**Symptoms and Effects.** RHFB larvae feed on plant roots and underground cranberry runners. Severe infestations can cause girdled roots and vine death. Adults feed on the upper and lower surface of foliage, skeletonizing leaves, and may also feed on the surface of cranberry fruit. The skeletonization of leaves leads to the leaf browning, which may result in the individual uprights dying. Heavy feeding can impact bud development and yield in the following year. Since adults prefer areas of lush growth, adult RHFB populations and damage are usually patchy. Adults prefer feeding on new leaves rather than older mature leaves (Jaffe et al. 2021).



**Foliar (left), root (center), and skeletonization (right) damage from cranberry flea beetle.** Photos courtesy of Daniel L. Mahr, University of Wisconsin - Madison.

**Scouting.** Monitoring for RHFB focuses on adult beetles, since finding larvae in the soil is difficult. Sweep nets can be used to monitor for RHFB adults, but it is important to sample thoroughly across different areas to account for the patchiness of adult infestation. There is no firm action threshold for RHFB in cranberry due to how patchy infestations can be. However, it is recommended to take action if you find more than ~15 RHFB per 20 sweeps averaged across representative areas of a cranberry bed.

**Control.** If sweep net samples yield enough adult beetles to warrant an insecticide spray, there are several products that are effective against RHFB adults.



**Cranberry flea beetle adults captured in a sweep net.** Photo courtesy of University of Maine.

These include neonicotinoids (such as thiamethoxam, acetamiprid, dinotefuran, imidacloprid), diamides (such as chlorantraniliprole, cyantraniliprole) spinosyns (such as spinetoram, spinosad), pyrethroids (such as bifenthrin, fenpropathrin),

organophosphates (such as phosmet, diazinon) and carbamates (such as carbaryl). Soil chemical applications targeting the larvae have been tested but were not very successful with the products allowed around bloom time. Please check with your handlers before using a new product as handlers may have restrictions on certain products for domestic and/or foreign markets. Handlers may extend PHIs beyond the number of days stated on the label to reduce residues, so please always check with your handler. And as always, make sure to read the labels before using any pesticide.

As always, it is recommended to rotate chemical classes to delay insecticide resistance, and to consider the effects on non-target and beneficial insects. Please check the Cranberry Pest Management in Wisconsin Guide A3276 for full product recommendations.

Little work has been done to develop alternative management strategies for RHFB. Since RHFB tends to prefer some weed species, trap crops could be effective but may be difficult to implement in cranberry. Biocontrol may be a promising way to control RHFB larvae and research from UW-Madison showed that native Wisconsin entomopathogenic nematodes significantly reduced RHFB populations in small scale experiments (Foye, 2019). Since RHFB is an emerging pest, there is still little information regarding other natural enemies that may help control the pest.

Happy growing season!

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## Beneficial Soil Bacteria - Role in Agriculture

By Jessica Rohde and Jyostna Mura

Microbes such as bacteria, archaea, and fungi naturally occur in every soil. These microbes perform many different roles vital to the soils, from breaking down organic matter to helping with plant growth. Soil bacteria have been used to improve crop production for many years. The primary function of these beneficial bacteria is to decompose organic matter, provide nutrients to crops, produce hormones to enhance plant growth, improve soil structure, recycle soil nutrients, etc. Healthy populations of beneficial bacteria can help to suppress pathogens and pests, promote plant growth, and increase yield. Some of these beneficial soil bacteria include:

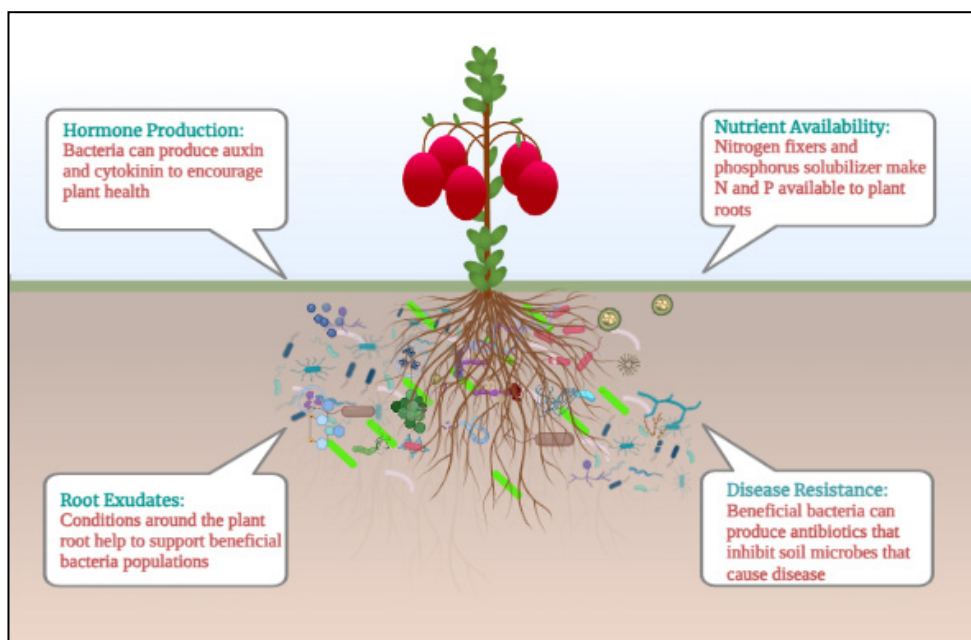


Illustration of role of beneficial microbes in cranberry production

**Nitrogen fixers** obtain assimilable N for plants, which plants cannot do themselves. They can pull nitrogen from the atmosphere and into the soils primarily as ammonia that plants can use.

