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2021 PROCEEDINGS

Photo by Christelle Guédot

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CRANBERRY FALSE BLOSSOM: A RE-EMERGING CONCERN IN WISCONSIN?

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Cranberry false blossom disease (CFBD) was a devastating disease of cranberry in the early 1900s. It spread from diseased vines in Wisconsin to other cranberry producing regions in the United State and Canada. It occurs naturally in both the large American cranberry (*Vaccinium macrocarpon*) and the small cranberry (*V. oxycoccos*). False blossom is transmitted by the blunt-nosed leafhopper (BNLH; *Limotettix vaccinii*). Infected vines do not recover from false blossom and they do not bear fruit. Symptom of false blossom can develop 1-month to 1-year after infection, making early detection difficult.

Symptoms. Symptoms of false blossom are most apparent during bloom due to distorted floral parts. Plants infected with false blossom can display dark pink flower petals or petals with red streaking. The pedicels are erect rather than arched. Stamens and pistils are irregular, and result in sterile flowers. Berries either abort or are small and misshapen. Branches are closely spaced, and leaves are folded close to the stem, creating a witches' broom effect. Infected vines may extend above the canopy and turn red prematurely in the fall. Enlarged terminal buds are prone to winter injury.

Spread of the pathogen. The false blossom pathogen is a phytoplasma, which is a type of bacterial parasite that lacks a cell wall. These pathogens are obligate, meaning they need living tissue to survive and multiply. They live in the phloem (sugar-conducting tissue) and are carried and transmitted by the BNLH. The BNLH occurs in Wisconsin, New Jersey, and Massachusetts. It has several other hosts plants besides cranberry, and all are ericaceous. The BNLH feeds on the phloem of infected plants where it picks up the false blossom phytoplasma and spreads it when feeding on healthy plants. The *only significant source of spread* of the phytoplasma is via the BNLH. It does not spread on machinery, by water or pollen. Infected uprights can go undiagnosed or misdiagnosed for years which could lead to further spread of the phytoplasma if the vector (BNLH) is present.

Carrier vs. Vector. As we investigate the source and spreads of cranberry false blossom in Wisconsin it is important to distinguish between insect carriers and insect vectors. Carriers can host the pathogen but not transmit it (cannot spread to healthy plants). Vectors, both carry and transmit pathogens to the host (can spread pathogen to healthy plants).

Re-emergence of false blossom in WI. In New Jersey, symptoms of false blossom showed up in the late 1990s and the phytoplasma was confirmed several years later. In Massachusetts, false blossom was observed at one location in 2017 and 2018. In Wisconsin, symptoms of false blossom were observed at 2 locations and the pathogen was confirmed. During the 2020 growing season in Wisconsin, both false blossom and leafhoppers were identified at a few marshes. It is unclear why false blossom has re-appeared in cranberry after almost a century since its initial discovery, however, it has been suggested that this is a result of leafhopper

vector populations multiplying again in cranberry beds. This may be due in part to the increased use of softer (i.e. more targeted) chemistries and possible changes in leafhopper activity due to climate change.

Management. When CFBD was observed in the 1900s, management approaches focused on chemical and cultural practices. Effective control of the vector was achieved with insecticide application and extensive planting of field resistant cultivars (ex. Stevens and McFarlin), which significantly reduced the impact of CFBD in cultivated beds. It is likely that the false blossom phytoplasma persisted at undetectable levels since then, but without the BNLH to transmit the pathogen, it was not spread. Evaluation of control approaches for CFBD are underway. We know that control of false blossom is achieved by controlling the vector, planting pathogen-free nursery stock and vines to prevent new introductions, and removal of infected vines.

Research in New Jersey. Recent studies in New Jersey have identified the phytoplasma (16SrIII-Y) associated with cranberry false blossom disease. Additionally, researchers have identified a second carrier of the false blossom phytoplasma, the sharp-nosed leafhopper, but there is no evidence that this leafhopper species can transmit the phytoplasma. Research on the vector, BNLH, has demonstrated that plants infected with false blossom show increased host qualities for BNLH and can increase the spread of the phytoplasma.

What we still need to learn about false blossom in Wisconsin:

- How **widespread** is false blossom in Wisconsin?
- What is the **identity of the FB phytoplasma** in Wisconsin?
- Is there **other insect carriers** of the FB phytoplasma in Wisconsin?
- Are there **additional insect vectors** in Wisconsin?
- Is there **resistance** in newer hybrid varieties to the leafhopper and/or phytoplasma?
- **Seasonal distribution** of the phytoplasma within a plant - when is the best time to sample? Is early detection possible?

What is next?

During the 2021 growing season:

- Determine how widespread false blossom is in Wisconsin
- Confirm the identity of the false blossom phytoplasma in Wisconsin
- Determine if other leafhoppers can **carry** the phytoplasma in Wisconsin

Diagnosing false blossom:

- The UW-Madison Plant Disease Diagnostic Clinic (pddc.wisc.edu) provides testing for the false blossom phytoplasma
- Testing is **optimized** for symptomatic leaves, vines, and roots
- Testing can be performed on leafhoppers, but this test is not optimized for leafhoppers and results may not be conclusive

CRANBERRY PEST MANAGEMENT PROGRAM
REVIEW OF THE 2020 FUNGICIDE TRIALS

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2020 Disease Status. While blossom and fruit set were average to quick in 2020, temperatures in August remained cool. Disease pressure was moderate for the Wisconsin cranberry production areas. Products were evaluated for control of early rot, fruit rot, and cottonball.

Registered Cranberry Fungicides – What Works for What

	Early Rot	Fruit Rot	Cottonball
Abound	++	++	++
Indar	+++	++	+++
Abound + Indar	+++	+++	+++
Bravo WeatherStik	++	++	na
Quadris Top	na	+++	++
Quilt Xcel	+++	+++	+++
Proline	+++	+++	+++
Oso	na	++	++
Regalia	na	++	++
Tilt/Orbit	na	na	+++
Topaz	na	na	++

na: no data; +: 60-79 % control, ++: 80-90 % control, +++: >90 % control

- Proline and Abound + Indar are the industry standards
- In 2020, 6 disease field trials were conducted: 3 trials for fruit rots, 1 trial for early rot, 2 trials for cottonball.
- Research was conducted on 11 registered chemistries and 14 experimental chemistries.
- Proline, Abound + Indar, Quilt Xcel, and Quadris Top provided good control of fruit rots and early rot.
- Indar, Abound + Indar, Quilt Xcel, Proline, and Tilt/Orbit provided good control of cottonball
- Kenja did not provide acceptable control of fruit rots or cottonball
- Similar to 2019, Regalia and Oso generally suppressed fruit rots and cottonball when compared to the untreated checks, but they did not perform as well as the top tier of fungicides. They are approved for organic cranberry production.

Mancozeb Non-Renewal. The European Commission recently made the decision to not renew mancozeb fungicide. It is likely that a review of existing Maximum Residue Levels (MRLs) for mancozeb will happen in the near future. To stay up to date on the status of mancozeb, please review your processor guidelines/restrictions.

Reducing the Number of Fungicide Applications. To reduce productions costs there has been an interest in reducing the number of or eliminating all fungicide applications. Two applications of fungicides/season have been the standard recommendation. To investigate, in 2016 - 2019, 2 applications vs 1 application vs 0 applications of each Bravo, Abound + Indar, Proline and Regalia were tested. Four fruit rot trials each with heavy disease pressure in 2016 and four in 2017 - 2019 with moderate disease pressure were conducted. In these trials, two applications of Bravo, Proline, Abound + Indar provide good disease control; a single application of these products provided marginally adequate disease control. Two applications of Regalia provided limited suppressed fruit rot; a single application of Regalia was inadequate. The recommendation for best control is for two applications. Two applications allow for some latitude in timing and cover extended infection periods. One application is risky and precise timing of the application is critical. No fungicide application is not recommended.

Application Timings of Fungicides. Recent concerns have been expressed over exposing bees to fungicides. The direct contact of bees is not of concern but the taking of fungicide-laden pollen back to the hives and the exposures of bee broods and hive environment are of concern. Our current recommendation is to apply fungicides during bloom since that is when fruit rot, early rot and cottonball disease infections occur. Trials were conducted in 2018-2019 to see if satisfactory disease controls could be achieved by reducing the number of or eliminating entirely fungicide applications during bloom when pollenating bees are present. Two applications of Proline, Abound + Indar or Bravo were made either pre-bloom, during bloom or post bloom and combinations of these timings. Against moderate disease pressures the following disease control efficacies were found: 1) two applications applied during bloom were the most efficacious. 2) one application made late pre-bloom + a mid-bloom application and a mid-bloom application applied early post-bloom provided acceptable controls. 3) two applications made pre-bloom and two applications made post-bloom provided less-than-acceptable disease controls. Conclusion - to provide effective disease management, at least one fungicide application made during bloom is necessary.

Factors Influencing Disease Severity. Three decision factors may be considered in determining the need for the number of fungicide applications for a season: 1) if April and/or May are frequently wet from precipitation and/or frost protection irrigation there may be an increased potential for diseases 2) if April and May are warm there may be an increased potential for diseases and 3) if the bed has a chronic history of disease.

WILDFLOWER PLANTINGS INCREASE BEE DIVERSITY ON CRANBERRY MARSHES

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Cranberries are highly reliant on insect pollination to achieve optimal yield. Most growers ensure the delivery of pollination services through rented honey bee colonies, though recent population declines due to a combination of factors have called the sustainability of this practice into question. Wildflower plantings have been utilized in other cropping systems, including blueberry, almond, and strawberry to augment the wild pollinator community and ensure delivery of pollination services and increasing overall farm sustainability. Increased wild bee diversity may also lead to increased crop yield, and reduce grower reliance on managed honey bees for pollination. The main objectives of our study were to assess how wildflower plantings affect the wild bee community in Wisconsin cranberry, to determine how the presence of a wildflower planting may affect bee visitation to cranberry flowers, and to evaluate how wild bee biodiversity and visitation affect cranberry yield.

Methods

We established 0.25-acre wildflower plantings on 5 marshes in 2018, and on 1 marsh in 2019. Wildflower plantings were seeded with a commercially available mix of 26 native, perennial wildflowers and 4 native grasses. At each marsh, the wildflower planting was located adjacent to a Stevens cranberry bed. This combination of wildflower planting and cranberry bed was paired with another Stevens bed and a conventionally-managed field margin at the same marsh at least a kilometer away, to act as a baseline measurement for comparison with the wildflower planting and adjacent bed. Bees were sampled weekly using pan traps placed in wildflower plantings, field edges, and cranberry beds before, during, and after cranberry bloom. Bee specimens were identified to species in the lab. Bee visitation was measured by observing all visits to cranberry flowers in a 1 minute period, and recording the morphospecies of the flower visitor. This procedure was repeated 7 times per bed on a weekly basis while cranberry bloomed. Yield estimates were conducted by collecting all berries in 3, 1 sq. foot quadrats per bed. Berries were taken back to the lab and sorted, counted, and weighed to obtain estimates of yield (total berry weight) and a mean berry weight (total berry weight/number of berries).

Table 1. Number of bee species collected from each family every year

Family	2018	2019	2020
Apidae	13	22	32
Andrenidae	5	19	21
Colletidae	0	3	3
Halictidae	32	43	46
Megachilidae	5	12	16
Melittidae	0	0	1
Total	55	99	119

Bee diversity

Over the course of the study, we collected 41,544 bees over three years of sampling. Of these, 35,797 or 86% were honey bees and 5,747 or 14% were wild bees (Table 1). The number of wild bee species documented in cranberry marshes increased from 2018 (55 species) to 2020 (119 species) with a total of 155 distinct species documented throughout the study. We documented the presence of five new state records (*Colletes solidaginis, Lasioglossum rozeni, L. semicaeruleum, L. trigeminum,* and *Melissodes boltoniae*), meaning that these species have never been documented in Wisconsin before. We also documented the presence of the endangered species the rusty-patched bumble bee at one of the collaborating marshes [which led to the removal of two marshes from the original study] and this was the first reported specimen of this endangered species in Jackson County since 1972 (see article in CCMJ). In addition, 13 rare bee species and 14 documented pollinators of cranberry were collected in our study. **These results highlight the rich diversity of wild bees on Wisconsin cranberry marshes and the stewardship of cranberry growers in promoting habitat and refuge for wild bees in the cranberry agroecosystem.**

Using the Simpson's diversity index, an ecological measure that combines both richness (number of bee species) and abundance (number of bees per species), to assess the bee diversity at the cranberry marshes with pollinator gardens, we found a higher diversity index outside of cranberry beds than within them, and higher within wildflower plantings than on conventionally-managed field edges (Figure 1). Simpson's diversity was not different between cranberry beds adjacent to wildflower plantings and those adjacent to conventionally-managed field edges and Simpson's diversity was lower in 2019 than in 2018 or 2020. **These results suggest that pollinator gardens increased bee diversity on cranberry marshes but not yet in cranberry beds near pollinator gardens.**

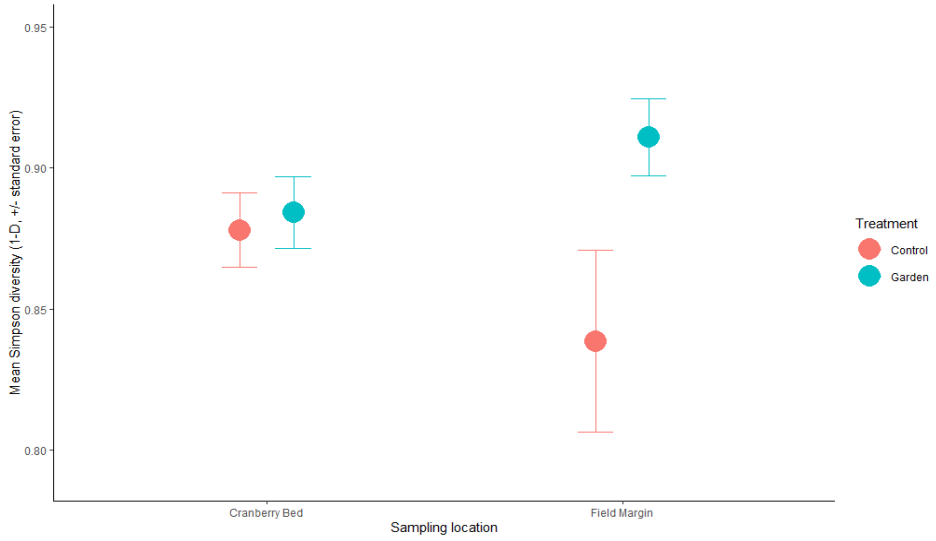

Figure 1. Simpson's diversity of wild bee communities collected from within or outside cranberries, adjacent to wildflower plantings or conventionally managed field edges. Simpson's diversity values are +/- standard error.

Bee species richness and abundance

Looking at species richness (number of species collected from a given area) and abundance (number of bees per species) separately, we found no impact of the pollinator gardens on either of these metrics between cranberry beds adjacent to wildflower plantings and cranberry beds adjacent to conventionally-managed field edges, nor was it different between wildflower plantings and conventionally-managed field edges. Species richness increased every year in our study and wild bee abundance was higher outside of cranberry than within cranberry beds (Figure 2). **These results suggest that there is a large abundance of wild bees on field margins that could be tapped into for cranberry pollination by fostering their populations with pollinator gardens and other recommended pollination practices.**

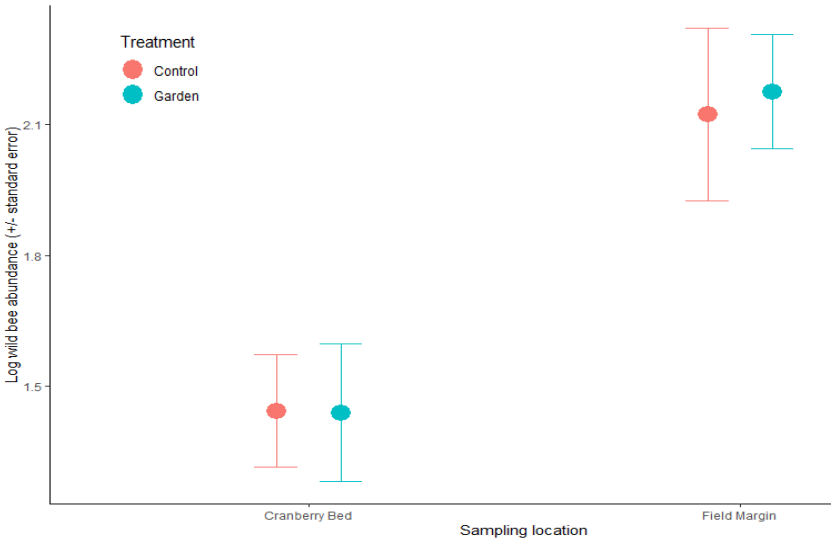

Figure 2. Abundance of wild bee communities collected from within or outside cranberries, adjacent to wildflower plantings or conventionally managed field edges.

Bee visitation

Bee visitation to cranberry (Figure 3) was not significantly different between cranberry beds adjacent to wildflower plantings or conventionally-managed field edges. As growers stock honey bee hives to insure optimal pollination, it was not surprising to see that honey bees visited cranberry flowers more often than wild bees. **These results suggest that while pollinator gardens are not yet leading to wild bees spilling over into cranberry, they are also not drawing honey bees away from cranberry.**

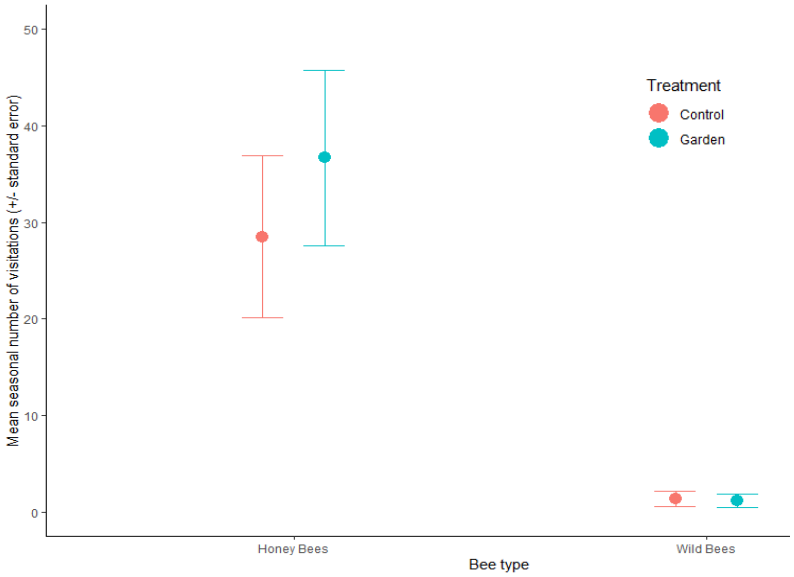

Figure 3. Mean seasonal visitation to cranberry flowers by honey and wild bees, in cranberry beds adjacent to wildflower plantings or conventionally-managed field edges. Visitation numbers are +/- standard error.

