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ADVANCES IN SPRAY TIMING AND BIO-INSECTICIDE DEVELOPMENT

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Studies of degree-day (DD) benchmarks for *Sparganothis* fruitworm, as well as the development of a novel bio-insecticide, were recently conducted in Wisconsin cranberries. Evidence suggests that the use of DD benchmarks to time an insecticide spray for *Sparganothis* fruitworm can significantly improve spray efficacy. Results from 2019 showed that insecticide sprays applied at the 10% or 25% egg-hatch benchmark (Fig. 1 below) were the best timings for *Sparganothis* control. These two-timing benchmarks are easily tracked using the temperature readings on any given marsh. The 10% and 25% spray timings were significantly better than sprays timed for 40% egg-hatch, 75% egg-hatch, immediately pre-bloom, or immediately post-bloom. The DDs associated with 10% and 25% egg-hatch are, respectively, 1,000DD and 1,140DD; thus, this particular range of DDs (1,000 - 1,140) represents a potential 'window of opportunity' in which sprays are likely to be most effective for *Sparganothis* fruitworm control.

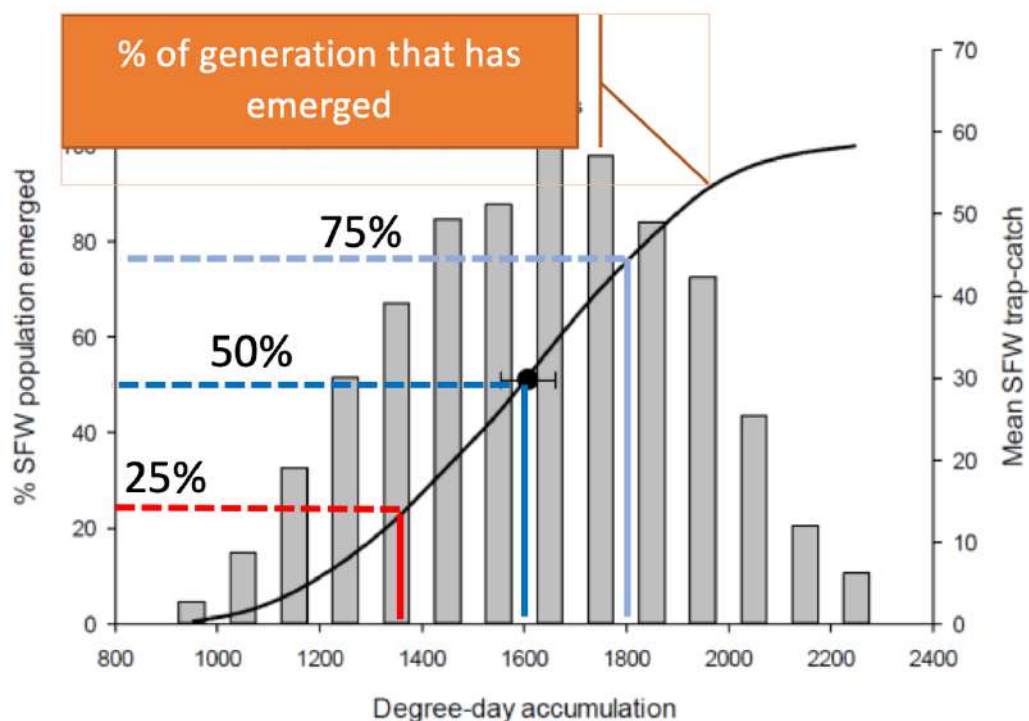


Figure 1. The seasonal flux of moths in the *Sparganothis* flight (bar-graphs), based on 9 years of trap-catch data in central Wisconsin. The black, S-shaped curve represents the % emergence of the moth flight (Figure modified from Steffan et al. 2017).

The first year of the DD timing project was 2018. This study was conducted at two commercial marshes in central Wisconsin. Treatment timings were replicated five times within each marsh. The insecticide treatment was Altacor (4.5 oz/acre), applied in relatively large plots at prescribed timings: 25% of egg-

hatch (1,140 DDs), 75% of egg-hatch (1,640 DDs), a combination of the two timings, and a no-spray control. The response variable was berry infestation rate, measured once per week for three weeks in August.

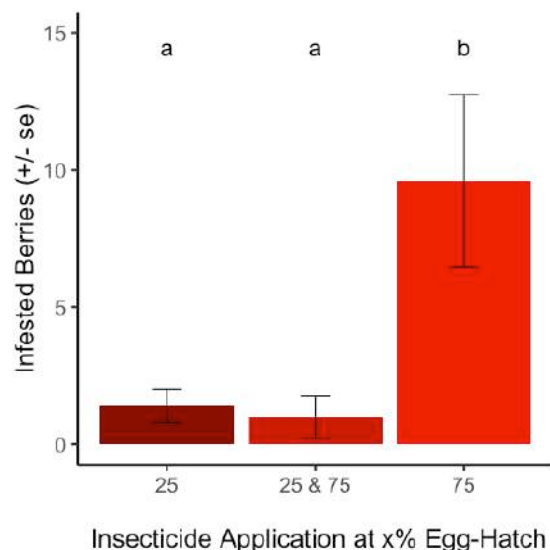
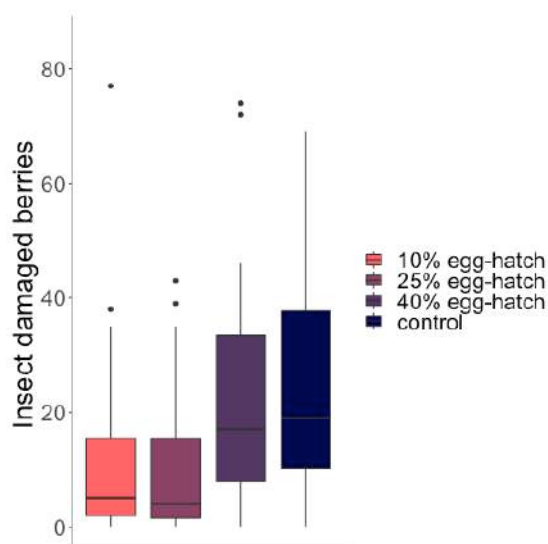