**Plant growth-promoting rhizobacteria** produce hormones, vitamins, and growth factors that enhance plant growth and increase yield. They promote soil bioremediation and protect from abiotic stresses and diseases.

**Phosphorus solubilizers** make phosphorus more available to the roots and even produce synthetic plant hormones to promote healthy root growth. Bacteria that solubilize phosphorus can help to manage phosphorus in soils. Phosphorus that is applied in a form useable by crops can become quickly bound to soil particles and immobilized in a form that is unavailable to roots. Phosphorus solubilizing bacteria can help to mobilize the phosphorus that has been bound to soil particles, making it readily useable. Additionally, this could be a more ecologically sound management practice as phosphorus fertilizers can contribute to algae blooms.

Biological approaches are becoming more popular as a supplement to chemical fertilizers for increasing crop yield in an integrated plant nutrient management system. We have isolated more than 50 potentially beneficial strains that can be nitrogen fixers, plant growth promoting, and phosphorus solubilizing bacteria from cranberry soils, rhizosphere (soil around roots), and roots around the state. We are testing these bacteria and identifying their role in cranberry growth and yield to improve cranberry production sustainably.

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## Evaluating An Unusual After-Flood Residue

*By Allison Jonjak and Ethan Lehman*

After winter floods were drawn down this spring, a handful of marshes in a similar geographic area found an unfamiliar residue clinging to their cranberry vines. The residue did not wash off with rainfall or with sprinkler irrigation, but rubbing it firmly with a fingertip was enough to remove it. The residue was present on cranberry vines as well as on perennial weeds, and vegetation at ditch edges.

Growers seeing this residue had one major concern: that the greyish-white residue would interfere with photosynthesis, and handicap the cranberry vines during a necessary carbohydrate production period. Growers wondered whether the residue was the result of an algae.

Three tests were conducted. The first was observing the vines through the spring stage—would new growth develop on the vines free of the residue? Thankfully, new growth developed at normal rates, and free of residue. This let growers feel comfortable that even if photosynthesis was compromised on the older leaves, the new leaves would be photosynthesizing effectively.

The second test was a windowsill assay. Residue-coated vines and residue-coated leaves were placed in an algae food media, and water was adjusted to a pH of 7.0. Sample jars were placed in a south-facing window, and no algae production was observed three weeks after the samples were placed. Eventually after 4 weeks, three jars each developed unique algae growth, and one jar developed a pinkish mold. Because the timing was so delayed, and because each jar presented a different growth type, the expectation is that the biological species that eventually did grow are the result of trace contaminant cells. If the gray residue had been an algae species, the high concentration on all four samples would have displayed rapid growth, and the same species in



**Gray residue on cranberry vines. The residue has been physically rubbed off of two leaves (yellow circle) to highlight the contrast. New growth is wilted because of elapsed time between collecting the sample and taking the photograph. New growth was in good condition when collected.**

all four jars.

The third test was the most formal: several samples were sent to the University of Wisconsin Plant Disease Diagnostics Clinic, where Brian Hudelson conducted a tape mount to determine whether the residue was algal or fungal in nature. Brian visually and microscopically examined the vines and leaves that I had submitted. The layer of material coating the leaves is a combination of irregular particulate matter and crystalline spine-like structures. None of the material appears to be biological in nature.



**Four samples of leaves and/or vines covered with the unusual after-flood residue, cultured in algae feeding medium at neutral pH. No algal colonies developed in 3 weeks of observation.**

For growers who experienced this residue in 2023, there is not a specific management strategy if it reappears in 2024. If your marsh has multiple sufficient water sources available, it would be interesting to flood portions of the marsh from each water source individually without commingling, to see if some water sources will result in more residue than others.

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## How Can AgrAbility Help You This Growing Season?

*By Andrea Klahn*

Before you swing into full gear for harvest, the late summer could be the perfect time to assess your farm's ergonomics. If you have persistent use injuries, from tennis elbow to arthritis to a lower back you don't want to aggravate, AgrAbility of Wisconsin aims to suggest tools, equipment, and practices that can improve how your body (and your employees' bodies) feel at the end of the workday.

"Sometimes, it's as easy as adding an extra step and handrail to your tractor or installing an automatic hitch," says Andrea Klahn, Outreach Specialist for AgrAbility of Wisconsin.

Since 1991, AgrAbility of Wisconsin has been promoting success in agriculture for farmers and their families living with a farm injury, disability, or health limitation. How can we help you?

"After enrollment, a rep from the Easterseals FARM program will visit your farm and evaluate your situation," explains Klahn. "They can take a closer look at equipment and processes. It's fresh perspective for your operation."