Mean berry weight (Figure 4) was not different in cranberry beds adjacent to wildflower plantings or conventionally-managed field edges, was not affected by visitation rates from any bees, and was not different between years. **Wild bee species richness was positively correlated with increased mean berry weight, with every additional wild bee species adding approximately 0.01 grams of weight to fruit, thus emphasizing the importance to foster bee richness and diversity on cranberry marshes.**

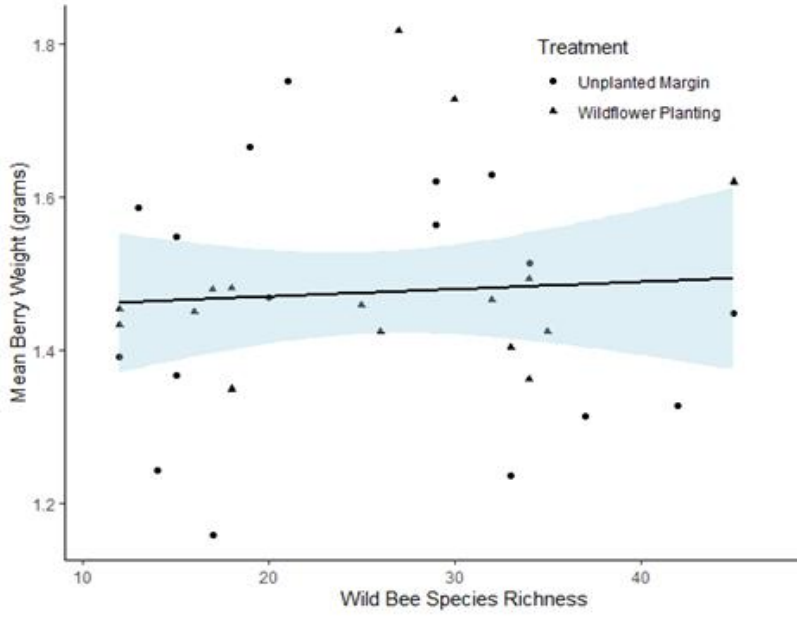

Figure 4. Mean berry weight as a function of wild bee species richness. Shaded area represents a 95% confidence interval for the relationship between berry weight and wild bee species richness.

Cranberry yield (Figure 5) was not different in cranberry beds adjacent to wildflower plantings or conventionally-managed field edges and was not affected by visitation rates from any bees. **Yield was lower in 2019 than 2018 or 2020, and variations in yield were best explained by the marsh berries were collected from, suggesting that overall growing and management practices strongly influence yield.**

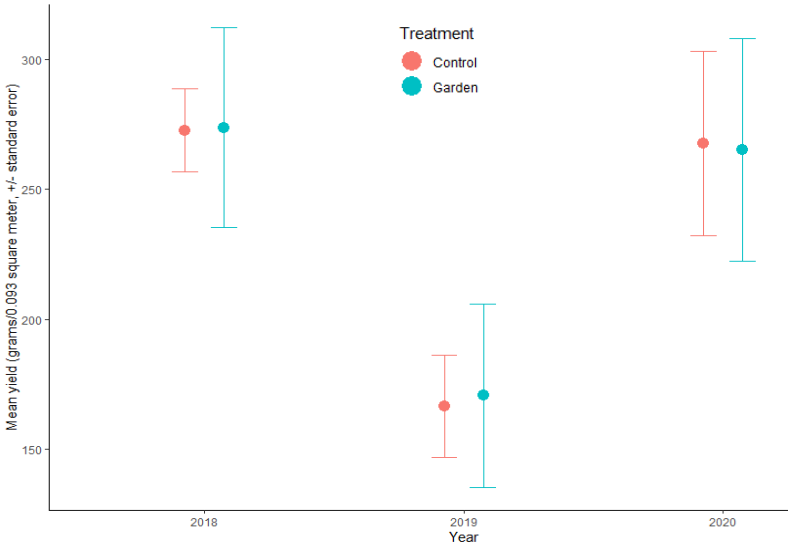

Figure 5. Cranberry yield (average weight of 3 harvested 1 sq. foot transects) between beds adjacent to wildflower plantings and conventionally managed field edges, across years. Yield numbers given are +/- standard error.

Wildflower plantings on cranberry marshes add an extra layer of support to the wild pollinator community and improve the overall resilience of pollination services to cranberry. The native floral resources afforded by pollinator gardens provide alternate means of forage for wild and honey bees. These resources may boost the overall health and resilience of honey bee colonies and may lead to greater sustainability of honey bee-mediated pollination and foster bee diversity of wild native bees on cranberry marshes.

Recommendations

Our result support the recommendation that pollinator gardens increase the diversity of wild bees on cranberry marshes and that increased bee richness positively impacts mean berry weight. We recommend planting at least ¼ acre pollinator garden but suggest that this is likely on the lower end of an optimal size to promote pollinators in cranberry and that pollinator gardens should be placed as close as possible to cranberry beds. The mix of plants we used was well received by growers and we provided recommendations for site preparation, planting, and maintaining gardens as well as managing weeds in pollinator gardens. Other publications on protecting and promoting wild pollinators were provided to growers and are available as short and longer versions.

Acknowledgments

We would like to thank all the participating cranberry growers who established and maintained wildflower plantings, and allowed us to conduct research on their marshes. We would also like to thank the WCB and DATCP for funding this research.

INSECTICIDE SCREENING PROGRAM IN 2020

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Overview

Overall, the insect pressure in 2020 was relatively low for our common insects, cranberry fruitworm and sparganothis fruitworm. Black-headed fireworm seems to be very isolated and not very abundant where they are found and tipworm remains an isolated problem. Flea beetle were relatively high at a few marshes which applied chemical control.

The new "kid on the block" this year was the blunt-nosed leafhopper (BNLH), which was seen at several marshes, in some cases in really high numbers which led to extensive feeding damage. As we all know, BNLH is the only known insect vector of the phytoplasma responsible for the cranberry false blossom disease (CFBD; please refer to the article by Dr. Holland on this disease).

Insecticide toolbox

Here is a table which reviews some of the most commonly used insecticides available in Wisconsin and how they are classified based on their mode of action and IRAC groups. IRAC stands for the Insecticide Resistance Action Committee which role is to prolong the effectiveness of insecticides by countering the development of resistance and you can learn more about it here. The IRAC committee classified insecticides based on their mode of action and assigned each class a number code to help you quickly identify similar products and help with planning your rotation of chemical classes when developing your IPM program to delay resistance to our available tools. Here, you can see that we added in 2020 our first pyrethroid, Danitol, which represents an old class of insecticide but

Insecticide class (IRAC)	Trade name (active ingredient)
Organophosphates (1A)	Imidan 70WP (phosmet) Lorsban 4EC (Chlorpyrifos) Diazinon AG600 (diazinon)
Carbamates (1B)	Sevin (carbaryl)
Diamides (28)	Altacor 35WDG (chlorantraniliprole) Exirel (cyantraniliprole)
Pyrethroids (3)	Danitol (fenpropathrin)
Neonicotinoids (4A)	Assail 30SG (acetampiprid) Venom (dinotefuran) Actara (thiamethoxam)
Insect Growth Regulators (15)	Confirm 2F (tebufenozide) Intrepid 2F (methoxyfenozide) Rimon 0.8EC (novaluron)
Spinosyns (5)	Delegate 25WG (spinetoram)
Biologicals (OMRI)	Venerate (Burkholderia) Grandevo (chromobacterium) Dipel and Agree (Bt)
Tetramic acids (23)	Movento (Spirotetramat)

yet a new one for cranberry and opens the door to a new class of rotation partners when thinking about resistance management. Indeed, we have 5 new candidate insecticides that we continue to evaluate for their fit in the cranberry system and one of them is a pyrethroid that has shown great efficacy against most of our major insect pests, including fruitworms, flea beetle, and leafhoppers.

New products

Danitol 2.4 EC is now registered on cranberry in Wisconsin. It is a pyrethroid (IRAC 3) with the active ingredient fenpropathrin and manufactured by Valent. The best fit for this product at this time is against leafhoppers. It has a 2 days PHI and 48 hrs REI.

Exirel 0.83 SE has been registered on cranberry in Wisconsin for a couple of years now. It is a diamide (IRAC 28) with the active ingredient cyantraniliprole also known as cyazypyr, manufactured by FMC. It is very effective against fruitworms and has the same mode of action as Altacor. The PHI is 14 days and REI 12 hrs and it has a bee warning as it is toxic to bees and cannot be sprayed during bloom.

Verdepryn 100 SL was registered on cranberry in Wisconsin in 2020 by Summit Agro. It is also a diamide (IRAC 28) with the active ingredient cyclaniliprole and has great efficacy against fruitworms. The label states to not spray during bloom unless at night. It has a 1 day PHI and 4 hrs REI.

Venom 70 SG has been registered on cranberry in Wisconsin for several years now. It is manufactured by Valent. It is a neonicotinoid (4A) with the active ingredient dinotefuran. It is very effective against leafhoppers and flea beetle and has a 7 days PHI and 12 hrs REI.

Cormoran 1.5 SC has been registered for about 2 years on cranberry in Wisconsin. It is manufactured by ADAMA as a premix containing Assail (neonicotinoid IRAC 4A) and Rimon (insect growth regulator IRAC 15). It has many insect pests on the label but when we tested Assail alone, Rimon alone, both combined (Cormoran), we found no significant difference between Cormoran and Assail for flea beetle or fruitworm control. Thus, I do not recommend using Cormoran to control these pests.

Always read the label especially when considering new products and check with your handlers to make sure the products you are considering are approved by handlers for domestic and/or export markets and to check for the approved PHIs required by handlers.

Recommendations for managing blunt-nose leafhopper (BNLH)

This summer, it is strongly recommended to monitor for BNLH by sweeping beds in the spring, mid-May to mid-June. Tentative thresholds from Cesar Rodriguez-Saona at Rutgers University suggest:

- 20 BNLH nymphs per sweep set in young beds, new varieties, and/or beds with false blossom disease incidence.
- 40 BNLH nymphs per sweep set in older beds, older varieties, and beds with no incidence of false blossom disease.

The University of Maine suggested that between 100 to 200 leafhoppers (not just BNLH) can significantly drain the water and sugar from vines, leading to feeding damage. **If you have a history of leafhopper damage, the threshold would likely need to be lowered this year to 20-30 leafhoppers per sweep set.**

If you reach any of these thresholds prebloom, several insecticides provide good control against BNLH nymphs and these include 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. If you have high numbers of BNLH adults postbloom (>40 per sweep set), you may consider a postbloom application after mid-July with either an organophosphate, a neonicotinoid (Actara or Venom), depending on the timing and PHIs.

Table 1. Insecticides and their efficacy against flea beetle.

Trade name	Efficacy
Actara	+++
Assail	++
Cormoran	++
Sevin	++
Lorsban, Orthene	++
Diazinon	+++
Imidan	+++
Altacor, Exirel	+
Venom	+++
Delegate	+
Intrepid, Confirm	--

+++ strong efficacy, ++ moderate efficacy, + low efficacy and – not efficacious.

Flea beetle

Flea beetle continues to be a problem for a number of growers and we continue to test different chemistries for controlling it. In this table, I highlighted products that have the best efficacy against adult flea beetles.

Acknowledgments

Thank you to the grower collaborators for allowing us to conduct trials in 2020 on their properties. Thank you to Jack Perry for his years of service with the industry, happy retirement Jack! And finally, thank you to WCB, CI, and Ocean Spray for funding this work.

NOVEL BIO-INSECTICIDE DEVELOPMENT FOR US CRANBERRIES

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Studies continue to refine the systems of mass propagation for two native nematode species, as well as the ideal timings of applications of these nematodes for flea beetle control. This nematode-based bio-insecticide was developed using native Wisconsin nematodes as the killing agents (Ye et al., 2018; Foye & Steffan, 2019). These two nematode species are *Oscheius onirici* (Fig. 1 below) and *Heterorhabditis georgiana*. Together, they hunt down and attack insects that spend part of their lifecycle in the soil (or in the litter layer on top of the soil). Because flea beetles and various other cranberry pests spend the bulk of their lives in the soil, they are easy targets for nematodes.

Figure 1. A juvenile Oscheius onirici nematode, hunting for an insect host.

Having shown that the nematodes could survive a trip through a boom-arm sprayer, we then tested how well the nematodes could control flea beetles after having passed through the boom-arm system. A single application of the nematodes was applied in early spring (late June), when flea beetle larvae are known to be still feeding underground on roots. Then, replicate cages were set up within the treated and untreated beds. These cages were checked in August for the presence of adult flea beetles. We found that a single application of nematodes reduced the entire flea beetle population by 44%, compared to untreated controls. This percent reduction is comparable to the efficacy of chemical insecticides, given that most foliar insecticides can only reach a relatively small percent of the total flea beetle population. The nematode bio-insecticide, therefore, holds promise as an effective approach to cranberry flea beetle control.

In 2020, a collaborative project was launched with Wisconsin cranberry growers to explore various means of mass-propagation as well as a new, gravity-fed low-pressure application

system. A variety of successes and failures were logged, and much was learned. Subsequent field applications were undertaken at the commercial sites where nematodes were being propagated. Applications were made to beds in late June and early July, using the “installment plan” system, in which only fresh, newly emerged nematodes were applied. At one site, a 55.1% reduction in flea beetle populations was documented. At a second site, 76% and 91.3% reductions were observed. These findings suggest that the timing of the nematode application may be a critical determinant of its efficacy. It appears that 90+% control is possible via proper timing and the use of only freshly harvested, vigorous nematodes.

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INFLUENCE OF FALL NITROGEN FERTILIZATION ON PLANT GROWTH AND FRUIT PRODUCTION IN CRANBERRY

PEDRO ROJAS, JENNY BOLIVAR-MEDINA, BETH ANN WORKMASTER, AMAYA ATUCHA

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Previous studies from the Atucha lab have revealed that flower primordia in apical buds of cranberry can continue to develop through the winter period, and that root growth after harvest can account for over 40% of all new roots produced during the year. Based on these new research findings we established a new project to evaluate the effect of fall nitrogen fertilization on plant growth, yield, and fruit quality of cranberries.

The experiment was established in 2017 at a commercial cranberry marsh in Nekoosa, Wisconsin. The experimental design consisted of a split-plot design in three beds of 'HyRed', each one divided in 8 plots corresponding to 2 replicates per treatment. During the summer of 2018, the plots were divided in two subplot, one subplot received 100% of the total N (60 units), while the other the balance to complete the total amount of N in the season (Fig. 1).

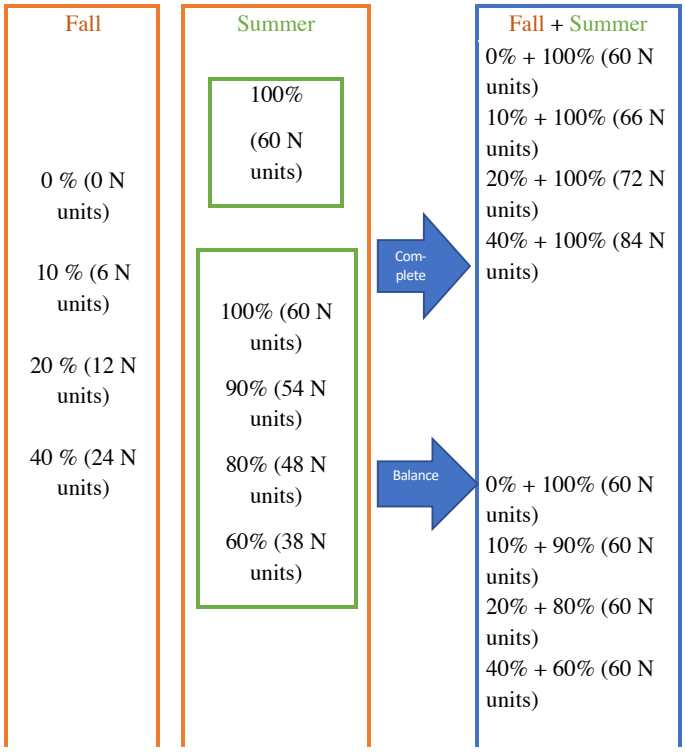

Figure 1. Nitrogen (N) fertilizer treatments applied during fall and summer. Fall N applications units were based on a percentage of the total amount to be applied during the growing season. All treatments were applied with ammonium sulfate. Fall treatments were applied on 9/22 in 2017, 10/30 in 2018, and 11/5 in 2019.

Results

Data collected during 2018, 2019, and 2020 growing seasons was pooled for a more robust statistical analysis. We evaluated total yield, berry weight, fruit firmness, upright density, leaf area of fruiting uprights, and runner dry weight for each season.

Total yield, berry weight and number of fruits per sq. ft.

Yield was estimated by harvesting all berries in a one sq. ft. area per plot and converting these values to barrels per acre. The average yield values across treatments were between 499 and 545 barrels per acre. There were no differences in yield among treatments (Table 1). However, treatments that received 40% of N during the fall had lower yields and higher berry weight compared to the other treatments. The increase in berry weight could be explained by the reduction on the number of fruits per sq. ft. under the same treatment (40% Fall N).

Table 1. Effect of N Fall fertilization on yield, the number of fruits, and berry weight. Means with the same letter within a column are not different at p-value < 0.05.

Main Effect	Treatment	Yield (g) [a]	Berry Weight (g)		Nº of fruits	
Fall	0%	532 ± 10.2	1.31 ± 0.02	a	408 ± 9.6	a
	10%	534 ± 16.3	1.30 ± 0.02	a	416 ± 14.4	a
	20%	545 ± 12.7	1.31 ± 0.02	a	420 ± 11.0	a
	40%	499 ± 13.6	1.35 ± 0.03	b	374 ± 12.1	b
	p-value	0.1048	0.0469*		0.0219*	
p-value		0.8696	0.0517		0.3138	

Fruit firmness and fruit color

Fruit firmness was measured by the amount of force required to compress 20% of the fruit volume. The fruit firmness is expressed as force (g). Fruit firmness or color was not affected by any N fertilization treatments as well as fruit color (Table 2)

Table 2. Effect of N Fall fertilization on fruit firmness in force (g) and fruit color. Means with the same letter within a column are not different at p-value < 0.05

Main Effect	Treatment	Fruit Color [a]	MCP (MPa)
Fall	0%	0.91 ± 0.01	111 ± 0.96
	10%	0.91 ± 0.01	115 ± 4.45
	20%	0.91 ± 0.01	112 ± 0.74
	40%	0.91 ± 0.01	110 ± 1.07
	p-value	0.7215	0.3249

Apical bud size of fruiting and vegetative upright

During 2018 and 2019 seasons, apical bud size of fruiting and vegetative uprights per sq. ft. was evaluated. The treatment receiving 40% of N in the fall had an increase in the number of small apical bud size (< 2mm diameter) in vegetative uprights and a reduction in the total number of large bud size (> 2mm diameter) in fruiting uprights (Table 3).

Table 3. Effect of N fall fertilization on the apical bud size in fruiting and vegetative uprights. Means with the same letter within a column are not different at p-value < 0.05

		Upright Type					
		Fruiting Upright			Vegetative Upright		
Main Effect[x]	Treatment	Large Bud size		Small Bud size	Large Bud size	Small Bud size	
Fall	0% N	83 ± 9.16	a	144 ± 8.5	107 ± 6.6	124 ± 10.7	a
	10% N	71 ± 8.31	b	133 ± 7.4	126 ± 8.5	122 ± 11.0	a
	20% N	66 ± 8.50	bc	144 ± 6.3	114 ± 6.7	139 ± 11.7	a
	40% N	56 ± 7.24	c	134 ± 10.5	122 ± 10.8	161 ± 14.6	b
	p-value	0.0003*		0.5959	0.3064	0.0027*	

Leaf Area and upright length

Leaf area per upright (mm) was calculated as an average of the total leaf area from 20 uprights per plot. Treatments receiving 40% of N in the fall had larger leaf area compared to the control (Table 3). Upright length was calculated using the same 20 uprights per plots. The length of vegetative and fruiting uprights from the plots receiving 40% of N in the fall were longer compared to the other treatments (Table 4).

Table 4. Effect of N fall fertilization on leaf area and upright length of fruiting and vegetative uprights. Means with the same letter within a column are not different at p-value < 0.05

		Leaf Area (mm^2) [a]			Upright Length (mm)		
Main Effect	Treatment	Fruiting Upright		Vegetative Upright	Fruiting Upright		Vegetative Upright
Fall	0%	24 ± 0.4	a	27 ± 0.3	83 a ± 1	a	72 ± 2
	10%	24 ± 0.4	a	26 ± 0.5	82 a ± 2	a	70 ± 2
	20%	24 ± 0.6	a	27 ± 0.8	83 a ± 3	a	72 ± 3
	40%	26 ± 0.9	b	28 ± 0.5	91 b ± 2	b	78 ± 4
	p-value	0.0031*		0.4121	0.0232*		0.0564

Upright density

Upright density was calculated by counting the total number of uprights in a sq. ft. area per plot. No differences were observed among treatments. However, the proportion of fruiting

uprights was reduced by 10% in the 40% N fall fertilization treatment was compared to all the other ones. The changes in the proportion of fruiting and vegetative uprights across the years of this study can be seen in Figure 2.

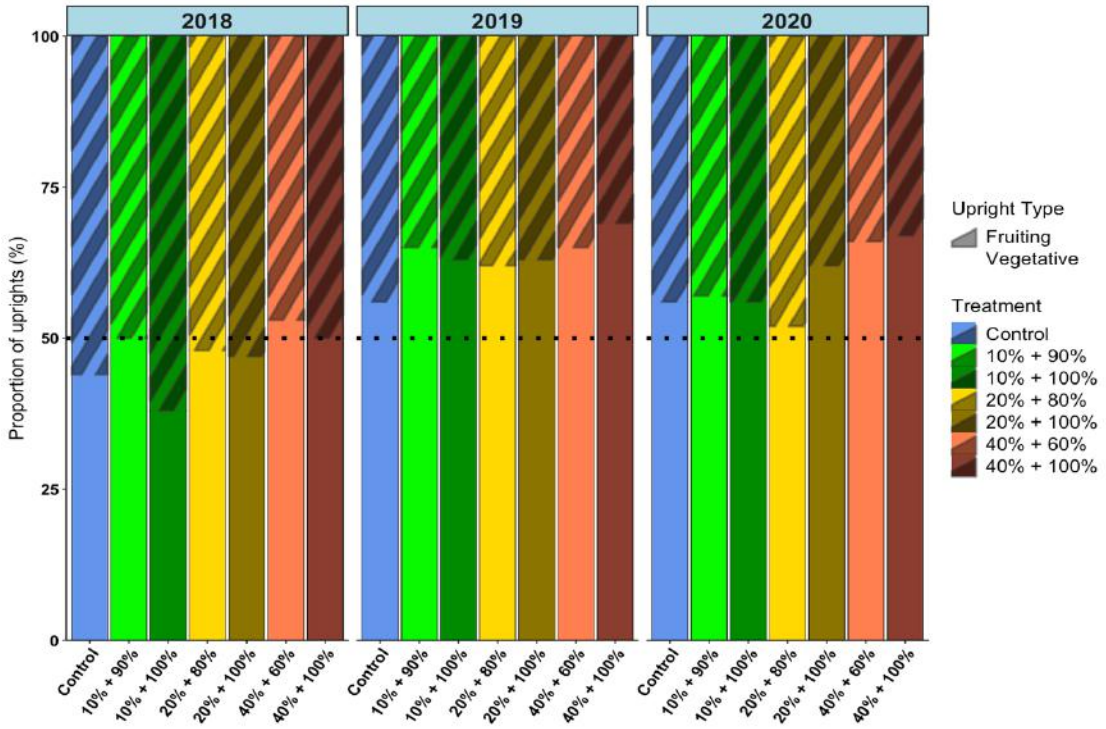

Figure 2. Effect of N fall fertilization on the proportion of fruiting and vegetative uprights (%) through the three-year study.

Conclusions

Cranberries have the capacity to uptake N during fall. Most of the N is used to support vegetative growth the following spring rather than fruit production. Fall nitrogen fertilization could be a potential management to enhance vegetative growth after biotic/abiotic stress that result in vine damage or to overcome severe N deficiency.

IMPACT OF HIGH SOIL pH ON FRUIT SIZE

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Vegetable Crops Research Unit, USDA-ARS and *Department of Horticulture, University of Wisconsin-Madison, WI*

Soil pH is an essential factor in determining a plant's nutrient availability and absorption. It is considered to be the 'master soil variable' influencing many soil characteristics such as microorganism activity, nutrient absorption, soil remediation, enzyme activity, nitrification, and denitrification. The level of soil acidity depends on the hydrogen (H^+) ions present in the soil. The optimum soil pH for cranberry (*Vaccinium macrocarpon Ait.)* growth ranges from 4.2 and 5.5. At low soil pH, many micronutrients are available along with the macronutrient phosphorus. As soil pH increases, many nutrients, like magnesium and calcium, become increasingly available and disturb the nutrient balance, causing toxicity. This imbalance is not suitable for cranberry growth because cranberries are not adapted for extracting their nutrients from alkaline soils. We have conducted a preliminary study to understand the effect of soil pH on cranberry nutrient absorption and fruit size using cultivar Stevens. This preliminary study included two treatments: one optimal pH soil 4.9 to 5.2 and two high pH soil ranging from 6.2 to 7.4. Soil, uprights, and fruit were sampled from optimum and high pH soil beds at different time intervals from August through September 2020. We measured multiple parameters such as soil pH, fruit size, and nutrient composition of leaves, stems, and fruits.

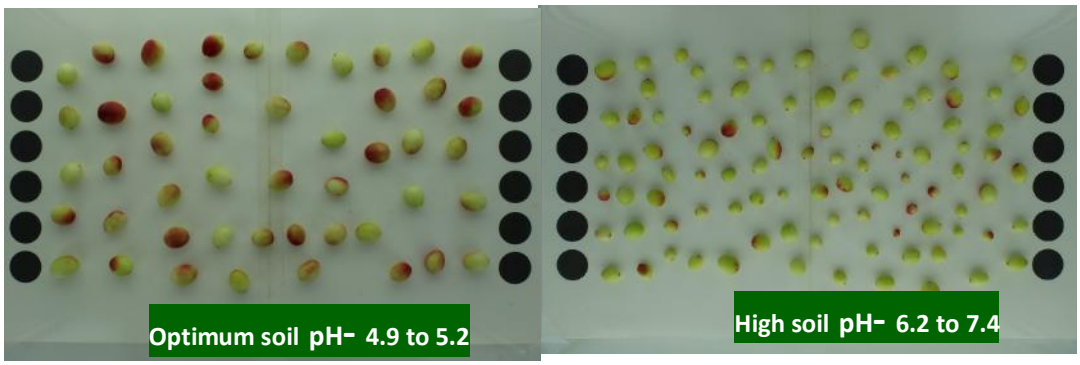

Fig. 1: Impact of high soil pH on Stevens variety fruit size

Our results showed significant differences in fruit size and nutrient absorption among pH treatments. We found a significant ($P<0.01$) reduction in cranberry fruit size in those collected from high soil pH beds compared with those from optimum soil pH beds (Fig 1). A 40 to 60% fruit size reduction was observed. In addition, our results showed that the cranberry fruits collected from optimum and high soil pH also differed in their nutrient absorption. We noticed

a significant increase in fruit calcium levels and a substantial decrease in fruit sodium, iron, manganese and zinc levels in high soil pH fruit samples compared to fruit samples of optimum pH levels (Fig. 2).

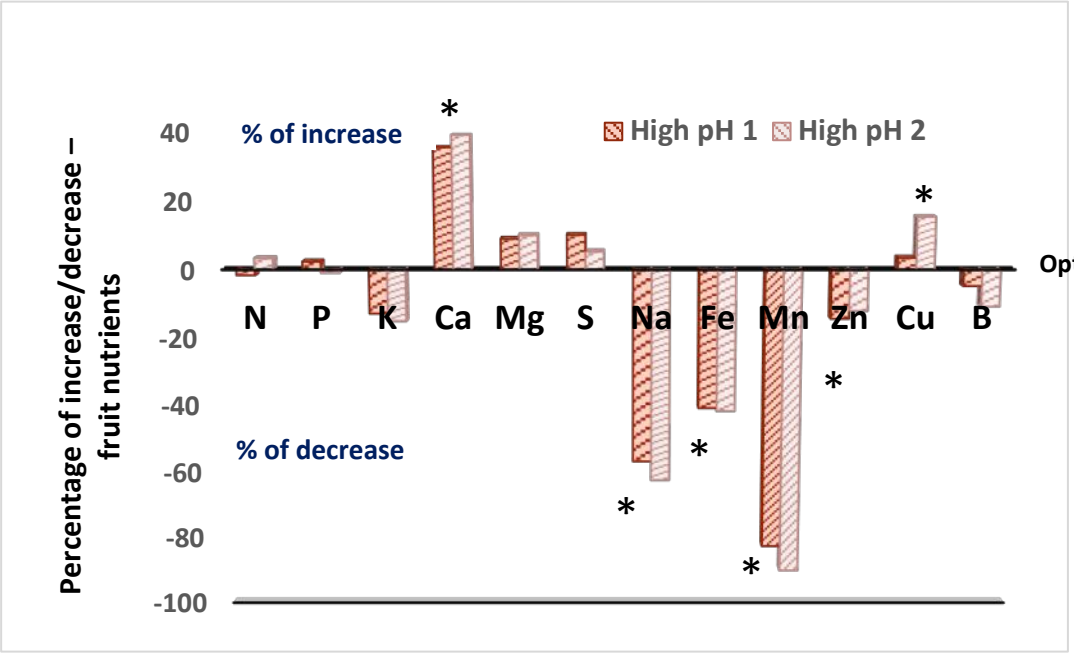

Fig. 2: Percentage of increase or decrease in nutrient composition of fruits collected from high pH soil compared to optimum soil pH. The bars marked with asterisk (*) are significantly different compared to optimum soil pH.

A similar trend in the percentage of decrease or increase in nutrients was observed in leaf and stem samples of high soil pH soils relative to control pH soil. These preliminary results suggest that the cranberries are unable to absorb some soil micronutrients such as sodium, iron, manganese, and zinc under high soil pH conditions, resulting in a significant drop in fruit size. In our future studies, we plan to understand the major nutrients impacting fruit size and the microbiome's role in maintaining soil pH. More research is required to study the effect of low and high soil pH on cranberry nutrient absorption, growth, and fruit size.

ANALYSIS OF PURITY AND YIELD IN A WISCONSIN CRANBERRY MARSH

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Vegetable Crops Research Unit, USDA-ARS and *Department of Horticulture, University of Wisconsin-Madison, WI*

Cultivar contamination is a common issue in Wisconsin cranberry commercial production. Unknown or unwanted cranberry genotypes are often found in commercial cranberry beds that are intended to be a single uniform genotype. Identification of contamination and the impacts of contamination remain crucial issues to the cranberry industry. Tissue samples were taken from the former commercial beds of the new Wisconsin Cranberry Research Station in 2017 for genetic fingerprinting analysis. The goals of this collection were to analyze the ten beds for genetic purity to determine if any should be maintained or replaced, and to analyze the accuracy of visual perception of contamination in the field. Two of the beds showed low enough levels of contamination to be maintained for future production. Visual differentiation was accurate in distinguishing between genotypes and detecting large areas of contamination, but failed to detect smaller pockets of contamination. A yield analysis was also conducted along with genotypic purity assessments and found a slight negative correlation between historical yield of the beds and their level of contamination. Overall, this study demonstrates the usefulness of genetic testing and purity mapping for cranberry bed management and renovation decision-making.

2021 CRANBERRY SCHOOL GROWER SURVEY RESULTS

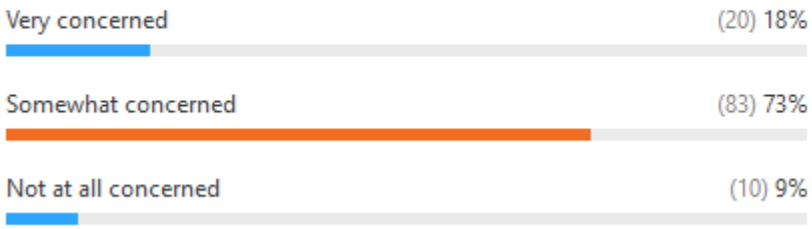
CHRISTELLE GUÉDOT[1] and ALLISON JONJAK[3]

[1]Dept. of Entomology, UW-Madison; [2]Division of Extension UW-Madison

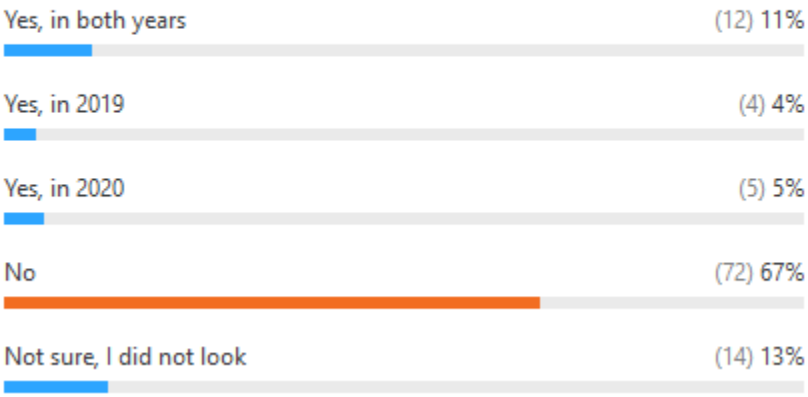
Results of the live survey of growers present at the Virtual 2020 Cranberry School are presented below. The survey was conducted using Zoom. Questions were displayed on screens and respondents were allowed to select answers, live and anonymously. After all responses were collected, the polling was closed, and the results of the survey were displayed on the screens. Due to the virtual format this year, responses were collected live and are displayed as they appeared during the meeting.

Disease and Weed Section

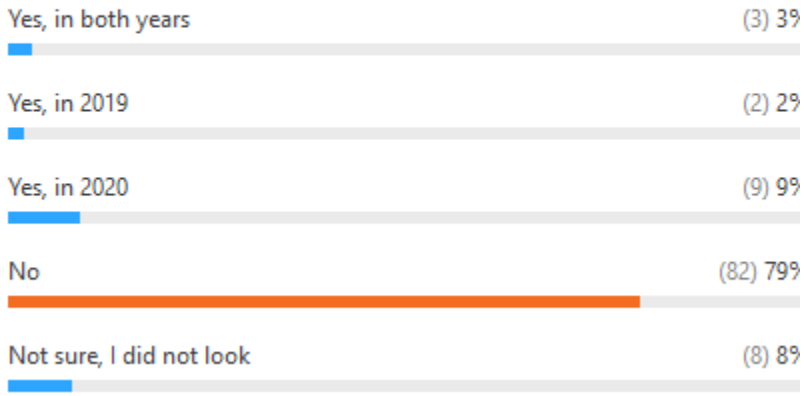
1. How concerned are you about cranberry false blossom?