AgrAbility of Wisconsin serves all types of farmers and farms, large and small. This grant-funded program through USDA is free to farmers! You can easily enroll in our program on our website or give us a call. It takes 10 minutes. We ask you basic health information, but no medical records are required.

The AgrAbility program focuses on information and referrals. Once enrolled in our program, you will have a phone call from one of our case workers and set up a farm visit with one of our rural rehab specialists. A rehabilitation specialist will come out to your farm and watch the type of tasks you do on a daily basis, and can then offer tips and ideas of how to make the task easier with your pain and share ways to help you find monetary funds, if needed.

AgrAbility of Wisconsin is a partnership between the UW-Madison Extension and Easterseals Wisconsin. The program is available to farmers, farm workers and their families. Check out a database of Assistive Technology from the National AgrAbility Project at <http://www.agrability.org/toolbox/>. Looking for more information on AgrAbility of Wisconsin? Give us a call 608-262-9336 or visit our website, <https://agrability.bse.wisc.edu>.

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# Upcoming Altacor Changes

By Allison Jonjak

This is shaping up to be a dynamic year for chemical manufacturers. Detail from FMC on Altacor is included in this post. Loveland products has discontinued Diazinon 600. Detail from Adama on their two Diazinon formulations (Diazinon 500, and Diazinon 50W) will be released in July.

A change is coming to the popular fruitworm control Altacor—luckily FMC has the same active ingredient available in Altacor eVo, which is listed for cranberry. Many suppliers still have sufficient stock of Altacor available for this season, but growers will want to familiarize themselves with Altacor eVo for coming use. Altacor eVo is a more concentrated form of chlorantranilprole than Altacor, so your use rate will decrease in order to apply the same amount of active ingredient to the crop. Thorough mixing and even coverage become all the more important with increased concentration formulations.

If you have questions, reach out to Allison, your chemistry supplier, or your handler. The label is the law.

	Altacor	Altacor eVo
Active ingredient	Chlorantranilprole	Chlorantranilprole
Formulation	Water dispersible granule	Water dispersible granule
Manufacturer	FMC	FMC
Active ingredient by weight	35%	70%
<b>Labeled rate for cranberry fruitworm</b>	<b>3.0-4.5 ounces of product per acre</b>	<b>1.5-2.2 ounces of product per acre</b>
Active ingredient per acre	0.066-0.099 lbs active ingredient per acre	0.066-0.098 lbs active ingredient per acre
PHI	1 day	1 day
REI	4 hours	4 hours
Chemigation allowed in cranberry	Yes, see label	Yes, see label
Link to label	<a href="https://www.cdms.net/ldat/ldFRK000.pdf">https://www.cdms.net/ldat/ldFRK000.pdf</a>	<a href="https://www.cdms.net/ldat/ldIF4000.pdf">https://www.cdms.net/ldat/ldIF4000.pdf</a>
Logo color	Purple, orange, maroon	Purple, blue

# Grower Updates

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## Flying Dollar Cranberry

*By Seth Rice*

Hello everybody! We are finally seeing fruit, and fruit sizing is underway. We have waited a long time and did a lot of work to get to this point and the journey is not over. We have started to see some flea beetle in areas and since we are seeing Diazinon go away it's going to be interesting to say the least. We are seeing fewer and fewer options in our tool box to battle these problems. A lot of growers are trying Venom for the first time. Time will tell how well this works. Also growers are still applying fertilizer to the beds and looking to see what they need.

We also need some rain just like the whole state of Wisconsin needs right now. Our ponds and reservoirs need to be recharged like everyone in the industry. Stay safe everyone!

## Vilas 51

*By Jeremiah Mabie*

Hello everyone, hope you all had a wonderful and safe Fourth of July! What a busy couple of weeks it has been. Between the bees, booms and sprinklers there has been constant activity across the marshes.



The wild fire smoke sure played a role in bee activity this year that's for sure, but overall fruit set is looking good across the north. Fertilizer apps are starting to wrap up and bug pressure has been minimal. We could sure use some rain up here, there has been lots of pop-up storms around us but nothing with decent rain.

Luckily, we have missed most of the hail storms with very minor hail damage in some areas. I look forward to seeing everyone at the August 9th trade show and hope you have a great month!

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# Update from the Wisconsin Cranberry Research Station

*By Beth Ann Workmaster*

Hi, Beth here, Now that fruit set has occurred and berries are starting to expand, new phases of research are going on at the research station. In addition to the suite of herbicide and pesticide trials by Jed Colquhoun, Leslie Holland, and Allison Jonjak, aspects of fruit development are the focus of projects by the labs of Amaya Atucha, Leslie Holland, and Jyostna Mura, covering areas of calcium nutrition, heat stress responses, and the incidence of cranberry fruit rot complex. Christelle Guedot is contributing to insect monitoring and Juan Zalapa's program will be expanding into a newly prepared bed for more plantings of more vines with varied genetic backgrounds. All the researchers are looking to sharing their ideas and current findings with growers at the Summer Field Day on August 9!