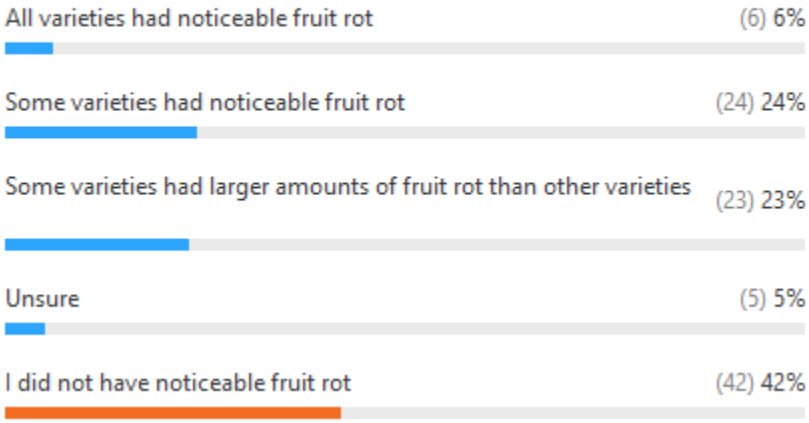
1. Did you observe cranberry false blossom at your marsh in 2019 or 2020?



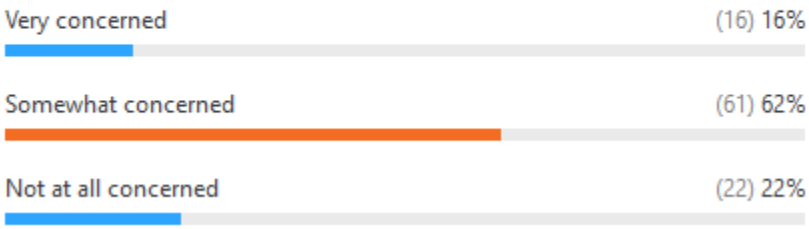
1. Did you observe high numbers of leafhoppers in your marsh in 2019 or 2020?



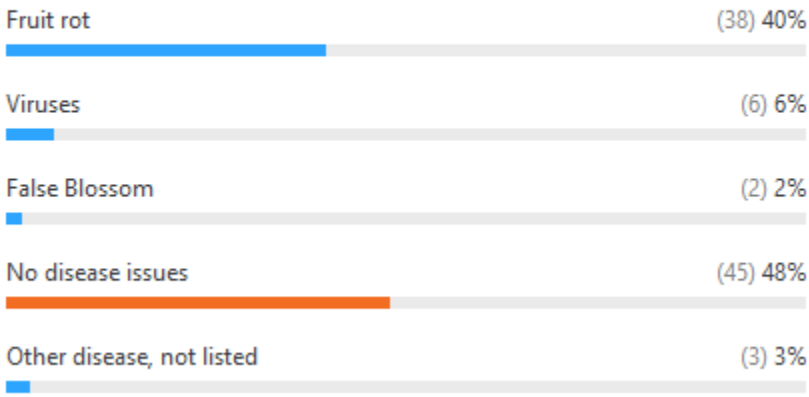
1. Did you notice fruit rot symptoms on all of your varieties or just some of the varieties



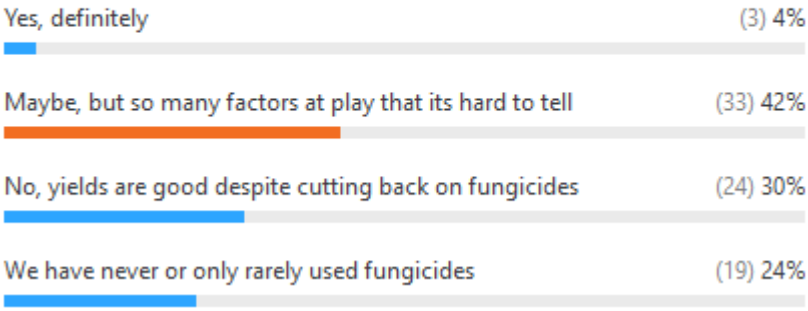
1. Are you concerned about the development of fungicide-resistant pathogens on your marsh?



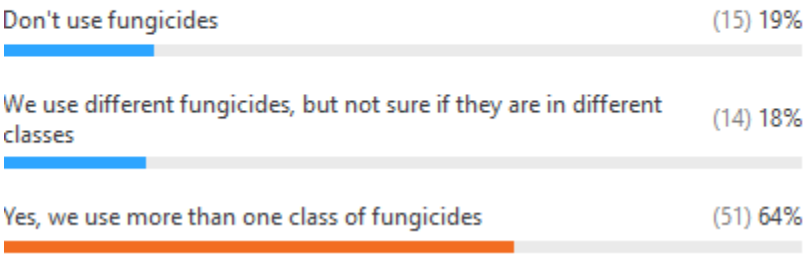
1. What was your biggest disease issue for the 2020 growing season?



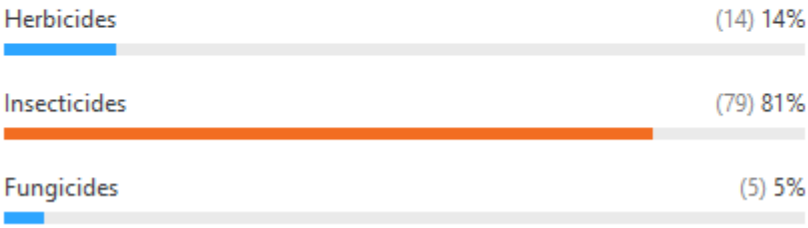
1. If you have reduced fungicide use in the last 3-4 years, has this coincided with reduced yields?



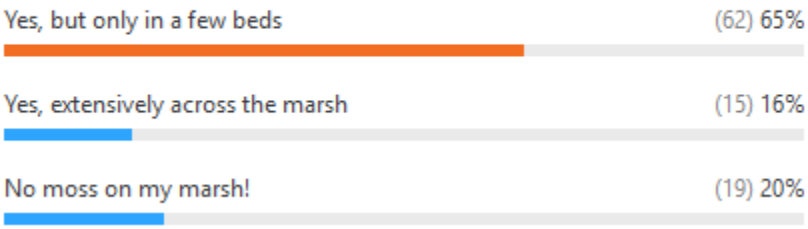
1. Do you use more than one class of fungicides to control fruit rot diseases?



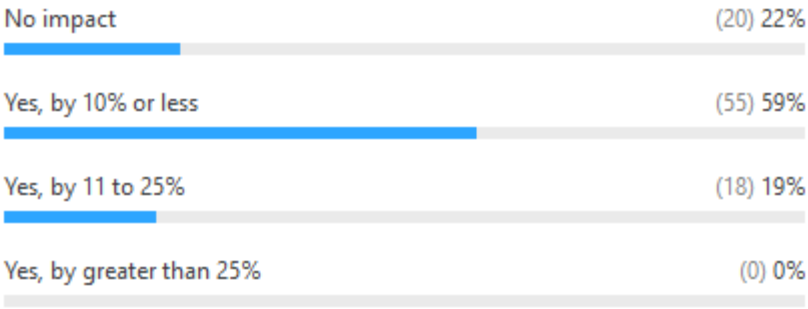
1. Which pesticide type would you say is MOST needed on your marsh? In other words, if you could have just one pesticide type, which would it be?



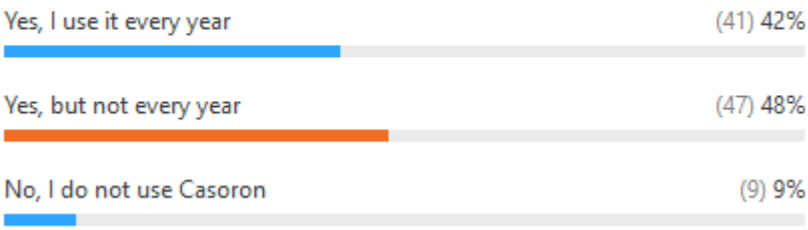
1. Do you have moss on your marsh?



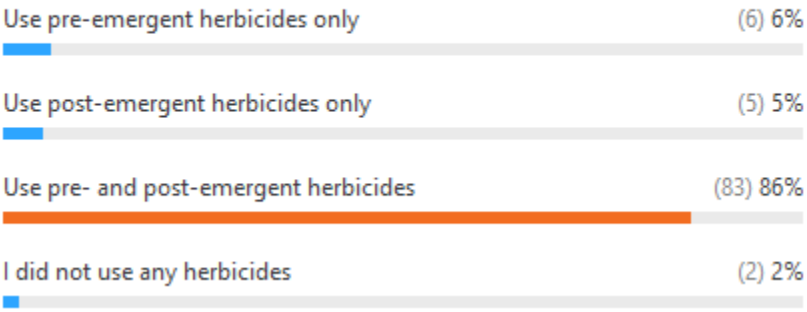
1. Do you feel that your weed pressure impacts cranberry yield?



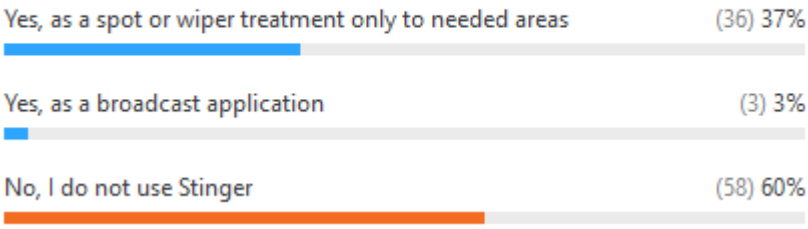
1. Do you use Casoron in your established beds:



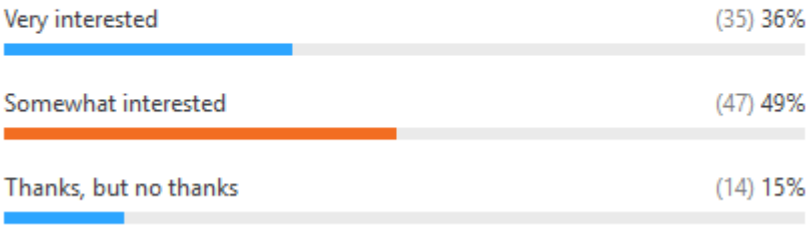
1. For your weed control program in 2020, did you:



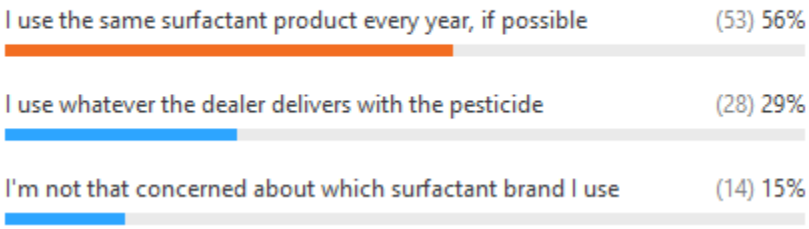
1. Do you use Stinger in your cranberries?



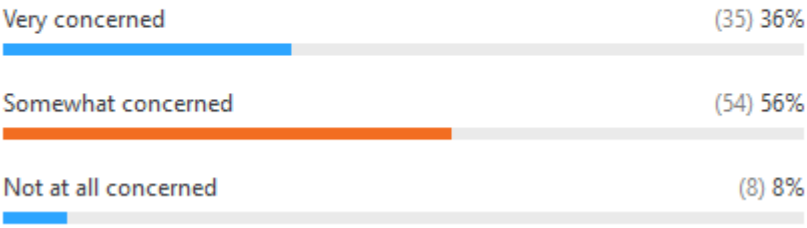
1. Robotic weeding technology is advancing rapidly. Would that be of interest to you for cranberry weed control?



1. When considering surfactants with your pesticides:

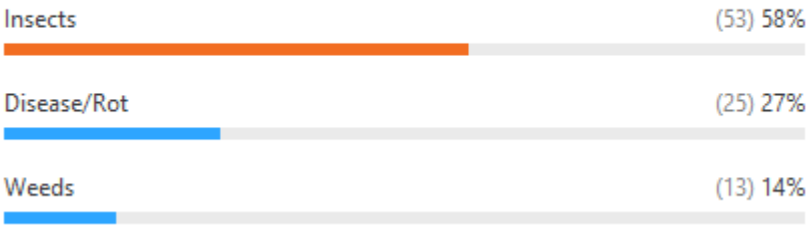


1. Are you concerned about the development of herbicide-resistant weeds on your marsh?

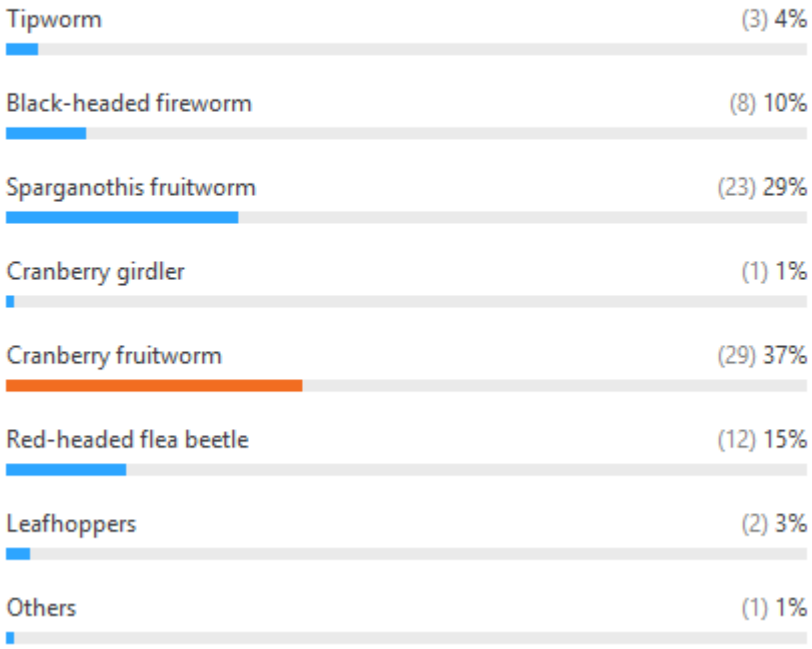


Entomology Section

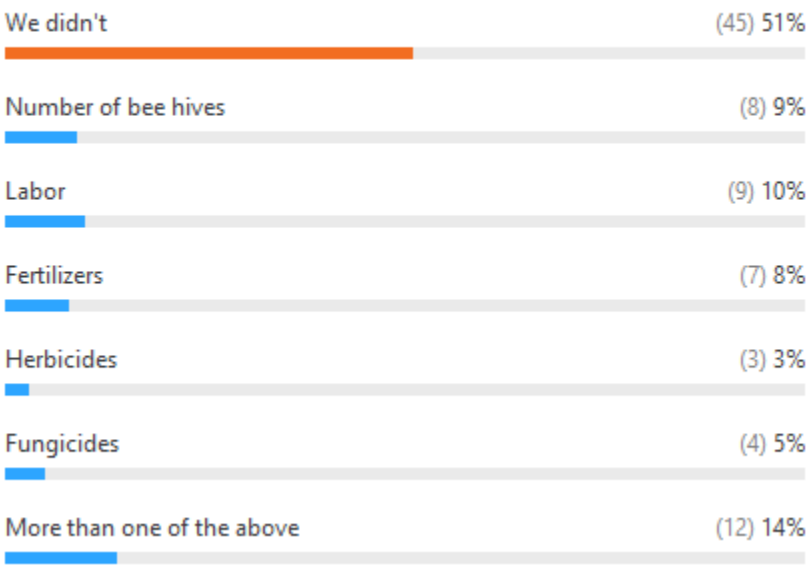
1. What was the main yield-reducing pest of the 2020 crop?



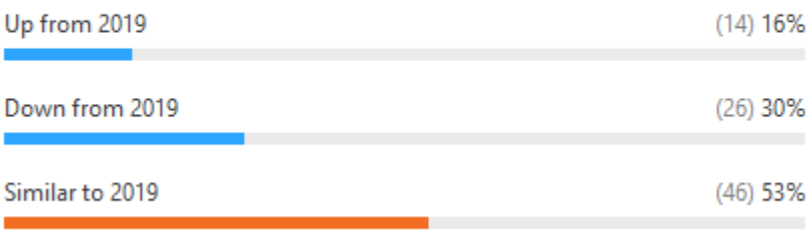
1. What was the first most economically important insect pest on your marsh in 2020



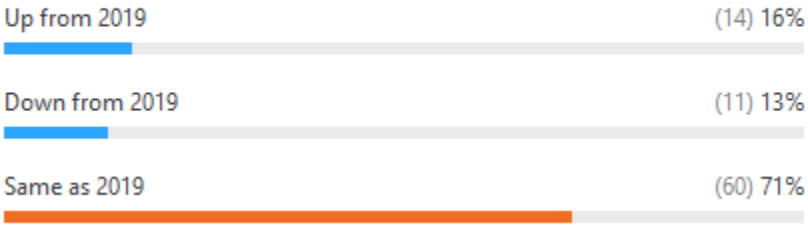
1. In 2020, we reduced these inputs:



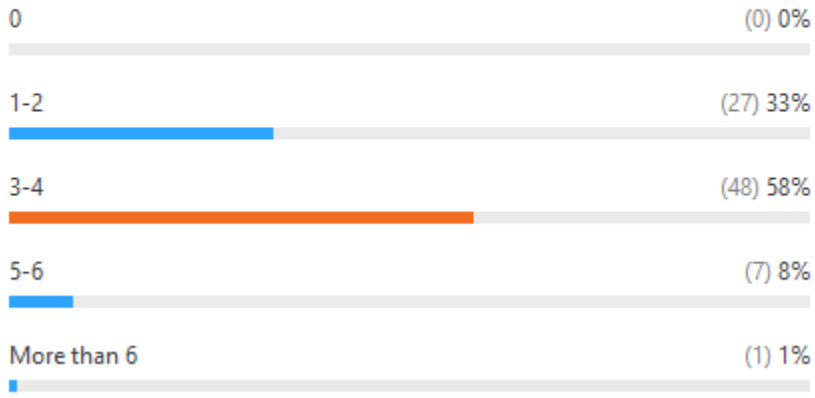
1. Was your insect pressure in 2020:



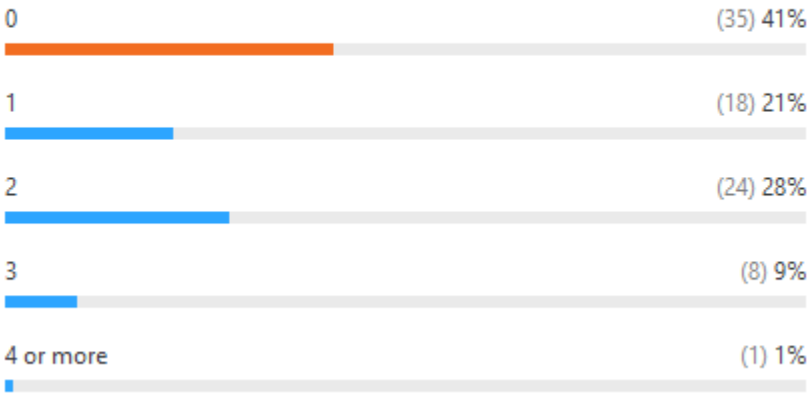
1. Was your number of insecticide sprays in 2020:



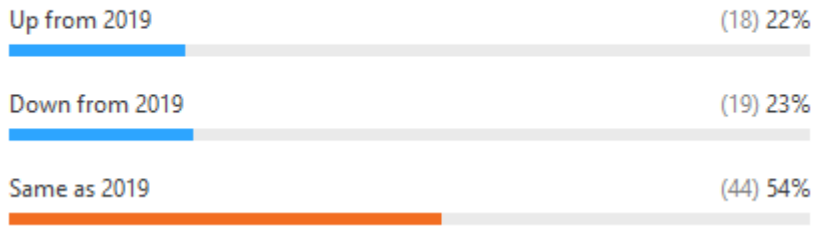
1. How many insecticide sprays did you apply in the 2020 growing season?



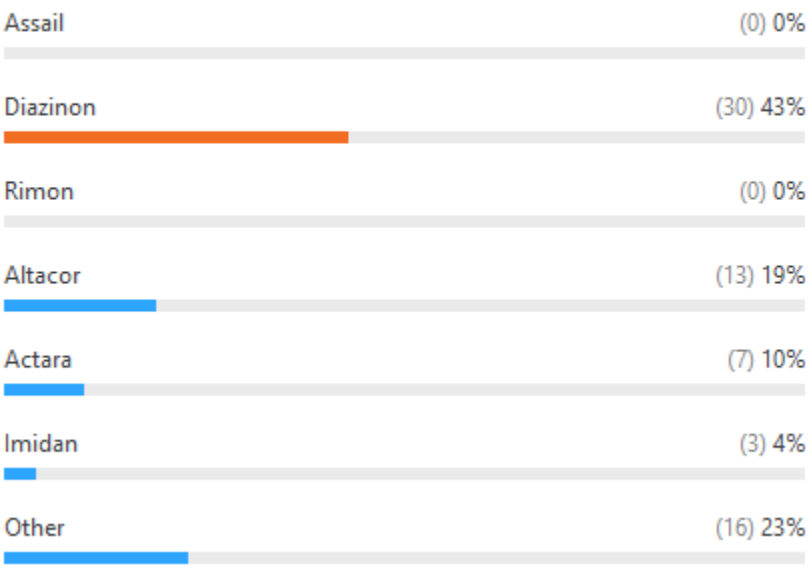
1. How many sprays did you apply specifically for flea beetle in 2019?



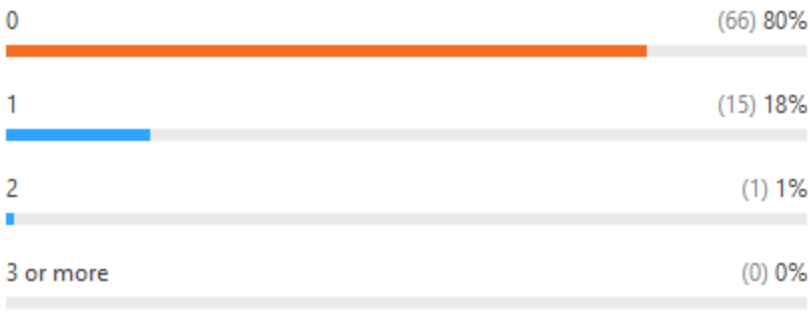
1. Was the flea beetle population on your marsh in 2020:



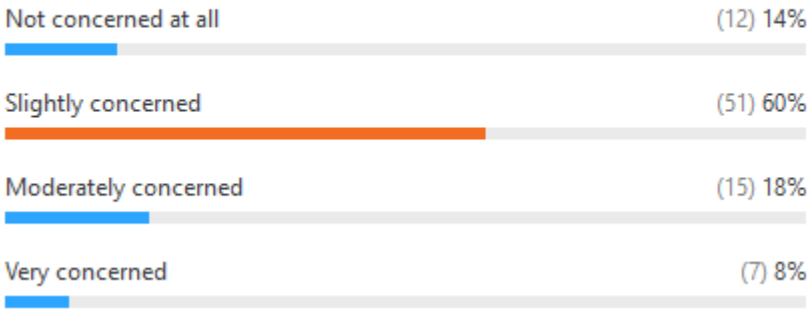
1. What insecticide did you use for flea beetle control in 2020?



1. How many times did you spray for leafhoppers in 2020?



1. How concerned are you about leafhoppers on your marsh?



1. Would you be willing to apply native, insect-killing nematodes on your marsh for control of caterpillars, grubs, and beetles in the soil?

Yes, on a small test acreage	(29) 33%
Yes, on any/all acreage	(35) 40%
No	(2) 2%
Maybe, I would like more information	(21) 24%

1. Would you be interested in using a flea beetle pheromone for monitoring and possibly managing flea beetles in the future?

Yes	(45) 52%
Maybe	(34) 40%
No, sweep nets work fine	(3) 3%
No, pheromones are expensive	(0) 0%
No	(4) 5%

1. Do you typically flood in spring (mid- to late-May) for insect control?

Yes, every year	(11) 13%
Yes, every other year	(3) 3%
Yes, some years	(30) 34%
No, I don't	(34) 39%
I did but stopped or plan to stop	(10) 11%

Horticulture Section

1. Was your crop in 2020:

Up from 2019	(23) 40%
Down from 2019	(26) 46%
Similar to 2019	(8) 14%

1. In the 2020 yields were:

Higher than average	(19) 23%
Lower than average	(42) 51%
Similar to previous years	(21) 26%

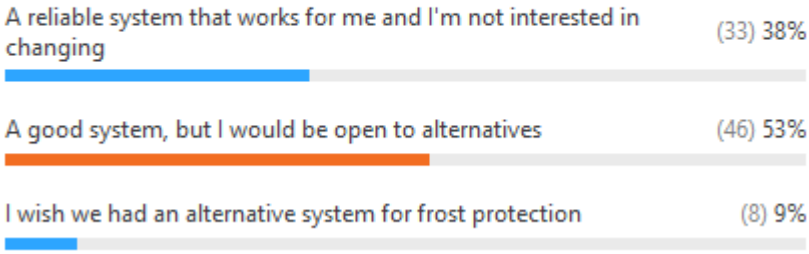
1. In 2020, fruit firmness was:

Similar to previous years	(60) 67%
Better than previous years	(27) 30%
Worse than previous years	(3) 3%

1. In the last decade how many times have you lost yield due to spring frost events?

Never	(35) 43%
Between 2-5 times	(44) 54%
Between 6-8 times	(0) 0%
Every year	(2) 2%

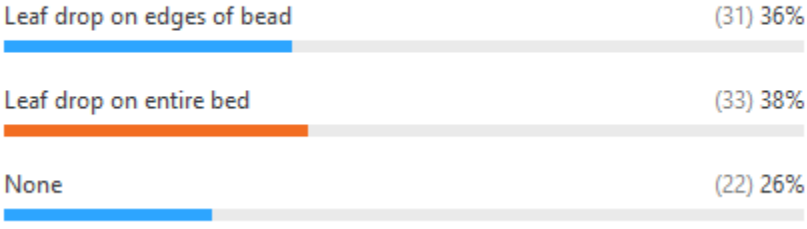
1. When it comes to frost protection, using sprinkler irrigation is:



1. Do you track chilling hours?

1. Would you be interested in using growing degree days for predicting plant development and fertilizer application?

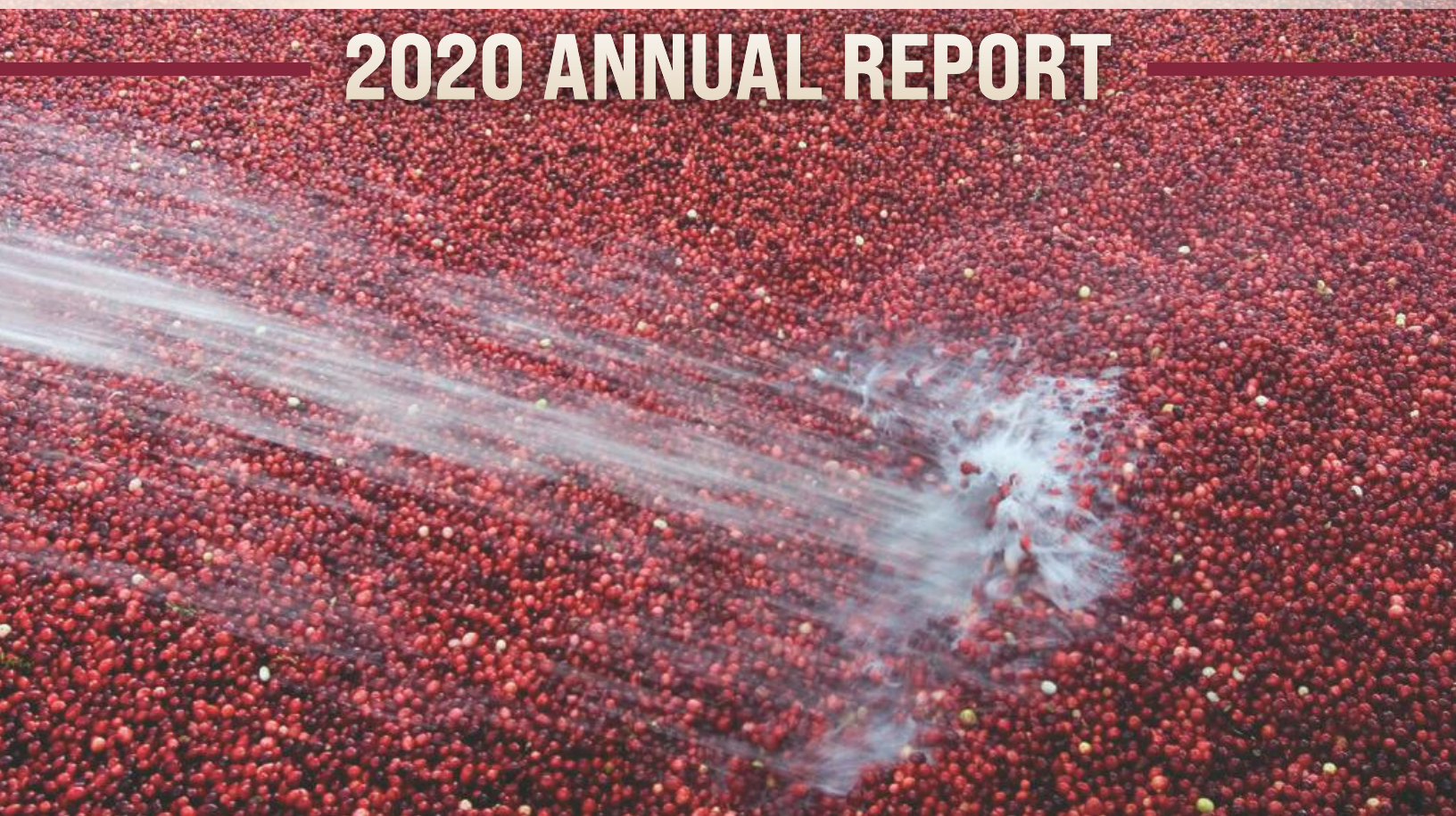
1. What kind of winter damage did you notice on your marsh?

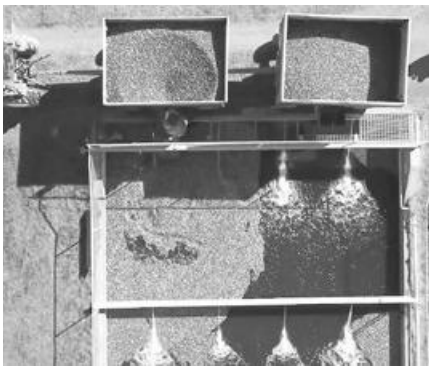


WISCONSIN STATE CRANBERRY GROWERS

Association

2020 ANNUAL REPORT





From the President

Hello, what a year it's been! We were last together in Wisconsin Dells with good energy, in a new place and with a revised structure for cranberry school. Board elections had taken place and officers were selected at which time I took over the President's position from the retiring Tyler Walker. Your Board of Directors were just getting momentum and making progress on the strategic plan. We held a Board development session during the February Board meeting to get everyone aligned and working together on our new plan.

Then, the coronavirus pandemic hit in March and hasn't subsided to date… So our last in-person meeting was held in February 2020. The Board and staff very quickly adapted moving all meetings online. Staff moved to a mostly "work remotely" structure. All in-person activities from the Association and constituent groups were extremely limited.

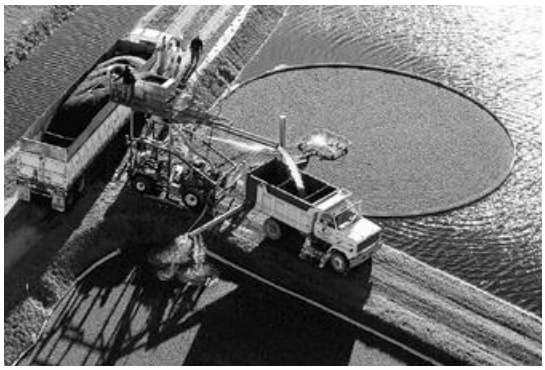
But this is a story of success to say the very least. Yes, the required changes in basically all of our operations were heavy on the emotions as we entered into the "foggy time". The Board and staff were very quick to adapt to new structures, keep all the current efforts underway, and embrace the chaos as an opportunity to evolve and open new doors. The list is very long on what is different and here to stay as a part of our daily lives and culture going forward. This was all successfully accomplished by the positive attitudes of staff and the Board. We will see the results of this time and it's evolution in play for many years.

Regarding governance of the Association, the Board finished restructuring committees so that all are now chaired by Board members and are focused working groups. We added an Executive Committee to evaluate the future direction of the Association and succession issues. We expanded the Nomination Committee to be a Board Development Committee. This group will keep an ongoing pipeline of people with skills to move into Board positions and make sure we have a well-rounded skill set on the current Board.

Tom Gardner stepped down from the Board this year and the new Board Development Committee quickly evaluated the cranberry community and recommended that Kris Parker be named by the board to fill out Tom's term. And finally, the Board moved the renewal date for annual dues to January 1st to better align with our fiscal year, as we had a window of short cash flow to address.

Regarding finances of the Association, the response to changing the membership renewal date has been extremely positive. Thank you to all members for playing your part in supporting your Association. Having as many members as possible, both growers and associates, making timely dues payments allows us to have a more focused plan for the year and also not be distracted by cash flows concerns.

Where are we going now? Well, we are ahead of schedule on our strategic plan as a result of the forced changes during this past year due to COVID-19. And we aren't going to slow down. There is still much learning and evolving to do now that we have integrated new formats and structures. The foremost issue that has come to light during this period is that the funding model for the Wisconsin cranberry industry has become outdated. The content and delivery of cranberry related information is effective and successful. However, who is paying for and supporting these efforts versus who benefits from this investment needs to be analyzed. Your Board and committees will be taking a deep dive over the next year to learn more about other models and structures as we educate ourselves regarding alternative models. We want to make sure that everything is positioned for the near term to get what is most effective for our growers. So, thank you for your trust and support as we go on this journey.



From the Executive Director

It's no doubt that the year 2020 was one of the most challenging and unusual years that I have seen in my time with the WSCGA. We faced an international pandemic that threatened our health, shut down our economy and took the lives of hundreds of thousands of people in the US and caused tremendous pain and suffering to millions of Americans. The immediate outlook to return to "normal" still is not positive, and although vaccines will help it, no one knows what the post-COVID future looks like.

So how does a trade association like WSCGA respond in such an environment? We have been creative, flexible and nimble in implementing programs for our members.

Our meetings and events went to solely online formats in March. We adopted technology for our uses and found that there were opportunities to save time and resources while conducting the work of the Association.

We adjusted our budgets to reflect revenue lost from trade shows and the summer and winter meetings, yet we still held virtual events to share information with growers. We implemented cost savings to manage expenses and worked on developing alternative sources of revenue. The Executive Committee was created and took a close look into the operation of the organization with the goal to enhance the financial foundation of the Association. We will continue to look at business and funding models to provide the best use of resources and to continue to partner with the Wisconsin Cranberry Board, Inc. and the Wisconsin Cranberry Research and Education Foundation.

We also discovered that we could provide additional education opportunities online for growers and members. Working with Allison Jonjak our new Extension Cranberry Outreach Specialist, Alex Skawinski and the Education Committee developed a series of virtual "Brown Bag Seminars" to update growers on timely topics throughout the growing season. They also have been working to develop the virtual Cranberry School, WSCGA Winter Meeting and Trade Show. The committee is already preparing a plan for the 2021 education programs and events.

Our communications program also had to make major adjustments to its plans for the year. A large part of the planned effort was participation in promotion events such as State Fair, UW Badger Sports, direct harvest promotions, etc. With these events cancelled, the Public Relations Committee and Isaac Zarecki pivoted to an emphasis on social media. This included sponsoring pieces with Charlie Berens of the Manitowoc Minute. The promotion reached millions of his viewers and we were able to leverage the work on our social platforms. The Public Relations Committee will be planning for 2021 for both social media and in person events, depending on conditions moving forward.

The State and Federal Governmental Relations work is detailed in the annual report, but we were able to continue to address state issues such as water quality, water conservation and ongoing environmental issues. At the state level we secured payments of up to $3,500 for growers as part of the COVID relief package. We also were able to get cranberries included in Federal COVID relief payments that provided substantial support for state growers, up to 10% of sales in 2019.

We continue to support the efforts of the WCREF to develop the Wisconsin Cranberry Research Station. The Foundation has started work on the building and lab phase of the project and anticipates an early summer opening of the new education and research facility. Our cranberry research team at UW is at full strength and continues to grow. We added two new ARS positions this year, one in Plant Pathology and one to work in Food Science. UW also filled the vacant Plant Pathologist position and added a new Extension Cranberry Outreach Specialist in partnership with Wood County.

These accomplishments align completely with the Strategic Plan we developed three years ago. Working with WCB and WCREF, we have been able to implement the plan and now look to evaluate the work and continue to look at the long term needs of growers and a strategy for the groups to address them.

It has been a difficult but rewarding year. Your board, staff and leadership have stepped up to transition the Association to operate in any environment. It is rewarding to see the participation by members in programs and leadership opportunities. A great metric is to look at grower support. Our grower membership dues revenue exceeded our budget projections as well as the amount received in the previous year. Thank you to all of you for that support. We will strive to continue to earn your support.

WSCGA Annual Report

The Wisconsin State Cranberry Growers Association was formed in 1887 to serve the state's emerging cranberry industry. Some 134 years later, the organization continues to work to meet its mission of providing quality programs for members to enable the industry to prosper.

WSCGA is organized as a non-profit, non-stock corporation governed by a nine-member Board of Directors. The Board is advised by a number of committees and working groups on topics ranging from Public Policy to Promotion to Grower and Public Education. The Association employs professional staff and consultants. The Board, committees, staff and consultants work together as a team to develop and implement programs and policy for the organization.

The 2020 Annual Report highlights activities by the Association on behalf of its membership throughout the course of the year. These successes are due to the hard work of the grower and associate members who volunteer their time and talent to work with the Association's professional staff and contractors to advance the mission of the organization. We hope all growers and members of the industry will thank those who continue to work on their behalf and to join the WSCGA in these efforts.

Wisconsin Cranberry Industry Strategic Plan Update

Purpose

In early 2018, the Wisconsin cranberry industry organizations – the Wisconsin State Cranberry Growers Association (WSCGA), the Wisconsin Cranberry Board (WCB), and the Wisconsin Cranberry Research and Education Foundation (WCREF) – agreed to jointly sponsor a strategic planning process.

The goal was to develop a strategic plan for the three Wisconsin cranberry grower organizations that will coordinate their collaborative efforts to support research, education, communication, and public policy programs identified as priorities by the grower community. The organizations sought to develop a set of strategic initiatives that would enhance the success of Wisconsin's cranberry growers and would build on the organizations' existing strengths in grower education, public affairs, governmental affairs, stewardship and investment of grower resources, and operation of the new Research Station.

So how has WSCGA done over the past three years?

Guiding Principles

Although the WSCGA, WCB and WCREF have distinct mission statements and areas of focus, they are connected by common Guiding Principles. These principles are followed as they develop programs and take on activities for Wisconsin growers.

These Guiding Principles shape collaboration and cooperation across all three organizations for the benefit of Wisconsin's cranberry growers and cranberry industry.

1. *Wisconsin Cranberry Grower Success*
   We are here to support the success of Wisconsin's cranberry growers and the $1 billion Wisconsin cranberry industry through development and adoption of best practices, support for sensible regulatory approaches, and strong relationships with industry partners and local communities.



2. *Industry Leadership*
   We are committed to advancing the interests of Wisconsin growers while advancing the cranberry industry as a whole.

3. *Operational Excellence and Innovation*
   We support the commitment of Wisconsin cranberry growers to leading edge agricultural and business practices through research, education, technical assistance, marketing, stakeholder engagement and advocacy.

4. *Stewardship*
   Wisconsin cranberry growers are local farmers who are committed to sustainable agricultural practices that ensure successful harvests, positive environmental effects, long-term viability of cranberry production and strong relationships with our neighbors and our communities.

5. *Partnership*
   We cultivate collaborative relationships at the national, state and local level. Our partners include growers, researchers, handlers, industry experts, policy makers, consumers, and community members

WSCGA Mission Statement
As part of the process the WSCGA developed a more concise mission statement.

> *The Wisconsin State Cranberry Growers Association enables Wisconsin cranberry growers to prosper by providing growers with information, championing responsible environmental stewardship, advocating for sound governmental policies and leading effective public communications and outreach.*

WSCGA Structure
The Board worked with WCREF and WCB to identify roles and responsibilities in programming. Once these were agreed upon, the Association took a look at its operations with an eye to be more efficient, more responsive to grower needs and meet the overall mission and strategic initiatives.

Significant actions included:

- Restructuring committees to meet program areas, eliminating several committees, naming Board members as committee chairs and developing specific charters, committee member duties and responsibilities, and the duties of each committee chair.
- Adding an Executive Committee with limited delegated Board powers to review organizational structure and finances
- Addition of the Board Development Committee to serve as nominating committee and to identify ongoing programs to develop board leadership skills.

Strategic Initiatives
Using the information gained from the grower survey, expert interviews, joint Board retreat, and the advice of the planning committee, four broad goals for Wisconsin cranberry industry over the next three years were identified.



Those goals are:

1. Increase demand for Wisconsin cranberries and manage oversupply.
2. Enhance grower education and technical assistance.
3. Strengthen grower engagement in research.
4. Improve efforts to market the strengths of the Wisconsin cranberry industry, specifically growers and grower practices.

Education

Grower education is central to the mission of the WSCGA. WSCGA sponsored grower education programs include the Wisconsin Cranberry School, nutrient and pest management workshops, Brown Bag Seminars and mini-clinics, newsletters and a variety of publications.

Through this strategic planning process, growers and Board members identified the need to continue to evolve grower educational offerings, including exploring ways that the Wisconsin cranberry industry's educational offerings could generate non dues revenue.

Structural Changes

As the organizations developed the plan there was a recognition of the need to identify each organizations' role in programming. Changes were made to the WSCGA staff to allocate program responsibilities in line with the desired outcomes of the plan. The Board created a Member Education and Communication Manager Position to enhance education programming.

Alex Skawinski took on responsibilities as the Member Education and Communications Manager Position. In this role, she works with the Education Committee on programming and the Associate Member Committee on Trade Shows, advertising and marketing opportunities. She coordinates and edits the monthly newsletter, manages the membership side of the wiscran.org website, new projects such as customized workforce development, and workshops as needed for owners and managers.

WSCGA worked with UW Madison Division of Extension to create a new Extension Cranberry Outreach Specialist to work across the state on Extension programming for Wisconsin growers. Allison Jonjak was named to the position and added a valuable resource to the Wisconsin Cranberry Research and Education Foundation team.

Through this strategic planning process, growers and Board members identified the need to continue to evolve grower educational offerings, including exploring ways that the Wisconsin cranberry industry's educational offerings could be revenue generating.

The plan identified two Education Initiatives and progress has been made to implement the strategies to meet the desired outcomes:

1. Enhance current educational offerings for Wisconsin growers.

   The WSCGA Education Committee named small working groups to focus on planning the content of the Nutrient Management Planning Workshop, the Pesticide Users Workshop, the May Mini-clinics and the WSCGA Summer Meeting. The Education Committee worked as a group to develop the programming, content and structure of the Wisconsin Cranberry School. The full Committee evaluated the events after their completion.

With the cancellation of in person events due to the pandemic the Committee moved to online and virtual programming. Allison Jonjak worked with Alex Skawinski and the Education Committee to develop a series of virtual programs for growers. These “Brown Bag” seminars provided growers with a fast and easy way to access important and timely information during the growing season.

2. Explore marketing Wisconsin cranberry grower education to other growing regions and other agricultural producers as new revenue – generating service offering.

   The Committee will be exploring opportunities to create education programs that would be in cooperation with other growing areas or lead to events that have a national appeal. Another option being discussed is partnering with other Wisconsin groups to develop educational opportunities of mutual interest to members. This initiative will be further developed in the next year.

   As a pilot project, the Education Committee sponsored a Brown Bag session on research being conducted at Rutgers Research Station in New Jersey. The Association extended an invitation to growers in all growing regions to participate with excellent response. The committee will look for other opportunities to provide these types of programs for the growers across North America.

Research

Supporting, participating in, and sharing the results of research on cranberry production are central functions of all three cranberry organization Boards. The development of the new Research Station creates a tremendous opportunity for the Wisconsin cranberry industry to advance a research agenda, supported by aligned strategies across all three Boards. The Research Station itself is a platform for grower engagement in research, as well as a positive industry promotion and workforce-recruiting tool.

Structural Changes

A major change was made to move the responsibilities for the Research Roundtable to the Wisconsin Cranberry Research and Education Foundation. This year the program was held in a virtual format with over 45 people participating. The program for the roundtable provided smaller breakout sessions for group discussions on specific areas and topics for research. These discussions resulted in further aligning grower priorities with research faculty programs. The Foundation is also looking at utilizing the Research Roundtable more than once a year to assist in directing the Foundation’s research programs and efforts at the station.

The Boards identified two Research Initiatives and progress has been made to implement the strategies to meet the desired outcomes. These programs fell to the WCB and WCREF with the WSCGA providing a supporting role.

Public Affairs/Community Engagement

Wisconsin has a large grower community that is committed to land and water stewardship and responsible growing practices. Growers believe there is an opportunity to promote cranberries and the Wisconsin cranberry industry through promotion of Wisconsin growers and growing practices.

Growers and Board members would like to see the industry organizations use the local, sustainable nature of cranberries and growing operations as a marketing asset.

The Wisconsin growing community's tradition of family farms and environmental stewardship is a story that needs to be told and reinforced with the public. The Boards believe the industry can drive demand by telling the "story of the Wisconsin grower" and differentiating cranberry production from increasing consumer concerns about "big food" and "corporate agriculture."

Structural Changes

As the organizations developed the plan, there was a recognition of the need to identify each organizations' role in programming. Changes were made to the WSCGA staff to add a newly created Public Education and Communications Manager position. The WCB and WSCGA share the costs of the position. Isaac Zarecki was named Public Education and Communications Manager in September 2019.

Working with the Public Relations Committee, Zarecki developed an initial program based on the objectives in the plan. WSCGA completed a public opinion survey which identified strengths and areas of opportunity for messaging to reach important audiences. The committee used these results to develop the plan for the year.

There were three Public Affairs/Community Engagement Initiatives identified and progress has been made to implement the strategies to meet the desired outcomes:

1. Tell the story of Wisconsin Cranberry Growers through grower centered promotion, outreach and communications strategies.

   The WSCGA has developed a team of grower spokespeople who have participated in communications development and host media on their farms, participate in promotions such as State Fair, the American Birkebeiner, the Crazylegs Classic and other promotional events.

   Growers also presented testimony at Legislative hearings on behalf of the WSCGA and participated in Cranberry Lobby Days delivering messages about cranberry growing in Wisconsin.

2. Expand outreach and community engagement to drive demand and promote innovation at the research station.

   The initiative is in the formative stage as WSCGA looks to increase grower engagement in community outreach. The organization will partner with interested growers to promote Ag and eco-tourism, marsh tours and cranberry festivals. The Research Station when completed will offer a hub for learning and will reinforce the positive messages about cranberry growing and cranberries as a healthy locally grown product.

3. Expand outreach and community engagement to build awareness of cranberry growing with prospective workers

   The Boards have been engaged to confirm priorities and to begin to develop an action plan. Discussions have been held with technical colleges on internship opportunities as well as workforce development and specialized training and certification programs. With the onset of COVID, plans for in person workforce development programs were set aside.

   As the research station development is completed, the facility will be utilized by various school and post secondary groups with programming to enhance education of careers and opportunities in cranberry growing.

Product Development
Growers, Board members, and industry experts agreed that a popular new product would play a key role in reviving demand for cranberries. In the past, new products have pulled the industry out of other periods of low demand, with sweetened dried cranberries being the most recent example.

It is unclear whether Wisconsin's three Boards ought to play a role in new product development. This responsibility traditionally has fallen to others in the industry. In the grower survey, a number of growers advocated for investing more WCB funding into product development rather than research. With the WCB's limited resources, it may be difficult to justify expenditures in this area.

The WSCGA did however work with USDA ARS to add a fourth scientist at the UW Madison who will work on fruit quality and food science. That position is expected to be filled in 2021.

1. Support development of new traditional or innovative cranberry products

   Even with limited funds available, the Wisconsin Cranberry Board, Inc. has funded two research projects to look at new products. The first is evaluating use of polyphenols in cranberries in animal feeds and dairy rations. The second is looking at using cranberry juice as a premium dye in natural fabrics and clothing.

The Board will be forming a work group to explore approaches to developing new product offerings.

Summary
The Boards wanted to make sure that the money invested in the plan was put to good use. As a result, the plan is well ahead of schedule to be implemented within the three-year period that was envisioned when adopted. Each organization has a clearer understanding of their role in providing the best for Wisconsin growers. They also have a commitment to collaborating and working together to avoid duplication and to deliver quality programming and services in as efficient a manner as possible. The plan will be a living document that changes as needed to meet grower needs and the missions off the WSCGA, WCB and WCREF. In 2021 the plan implementation will be evaluated, and the Boards will look at the future to continue to provide the Wisconsin cranberry grower with the tools they need to be successful.

The Team – WSCGA Board of Directors 2020

Steven Bartling, President
Steven and his family own and operate Bartling's Manitowish Cranberry in Manitowish Waters. Steven serves as the WSCGA President, as well as on the Executive, Education, Research Committees and the Technology Subcommittee. Steven served as the WSCGA representative on the Strategic Planning Committee. He participated in the inaugural class of the Wisconsin Cranberry Leadership Development Program in 2012-13, and was elected to the Board in 2016.

Rocky Biegel, Vice President
Rocky Biegel is part of Dempze Cranberry Co. in Wisconsin Rapids and King Cranberries LLC in Augusta. Rocky joined the Board in 2017 and became the WSCGA Vice President in 2020. He serves on the Executive, Board Development and Education Committees.

Mary Smedbron, Secretary
Mary is part of Saratoga Cranberry in Wisconsin Rapids. Mary was elected to the Board of Directors in 2020 and serves as the WSCGA Secretary. Mary also serves on the Executive, Board Development and Public Relations Committees. Mary participated in the inaugural class of the Wisconsin Cranberry Leadership Development Program in 2012-13.

Jenna Van Wychen - Treasurer
Jenna joined the Board in 2017. Jenna is part of Van Kow Cranberries and Wetherby Cranberry in Monroe County. Jenna serves as chair of the Associate Member Committee and is the WSCGA Treasurer. She participated in the 2013-14 Wisconsin Cranberry Leadership Development Program.

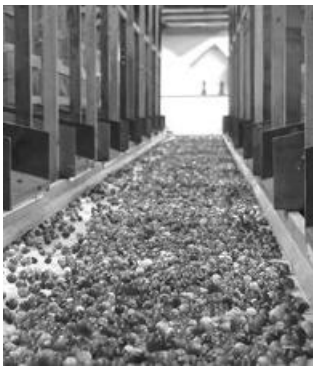
Jim Bible
Jim is part of Brockway Cranberry and Rock Creek Cranberry in Black River Falls. Jim was elected to the Board in 2020 and serves as chair of the Education Committee.

Mike Bretl
Mike serves as the Wisconsin Region Manager for Farmland Management Services, based out of Wisconsin Rapids. Mike joined the Board in 2019 and is the chair of the Research Committee. He took part in the inaugural class of the Wisconsin Cranberry Leadership Development Program, in 2012-13. Mike earned the Accredited Farm Manager designation from the American Society of Farm Managers and Rural Appraisers in 2017. In 2018, he became a Wisconsin Certified Crop Advisor and Sustainability Specialist, qualified through the American Society of Agronomy.

Tom Gardner
Tom is part of Gardner Cranberry and Hay Creek Cranberry located near Pittsville. Tom joined the Board in 2012. Tom served as the President of the Association in 2017.

Karl Pippenger
Karl is part of the team at Cranberry Lake Cranberries in Phillips and owns and operates his own small cranberry marsh, "Pip's Cranberries". He participated in the 2013-14 Wisconsin Cranberry Leadership Development Program. Karl joined the Board in 2015 and serves as the chair of the Public Policy Committee.

Rusty Schultz
Rusty joined the Board in 2018 and is part of Russell Rezin & Son and Jay Creek Cranberries in Monroe County. He participated in the inaugural class of the Wisconsin Cranberry Leadership Development Program in 2012-13. Rusty is the chair of the Public Relations Committee.


WSCGA Committees

Executive Committee

Charge: The Committee is tasked with review of the current employee evaluations process, personnel policies, and succession planning, and will also look at long term funding dynamics for the WSCGA. The Executive Committee has received limited, delegated powers to act on the board's behalf between board meetings, develop budgets, monitor the finances of the organization, and coordinate the evaluation of the Executive Director.

Steven Bartling, President
Rocky Biegel, Vice President
Mary Smedbron, Secretary
Jenna Van Wychen, Treasurer
Bill Hatch
Mark Mahoney

Public Policy Committee

Charge: The Committee is responsible for the development of recommendations on policy related to issues and state, federal regulatory and legislative actions that arise as part of the public policy advocacy program. The committee works to mobilize growers on issues to implement policy and works to develop relationships with elected officials to help them understand the concerns of Wisconsin cranberry growers.

Karl Pippenger- Chair
Asa Bennett
Amber Bristow
Jenna Dempze
Karen Doers
David Hansen
Nicole Hansen
Bill Hatch
Leroy Kummer
Andy Reitz
Seth Rice
Doug Rifleman
Russ Rifleman
Ben Ryner
Scott Schultz
Craige Scott

Education Committee

Charge: The main emphasis of the WSCGA mission is education, both for growers and the general public on cranberry growing. A large portion of this responsibility is assigned to the Education Committee, making it one of the key committees in the Association. The committee meets with UW Extension faculty and others during the year to review and plan the various education programs for the Association including the Wisconsin Cranberry School, early season workshops and the Summer Meeting and Field Day.

Jim Bible- Chair
Christelle Guedot- Cranberry School Program Chair
Dani Anderson
Steven Bartling
Steph Bennett
Rocky Biegel
Jim Bielmeier
Alex Billman
Jeremy Eichhorn
Steve Hahn
Nicole Hansen
Jason Hatch
David Jones
Christina Maley
John Moss
Kris Parker
Andy Reitz
Russ Sawyer
Jayne Sojka
Pam Verhulst

Public Relations Committee
Charge: The Public Relations Committee is responsible for development and implementation of the communications plan for the Association. The objectives of the communications program of the WSCGA are twofold. First, to promote the general knowledge of cranberry growing in Wisconsin to enhance the image of growers and the industry; second, to inform consumers and the public about cranberries and cranberry products to enhance and promote the consumption of fruit and increase overall demand for cranberry products.

Rusty Schultz– Chair
Dani Anderson
Amber Bristow
Robert Detlefsen
Jeremy Eichhorn
Amy Gebhardt
Mike Gnewikow
Fawn Gottschalk
Rochelle Hoffman
Leroy Kummer
Gabriella Liddane
Beth Oemichen
Jessica Rezin
Mary Smedbron
Nodji Van Wychen

Research Committee
Charge: The Board of Directors established the committee to provide growers with a forum to discuss research needs with University of Wisconsin research faculty and the cranberry research community on a national basis. The committee works cooperatively with the Wisconsin Cranberry Board, Inc. (WCB), The Cranberry Institute (CI), and others to identify grower research needs, coordinate projects to avoid duplication, and to help establish priorities.

Mike Bretl – Chair
Dani Anderson
Suzanne Arendt
Steven Bartling
Alex Billman
Amber Bristow
Stephen Brown
Robert Detlefsen
Mike Gnewikow
Fawn Gottschalk
Ed Grygleski
Jeff Habelman
Nicole Hansen
David Jones
Gabriella Liddane
Mark Mahoney
Christina Maley
John Moss
Doug Rifleman
Ben Ryner
Dustin Sawyer
Russ Sawyer
Scott Schultz
Jayne Sojka
Pam Verhulst
Bill Wolfe

Associate Member Committee
Charge: The Associate Member Committee provides input on WSCGA Associate Membership benefits, Summer and Winter Trade Shows, NEWS advertising, Program Book & Buyers Guide publication advertising, sponsorships, mailings and evaluations.

Jenna Van Wychen - Chair
Tom Altmann
Amy Boson
Derek Johnson
Casey Koback
Paul Roberts
Dawn Ruiter
Nicki Ryner
Jay Weidman

Board Development Committee
Charge: The Board Development Committee functions to identify paths of leadership for potential leaders and develop their skills. The Committee is responsible for Board recruitment, orientation, Board and director self-assessment, continuing education, and Board management in addition to serving as the Nominating Committee

Rocky Biegel, Chair
Mike Bretl
Mary Smedbron

Technology Subcommittee
Charge: The Technology Subcommittee is a subset of the Education Committee. The subcommittee is tasked with assisting the Board of Directors and WSCGA Committees on an as-needed basis in matters such as information technology, adoption of new technologies by the industry, identifying solutions to the technological needs of the Association, etc.

John Moss – Chair
Dani Anderson
Steven Bartling
Russ Sawyer
Pam Verhulst

WSCGA Staff

Tom Lochner, Executive Director

Tom Lochner was named the first WSCGA Executive Director in 1988. Since then, the association has grown into a well-respected voice for Wisconsin's cranberry growers. The Association expanded its education, communications and public policy programs. It took on the responsibility of providing administrative services to the Wisconsin Cranberry Board, Inc. to enable it to implement its research, education and promotion programs in a cost efficient manner. In 2004 the WSCGA also assisted the Cranberry Museum, Inc. develop and operate the Wisconsin Cranberry Discovery Center in the Village of Warrens. Most recently, WSCGA has provided administrative services to the Wisconsin Cranberry Research and Education Foundation for its effort to establish a research station for cranberries in Wisconsin.

As the chief staff person, Tom serves as the lead spokesman for the organization and represents WSCGA in interactions with University Research and Extension faculty and administration, as well as with Federal, State and local governmental organizations. He is also responsible for coordinating the activities of staff and various consultants who assist with communications and public policy programs. He serves as a liaison with industry groups, such as the Cranberry Institute and the USDA Cranberry Marketing Committee.

Over the course of his career, Tom has worked with the Board and committees on growing the programs and membership of the association. He believes in a team approach to program planning and development. This approach has resulted in active committees, an engaged and high performing Board, and high grower participation in WSCGA programs.

Alex Skawinski

Alex Skawinski joined WSCGA in December 2015. Last year, following the strategic planning project, Alex shifted into the role of Member Education and Communications Manager. In this role, she continues her duties as administrative assistant, but also leads education and communication programs for the association aimed at improving grower practices, knowledge and activities of the organization.

Alex is part of the team that keeps the office in Wisconsin Rapids up and running smoothly. She prepares materials and maintains records for Board and Committee meetings, develops and implements Associate Member programs with input from the Associate Member Committee, and works with the WCREF Development Fund Committee to plan and hold the annual Cranberry Open Golf Outing and the Sporting Clay Shoot. She also provides administrative support to the Wisconsin Cranberry Research and Education Foundation and the Wisconsin Cranberry Board, Inc.

Going forward, Alex will also work with the Executive Director, the Education Committee and the Associate Member Committee to develop industry education and communications plans, and assist with new projects such as workforce development, workshops for owners/managers, etc. She will continue to manage membership benefits, programming and education including all grower education programs, as well as develop content for and manage the membership side of the wiscran.org website, coordinate and edit the monthly newsletter, maintain the association's Oral History Project, and organize the Buyer's Guide publication.



Crystal Johnston
Cris joined the staff at WSCGA in 2005 as a part time bookkeeper. Her main responsibility is to keep the financial records for the Association. Cris has additional responsibilities as Clerical Assistant managing the databases for the membership, serving as back-up for staff support, assisting at meetings and WSCGA events, and serves as the office manager in purchasing supplies and equipment for the Association. In 2018, Cris became a Wisconsin Notary Public.

Additionally, she manages the assessment forms, filings, and bookkeeping for the Wisconsin Cranberry Board, Inc. Cris provides administrative support and bookkeeping to the Wisconsin Cranberry Research and Education Foundation and the Cranberry Museum, Inc.

Isaac Zarecki
Isaac joined the WSCGA in September 2019 in the new role of Public Education and Communications Manager. The association reorganized staff duties as part of the implementation of the strategic plan adopted in 2018. In the plan, growers supported increased communication and public relations efforts as well as continuation of the quality education programming provided by WSCGA. The new staffing structure is designed to accomplish these goals.

Isaac leads the WSCGA communication and promotion programs aimed at educating the public about cranberry growing in Wisconsin, maintaining a strong reputation for the industry and promoting the consumption of Wisconsin cranberries. He joined WSCGA after serving as an editor of a local newspaper in Hot Springs, South Dakota.

In this role, Isaac works with Executive Director and Public Relations Committee to develop an industry public relations and communications plan as well as implementing the plan, including various communications and marketing initiatives. He also develops content for and manages the public side of the wiscran.org website and the Wisconsin Cranberries social media channels content and strategic ad program, writes and edits various communications materials, including newsletter articles, annual reports, program books, news releases, pitch letters, talking points, articles and blog posts.

In addition, Isaac conducts media relations efforts on behalf of industry, including managing reactive and proactive news opportunities as well as managing WSCGA's partnership/sponsorship program, including logistics and contract negotiations. He also coordinates and markets the Made with Wisconsin Cranberries program.

Association Consultants

Dewitt, LLP is a full-service law firm based in Madison, WI. DeWitt has experienced attorneys in virtually all areas of law practice and has offices in Brookfield, Madison and Minneapolis, Minnesota.

The DeWitt Government Relations team is led by Attorney Jordan Lamb, a partner in the Madison office, who also serves as WSCGA's legislative counsel. Jordan Lamb's expertise in environmental regulation is a particular asset to WSCGA and our members, as they navigate the interplay between state and federal regulations and running a successful business. She is a consistent and trusted voice for us in the development and current rewrite of the State non-point source pollution program in NR 151 and ATCP 50. In prior legislative sessions, she played a key role in Wetland Reform Legislation, the development of a protocol for dealing with cranberry floodplain and consistently provides leadership on issues related to groundwater, drainage, artificial and navigable water bodies and business issues that affect our members.

Laughlin Constable, Communications and Public Relations

Laughlin Constable (LC) is a multi-faceted and full-service agency. The LC team is made up of a group of talented and creative public relations professionals with a wide variety of backgrounds. LC provides access to expertise for communications, public relations, advertising, influencer marketing and social media programs for WSCGA and its members and partners.

Kris Naidl, APR, began working with WSCGA in 1994 and she has assisted the cranberry industry with a number of efforts, including strategic communications work to affect change in state regulations, branding, publicity and media relations, issues management, digital strategy and more. She heads up LC's PR team and has earned her national accreditation from the Public Relations Society of America (PRSA). Kris and the LC team have been honored on numerous occasions by PRSA for its communications work to support Wisconsin's cranberry industry.

Katie Whitlock, APR, has worked with WSCGA for more than 5 years, assisting the industry with communication efforts, including strategic planning, public opinion research, media relations, issues management, event and sponsorship coordination, crisis communications, social media and more. She has earned her national accreditation from the Public Relations Society of America (PRSA).



WSCGA Program Activities

Public Policy Advocacy

WSCGA Public Policy Advocacy Program Overview

Policy Statement of WSCGA Public Policy Advocacy Program

The WSCGA's Public Policy Advocacy Program strives for state and federal legislative outcomes that allow Wisconsin growers to farm in an environmentally and economically sustainable manner. The position statements and activities of the Public Policy Program are weighed against this goal:

> Wisconsin cranberry growers support legislation, rules and policies that balance the conservation of important natural resources and the stewardship of resources by growers against the economic needs and benefits of cranberry growing in Wisconsin.

The following are priority areas for the WSCGA Public Policy Advocacy Program:

Environmental Policy and Regulation

The greatest threats – and opportunities – for the industry in public policy are in the area of environmental regulation. Whether it pertains to water access and quality, wetlands or the chemicals for crop production that growers use, WSCGA members expect their Association to represent their interests.

Water Access

An abundant and high quality water supply is the key to the success of cranberry growing in Wisconsin. As such, the highest priority for the WSCGA is to maintain and protect growers' ability to access surface and groundwater for their farming operations. Conducting normal farming operations to maintain and enhance water use and conservation must be protected and must continue to be allowed with limited regulation.

Water Quality

Cranberry farming practices face increasing scrutiny as to their impacts on water quality. WSCGA has led efforts with UWEX, USDA NRCS, DNR and DATCP to address Best Management Practices to protect water quality. Maintaining the definition of return flow from irrigated agriculture as a non-point source is a priority for the WSCGA. Changes to the state water regulatory program need continuous monitoring. TMDL development for cranberry waters and the Statewide Nutrient Management Strategy are also priorities for WSCGA.

Federal/State Linkage

In many cases with environmental regulation, there is a strong and important relationship between Wisconsin and federal laws and regulation. This is the case with the Clean Water Act and floodplain regulation. As changes take place in federal programs, they impact the state as the delegated authority to administer those programs. At the same time, attempts to reform or revise state regulatory programs require federal approval. WSCGA and its Legislative Counsel continue to be vigilant in these areas.

With these identified priorities, WSCGA staff and leadership will closely communicate with the WSCGA Legislative Counsel to evaluate issues as they arise, assess risk and threats to the industry, and then determine the level of activity that is required to meet the organization's goal and mission.

Federal Legislative Update
The WSCGA maintains a targeted Federal Legislative program that has developed a working relationship with all of the members of the Wisconsin Congressional Delegation. Bill Broydrick assisted the Association in these efforts which resulted in major benefits to growers this past year and a half.

When retaliatory tariffs were placed on cranberries into major markets WSCGA worked with the Administration and Members of Congress to secure payments for growers that provided cranberry farms $640 per acre in payments. The average sized marsh received over $50,000 in payments.

In responses to the COVID-19 pandemic, the Federal Government created a program to assist farmers under the CARES Act. Again the WSCGA worked with Members of the Congressional Delegation and Cranberry Caucus to make sure cranberry growers were included in the second round of the payments. That provided a payment of about 10% of sales for growers.

The Association also works with other grower and handler groups on issues such as pesticide registrations, MRLs, research funding and USDA purchases.

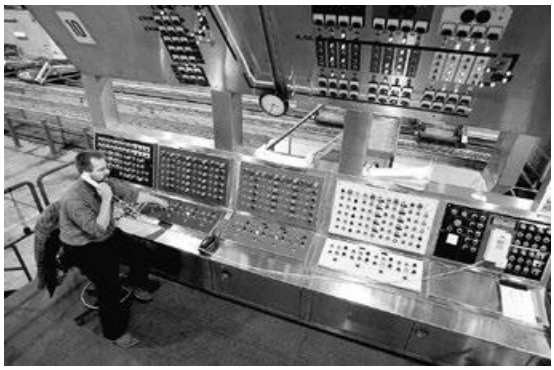
State Legislative Update
By Jordan Lamb, DeWitt LLP

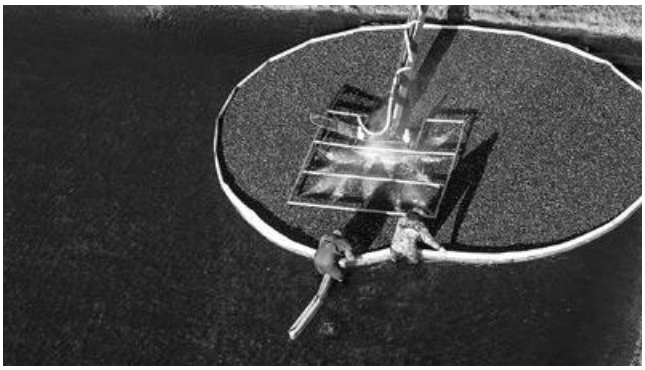
Attorney Jordan Lamb from DeWitt law firm in Madison, serves as the WSCGA's lead legal and legislative counsel. Successful management of governmental issues for the WSCGA depends on our comprehensive approach to the unique challenges ranging from environmental to business issues that are faced by Wisconsin cranberry farmers. Our approach to each issue depends on a combination of legal analysis, statute and rule design, constituency involvement, political action and media management.

The Wisconsin State Legislature is currently "out of session" until January 4, 2021. The Legislature effectively adjourned their 2019-20 legislative session in mid-March 2020, when the coronavirus pandemic ended the 2020 legislative session. The Assembly had finished its regular business, but the Senate, which was scheduled to finish its action the last week of March, never returned to act on regular session business. As a result, a number of issues of importance to WSCGA members passed the Assembly and were poised for passage in the Senate, but never made it to the Governor's desk. Accordingly, we will seek reintroduction of these issues in 2021.

WSCGA State Legislative Successes in 2020:

- **Farmers are Essential Workers Under Wisconsin's Safer at Home Order.** The WSCGA state advocacy program proactively engaged to support the needs of Wisconsin farmers throughout the COVID-19 public health emergency. On March 20, 2020, WSCGA, along with over twenty other agricultural and agribusiness organizations, preemptively wrote to Governor Evers' to request that Wisconsin farmers be allowed to continue to work under any forthcoming stay-at-home order. On March 25, Wisconsin's original "Safer-at-Home" (https://tinyurl.com/rr5fwos) order was released and it preserved Wisconsin farmers, agribusiness, food production and related supply chain entities as Essential Businesses, allowing them to remain open during the term of the order.





- **Wisconsin Farmers Receive $50 million in Pandemic Relief Payments.** The WSCGA joined with several other agricultural organizations to secure direct support payments for Wisconsin farmers. The Evers Administration created the "Wisconsin Farm Support Program" (https://tinyurl.com/y6poyes2) and distributed $50 million of the federal CARES funding that Wisconsin received for cash payments of up to $3,500 each.
- Tracking UW State Specialists Hours Spent Teaching Farmers (2019 AB 556 / SB 497) – PASSED ASSEMBLY. Sen. Howard Marklein (R- Spring Green) and Rep. Amy Loudenbeck (R-Clinton) introduced a bill to support applied agricultural research in Wisconsin. Wisconsin farmers rely on a select group of agricultural researchers known as extension State Specialists to engage in applied agricultural research. State Specialists are co-funded by the Division of Extension and academic departments at UW–Madison, UW–River Falls or UW–Platteville. These tenure-track faculty members conduct research and develop training programs in their area of expertise. State Specialists teach FARMERS and GRADUATE STUDENTS who are conducting critical on-farm research that is of direct economic importance to our agricultural economy. This legislation would track and report the hours that state specialists spend teaching graduate students and teaching Wisconsin farmers. *AB 556 passed the State Assembly on February 20, 2020.*
- **Increased Funding for Integrated State Specialists (2019 AB 627 / SB 563) – PASSED ASSEMBLY.** Rep. Nancy VanderMeer (R-Tomah) and Sen. Howard Marklein (R-Spring Green) authored legislation to provide additional funding for UW Integrated State Specialists. This legislation would require the Board of Regents to allocate $1,000,000 in additional funding each year for state specialists providing extension services at the UW-Madison College of Agricultural and Life Sciences in the field of applied agricultural research. *AB 627 passed the State Assembly on February 20, 2020.*
- **Assistance to Farmers for Conservation (2019 AB 795 / SB 715)** – PASSED ASSEMBLY. Authorizes DATCP to **administer a program to provide rebates of $5 per acre for crop insurance premiums paid for acres planted with a cover crop; it increases the amount appropriated for producer-led watershed protection grants by $250,000 GPR in fiscal year 2020-21 to a total of $1,000,000 for 2020-21; and it contains provisions supporting managed grazing, creating a grant to become certified by the Alliance for Water Stewardship program and amends the soil and water resource conservation grant allocation.** *AB 795 passed the State Assembly on February 18, 2020.*
- **Pilot Program to Address Nitrate Contamination (2019 AB 796 / SB 718)** – PASSED ASSEMBLY. Appropriates $1 million in fiscal year 2020-21 for a nitrogen optimization pilot program. Requires DATCP to award grants of up to $50,000 to agricultural producers through the program. In conjunction with a grant to an agricultural producer, authorizes DATCP to award up to 20 percent of the amount of the grant awarded to an agricultural producer to "eligible university entities" – namely the College of Agricultural and Life Sciences at UW-Madison, the Center for Watershed Science and Education at UW-Stevens Point, and the UW-Extension. *AB 796 passed the State Assembly on February 18, 2020.*

- Hydrologist Position, Phosphorus Research and Groundwater Mapping (2019 AB 800 / SB 722) – PASSED ASSEMBLY. **Provides funding for matching grants of up to $10,000 per county to test and map privately owned wells and up to $2,500 per county for education and outreach regarding the results. Allocates $250,000 in 2020-21 for this program. Also provides $150,000 in 2020-21 to create a special three-year project position for one full-time hydrogeologist for the Wisconsin Geological and Natural History Survey to focus on groundwater resource information at the county and local level to assist state and local governments, industries, and the public in interpreting the information. Also includes $200,000 for UW-Extension's Phase 1 policy research proposal under the market-based North American Phosphorus recovery and reuse policy program to continue researching phosphorus best practices.** *AB 800 passed the State Assembly on February 18, 2020.*

Issues on the Horizon for 2021:

- **Funding for UW Integrated State Specialists.** Our advocacy team will work to secure the additional funding for UW integrated state specialists that we came so close to securing during 2020. See 2019 AB 627 / SB 563.
- **Tracking Hours by UW Extension Faculty.** We will also seek to secure final passage of a statutory amendment that will allow UW Extension faculty to track and record the hours they spend teaching Wisconsin farmers. See 2019 AB 556 / SB 497.
- **NR 151 Amendment to Develop Targeted Performance Standard for Application of Nitrates to Farmland.** The DNR formed a Technical Advisory Committee to begin the first step in the development of an amendment to Wis. Admin. Code. s. NR 151, Wisconsin's nonpoint source pollution standard for agriculture. The targeted performance standard will regulate the application of nitrates to agricultural land. The WSCGA monitored the meeting of the TAC throughout 2020 and intends to continue actively participating in this rule development process throughout 2021.
- **Sales Tax Exemption for Dried Cranberries.** The WSCGA worked throughout 2020 to secure an amendment to the Streamlined Sales and Use Tax Agreement, which has been adopted by 24 states, to provide an optional sales tax exemption for sweetened dried fruit (i.e., dried cranberries.) Prior to this amendment, under the Agreement, dried cranberries and other fruits that are sweetened before they are dried, are taxed as "candy." Securing this amendment was the first step toward seeking a statutory change in Wisconsin that will remove dried cranberries from state sales tax, which we will pursue during the 2021-22 legislative session.

2020 Communications & Marketing Highlights

2020 forced many organizations to adjust their standard operating procedures, WSCGA's communications program was no exception. With all in-person promotions cancelled from March through the end of the year, the program was forced to change its strategy in unprecedented ways. The flexibility of the PR Committee, WSCGA Board and staff allowed the program to pivot quickly and effectively. Despite challenges and changes, the Public Communications program was able to accomplish its goals, in some ways, better than ever.

Partnerships and Sponsorships

As previously mentioned, most of WSCGA's traditional promotional partnerships were different this year. Fortunately, the American Birkebeiner took place prior to the pandemic. This event provides a great opportunity for WSCGA staff and growers to sample in front of an engaged and interested audience. The Birkie is potentially one of the most successful events WSCGA participates in.

Several sampling events were also completed for the 2019-2020 Badger Athletics contract in January, February and early March at women's hockey, men's basketball and women's volleyball. The 2020 Crazy Legs Classic was cancelled.

Traditionally, WSCGA has a booth at the Wisconsin State Fair and partners with the Green Bay Packers to sample during a 5k, training camp and a preseason game. Neither of these partnerships were able to be renewed in 2020 due to COVID-19. Additionally, no sampling partnership was pursued with the Badgers for 2020-2021 for the same reason. Several smaller sampling partnerships were also cancelled along with WSCGA's presence at cranberry festivals throughout the state during the fall.

Social Media

Social media became the primary way for WSCGA to reach the public during the COVID pandemic. Facebook remained WSCGA's primary platform with 1.2 million impressions and 31.9k followers. Twitter generated 70k impressions and Instagram 200k. Additionally, Instagram saw 50% growth in followers.

Videos

In October of 2019, WSCGA hired a video production company, Don't Blink, to create video assets for use on WSCGA's social media channels. Filming took place on two marshes with four growers interviewed.

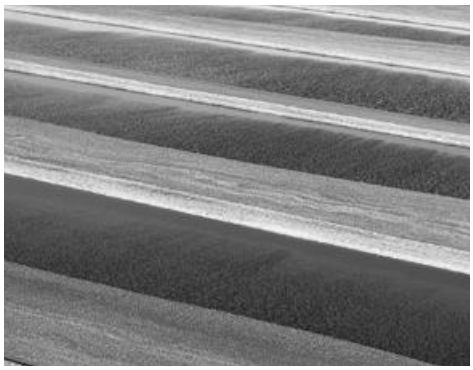
Outputs from this project were released throughout 2020 and performed well on WSCGA's social media channels. Video content focused on themes like sustainability, health and multigenerational agriculture. These themes were identified as highly resonant with WSCGA's target audiences of people under the age of 35 and people living in urban areas in the 2019 consumer survey.

Charlie Berens Project

In late summer, an opportunity was identified to hire with Charlie Berens. Berens is a Wisconsin based internet personality. He creates humorous videos and sketches about Wisconsin and Midwest culture. Berens primary audience matches well with the demographics WSCGA wants to reach.

In October of 2020 Berens visited Russell Rezin and Sons to film. WSCGA came to an agreement with Berens for him to release one cranberry focused long form digital video, another food focused video featuring cranberries and three shorter videos to be released by WSCGA. The reach of this project is something WSCGA hasn't seen with a total of about 6 million views across all platforms.

Additionally, WSCGA introduced a merchandise component alongside the release of the Berens videos. A new web store was created selling Wisconsin cranberries hats and shirts. The program has been successful enough to generate extra funds for the promotions program.



Specialty Crop Block Grant

The WSCGA promotions program was awarded a $60k Specialty Crop Block Grant in 2020. This will include a "Wisconsin Cranberries'' branded backdrop and juice dispensers to be used at sampling events, a photo booth display that encourages event goers to take photos as if they were in a cranberry marsh and share with on their social media, and customized cranberry packet samples that include information about Wisconsin's cranberry industry.

Additionally, WSCGA will produce more engaging video content to be shared on its "Wisconsin Cranberries" social media channels. Cranberries are a unique crop, communicating how growers tend to their crop year-round is an important component of communicating the sustainable nature of the fruit.

Fall Harvest Efforts

Despite challenges presented by the COVID 19 pandemic. WSCGA was still able to safely coordinate media visits to marshes and organize interviews with growers. Because it was an election year, WSCGA decided to limit proactive media pitches to state and regional media outlets to avoid getting cranberries caught in the national election coverage.

Despite the measured approach, there was still considerable local and national coverage. Wisconsin cranberries generated about 340 million impressions across online, print, and broadcast outlets between August and November. Interest in the Ocean Spray TikTok challenge along with weather's effect on growers both significantly impacted this year's harvest coverage alongside traditional harvest stories.

Research Programs

Research Coordination and Administration

Although the WSCGA does not have a direct research program, it does provide administrative services to the Wisconsin Cranberry Board, Inc. Under this agreement, WSCGA provides the staffing services that the WCB needs in order to operate. This allows WCB to maximize its investment in research, education and promotion programs on behalf of the Wisconsin growers and minimize administration costs.

As part of this service, the WSCGA also works with other cranberry groups to coordinate research activities to avoid duplication and to create synergies and partnerships to maximize the investments by growers.

WSCGA also provides similar services to the WCREF under a contract. Working together, all three organizations developed an industry wide strategic plan in 2018 and began implementation in 2019. Good progress has been made to restructure programs, reassign responsibilities and provide an efficient and coordinated effort on behalf of Wisconsin growers.

2020 saw the completion of Phase I of the renovation of the Cranberry Research Station which included creation of small plots for replicated trials under controlled condition, a two acre bed for variety trials and 18 acres of commercial plantings of hybrids from Wisconsin and New Jersey to be evaluated and cropped to generate revenue to support the research station.

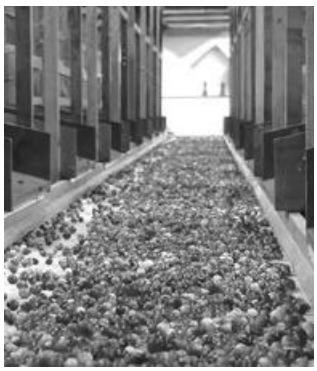
The WSCGA also helped coordinate the construction of the new Research and Education Center at the station. The facility includes simple labs, office space, storage space and a maintenance area for researchers and a conference room to host education events. The facility is slated to open in early summer of 2021.

Education Program Highlights

Education is a major component of the WSCGA Mission. The organization's Education Committee works throughout the year to present programs for growers on improving management practices with the goal of allowing growers to operate their farms in an economically sustainable manner.

The Association worked hard in 2020 to continue to provide valuable education programming to members in a safe and effective way while taking appropriate precautions for the COVID-19 pandemic. This year the Association partnered with Allison Jonjak, the UW-Madison Division of Extension Cranberry Outreach Specialist. Working with Jonjak, the Education Committee shifted its programming to a virtual setting and reformatted the content to reach growers online. The Education Committee developed an Education Program Plan to provide growers with continued learning opportunities throughout the year.

2020 Education Programs		
Month	**Event**	**Topic/Theme**
January	Cranberry School	Business Management
February	Business Management Brown Bag	
March	Nutrient Mgmt.	
April	Mini-Clinics	Growing Season
May	Monthly Brown Bag	
June	Monthly Brown Bag	
July	Monthly Brown Bag	Pre-harvest/Harvest
August	Summer Field Day	
September	Off	
October		
November	Monthly Brown Bag	Research/ Out-of-state networking
December	Monthly Brown Bag	



Wisconsin Cranberry School

The 2020 Wisconsin Cranberry School was held at the Glacier Canyon Conference Center in Wisconsin Dells. With nearly 350 registrants, the event provided educational sessions, an interactive grower management session, and a forum for growers and related affiliates to exchange ideas and best practices in the cranberry industry. The School is the signature education event for the WSCGA.

The annual program is sponsored as a collaborative effort by the Wisconsin Cranberry Research & Education Foundation (WCREF), the Wisconsin State Cranberry Growers Association, and UW-Madison Division of Extension.

A Pesticide Applicator Training and Certification (PAT) session with information and exam was provided on-site as a one-stop convenience to growers by Wood County Extension, and facilitated by Matt Lippert.

A popular session utilizing live ParticiPoll software technology provided growers with insights into industry management practices. A range of questions were posed to the audience; growers responded with their respective answers on their smartphones or computers, and could see an immediate summary of the results, which showed the percentages for each answer of each question.

The event began with a keynote speaker, Penn Vieau, and moved into the WSCGA Winter Meeting and presentation of industry awards. The industry updates were spread throughout the two days and interspersed with the research-focused presentations. Presentations included tariffs and MRLs, pesticide spray timing, bio-insecticide development, genetic diversity of wild cranberry populations, specialized training opportunities through Mid-State Technical College, and much more.

Virtual Nutrient Management Training

Tom Lochner worked with the Wisconsin DATCP to provide virtual Nutrient Management Training options. In early-August, Allison Jonjak, Cranberry Outreach Specialist facilitated a training session via Zoom for 17 growers that needed to re-qualify for their certification.

The workshop was designed to help cranberry farmers write their own nutrient management plans to meet DATCP requirements. Wisconsin DATCP requires that farmers complete a department-approved training course at least once every four years to maintain their qualification.

Presentations were provided by Michael Stinebrink, NRCS; Ryan Erisman, DATCP and Allison Jonjak, UW-Madison Division of Extension. Since the start of the program, more than 400 growers have participated in the training to become qualified to write a nutrient management plan for their farm.

Virtual Spring Mini-Clinic

The WSCGA and UW-Madison Division of Extension co-sponsored a spring mini-clinic. Jed Colquhoun and the UW cranberry team worked to successfully bring the event to a virtual format. More than 75 participants attended the workshop.

While the format was different this year, growers were still able to gather virtually. The spring mini-clinic event is held annually to update growers on new management practices and strategies for the growing season, review of winter impacts on crop, new crop production tools available, and informal discussions on the upcoming growing season.

Topics included: Moss Control, Jed Colquhoun; Allison Jonjak introduction; Sparganothis Spray Windows and Nematode Bioinsecticides, Shawn Steffan; Jyostna Devi Mura introduction; Insect Updates, Christelle Guedot; and Potassium Fertilization and Growing Degree Days, Amaya Atucha.

Virtual Brown Bag Seminars

Following the success of the Virtual Spring Mini-Clinic, the Education Committee worked with Allison Jonjak, UW-Madison Division of Extension Cranberry Outreach Specialist to host monthly "brown bag" seminars. The seminars were held virtually over the lunch hour, providing growers the opportunity to catch up on seasonal updates without having to set aside time during the workday. The Education Committee helped to develop topics and plans for the seminars, and Jonjak hosted and facilitated the meetings:

- June: Legislative update & discussion on growing season
- July: Growing Season Topics- flea beetle, tipworm, plant physiology, crop consultant update
- August: Harvest Topics- COVID-19 safety, finding employees, communications update
- November: Post-Harvest, Flood and Winter Strategies
- December: "Across the Nation" Research Roundup

Virtual Summer Meeting

Due to COVID-19 restrictions on gatherings, the WSCGA Board of Directors decided to hold the annual Summer Meeting virtually. Over 70 WSCGA grower and associate members joined the meeting on August 12, 2020 via Zoom. Topics included the Association's summer business meeting, timely educational presentations, and Associate Member lightning talks. The program also included an Associate Member Showcase in lieu of the traditional Summer Trade Show.

While there is no substitute to gather in person to network and build connections, the WSCGA Board of Directors, Education Committee and Associate Member Committee worked to provide an alternative platform for the membership to meet as well as provide connections between grower and associate members.

WSCGA NEWS

Each month, members of the WSCGA are provided with up-to-date information on the cranberry industry, news, activities and anything that would be of interest to the growers of Wisconsin's number one fruit crop. WSCGA coordinates the publication of the newsletter and solicits articles from a cross-section of organizations and individuals. The NEWS is distributed in both print and electronic form with over 600 people on the subscription list.

Weather Forecasting

The Wisconsin Cranberry Board, Inc. has provided funding for weather forecasting services for decades. WSCGA administers the program for the industry. Working with forecasters from Great Lakes Weather Services, daily forecasts are available online and via a toll free number. The forecasts are specific to cranberry farms and are an important tool for growers as they make decisions about management practices such as frost protection. The forecasts are available April 15 through October 31.

Associate Member Programs

The WSCGA has an active program for the businesses that support the industry in the state. Associate Membership in WSCGA allows these companies to participate in a wide variety of marketing opportunities. The most popular are the Winter and Summer Trade Shows. The Association's advertising program offers opportunities in the WSCGA NEWS as well as the Summer Meeting publications. Associate members are also actively involved in industry events such as the Foundation's annual Cranberry Open Golf Outing and the Sporting Clays Shoot.

A Committee of the Associate membership works with WSCGA Staff to develop and conduct these programs. Highlights for 2020 include:

Winter Trade Show

The annual Winter Trade Show is held in conjunction with the Wisconsin Cranberry School and the WSCGA Winter Meeting. The 2020 event took place on Wednesday, January 22 at the Glacier Canyon Conference Center in Wisconsin Dells. There were nearly 60 Associate Members represented, as well as the WCREF and the Wisconsin Farm Bureau Federation.

Cranberry School attendance was nearly 350 people, all of whom were provided with opportunities to visit the trade show throughout the day. Trade Show exhibitors shared samples and materials, provided demonstrations, displayed equipment, and introduced new products and services.

Summer Trade Show

The annual Summer Trade Show is held in conjunction with the WSCGA Summer Meeting and Field Day. Due to the global coronavirus pandemic and state and local restrictions on mass gatherings, the 2020 event was held in a virtual format. WSCGA Grower and Associate members joined the event via video conference utilizing the Zoom platform. Agenda items included the Association's summer business meeting, timely educational presentations, and Associate Member lightning talks. The Education Committee incorporated an Associate Member Showcase in lieu of the traditional Summer Trade Show and also partnered with the Associate Member Committee to develop and execute a lightning talk program.

While there is no substitute to gather in person to network and build connections, the WSCGA Board of Directors, Education Committee and Associate Member Committee worked to provide an alternative platform for the membership to meet and to provide connections between grower and associate members.

New Membership Benefits

As part of sustaining the Associate member program, the staff and Associate Member Committee recognize that financial constraints are affecting everyone's decisions on marketing and advertising dollars. This year has brought additional challenges with the loss of in-person events. With this in mind, the staff and Associate Member Committee conducted an evaluation of Associate Membership benefits.

Building off of the enhancements made in 2018, there have been revisions of the existing benefits and the introduction of a new program to bring more value to the investment in WSCGA Associate Membership:

- Grower-Direct Outreach (revised): Basic level membership includes one outreach opportunity per membership year and the ability to purchase up to three more outreach opportunities. Premium level membership includes four outreach opportunities per membership year, at no charge.



- WSCGA Associate Member Showcase (new): The Associate Member Showcase is an online repository of in-depth and multimedia information from Associate members. The showcase is now live on the WSCGA website and will be promoted to WSCGA Grower Members via email, the monthly newsletter and in conjunction with virtual events. New for 2020 and going forward, the online publication has been upgraded to a user-friendly flip book that increases the readability and interactivity of the booklet.
- Vendor Presentation Program – Associate Member Lightning Talks (new): The Vendor Presentation program was designed to provide exposure of Associate members/exhibitors, as well as to provide Grower members with new and relevant information. Lightning talks are efficient ways to accomplish this, by quickly introducing a topic or idea focused on delivering the most important information in a short, strict time frame. Vendor presentations were previously held at in-person events, but the program was reformatted and reimagined this year for the virtual environment and implemented at the Virtual Summer Meeting and Brown Bag seminars.

Notes

Notes

WISCONSIN STATE CRANBERRY GROWERS Association

WSCGA MISSION:

The Wisconsin State Cranberry Growers Association enables Wisconsin cranberry growers to prosper by providing growers with information, championing responsible environmental stewardship, advocating for sound governmental policies and leading effective public communications and outreach.