Figure 2. In the 2018 *Sparganothis* fruitworm spray timing study, cranberry infestation rates were measured following spray treatments timed for 25% egg-hatch, 75% egg-hatch, and a combination of the two timings (25% + 75%). The earlier timing (25% egg-hatch) was far superior to the later one (75% egg-hatch).

Of the two marshes used in the 2018 study, only one had enough of a moth population to assess a treatment effect. At this marsh (Fig. 2), the 25% timing was significantly better than 75%, suggesting that a spray timed for earlier in the flight emergence was far superior to later timings. The combination treatment was no different than the 25% timing, likely because 25% was so effective there was little room for improvement.

In 2019, the timing trial was modified to explore some earlier spray timings. We opted to examine 10% (990-1,000 DDs), 25% (1,140 DDs), and 40% (1,290 DDs) egg-hatch timings. In this study, we again showed that the earlier timings (10% and 25% egg-hatch) were significantly better than the other treatments (Fig. 3)—berry infestation rates were 75-80% times lower.



Both the 10% and 25% timings provided very good berry protection, providing the first evidence that there may be an ideal 'window' in which to target *Sparganothis* fruitworm. This window is the specific DD range (1,000-1,140 DDs) that corresponds to the 10-25% egg-hatch range.

Figure 3. Berry infestation rates following spray treatments timed for 10% egg-hatch, 25%, 40%, and an untreated control. The 10% and 25% egg-hatch timings were significantly better for *Sparganothis* control than both the 40% egg-hatch timing and the control.

For cranberry flea beetle control, a 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. 4 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 spend the bulk of their lives in the soil, they are easy targets for nematodes. In the past, it has been shown that 60-75% of flea beetle larvae in the soil can be killed with a single application of nematodes (Foye and Steffan, 2019).

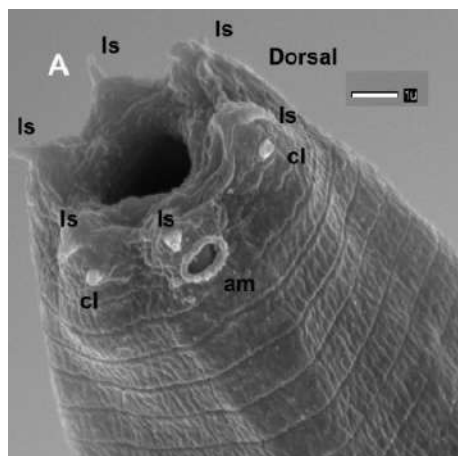


Figure 4. A scanning electron micrograph image of the anterior portion of *Oscheius onirici*, a nematode native to Wisconsin.

These two nematodes are highly virulent bio-control agents, and as such, represent a new bio-insecticide. However, it had remained unclear whether the nematodes could be sprayed just like a conventional insecticide. So in 2018, we tested how the nematodes could survive and perform when they were poured into a typical sprayer tank and applied to a bed through the standard boom-arm system. An important part of this work was a demonstration that both nematode species would be as virulent coming out of the sprayer as when they went in. After many rounds of testing, we showed that the nematodes required the removal of the nozzle on the downtube hanging from the boom-arm. Removing the nozzle allowed the nematodes to remain active and virulent (when nozzles were left on, the nematodes were seriously damaged).

Having shown that the nematodes could be readily applied via a boom-arm sprayer, we then tested how well the nematodes could control flea beetles after passing 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.

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EXPLORING THE GENETIC DIVERSITY OF WILD CRANBERRY POPULATIONS IN THE UPPER MIDWESTERN UNITED STATES

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Plant breeding has been crucial for food production and food security, but multiple cycles of selection can result in reduced genetic diversity (Cheema, 2018) and homogeneous crops. In cranberry, most cultivars released share a similar genetic background that includes selections such as Early Black, McFarlin, Howes, Potter's Favorite, Ben Lear, and Searles. Because of this narrow genetic base in cranberry, the introduction of new genotypes from wild populations into breeding programs could add much needed genetic diversity. Incorporating new and useful traits such as adaptability to withstand changes in temperatures and environments, resistance to diseases and pests, and favorable traits to impact yield, quality, and nutrition can improve cranberry breeding programs.

In the United States, little has been done to analyze and understand the genetic diversity of wild populations of cranberry, especially in the Midwest, which is one of the biggest areas of production for this crop. Therefore, this study seeks to provide the most comprehensive analysis of wild populations of cranberries in Wisconsin and the first insight into the diversity present in Minnesota. We sampled a total of 22 populations in Wisconsin and 14 in Minnesota (Fig. 1, Table 1) from State Natural Areas, Forest Lands, and Scientific Natural Areas.

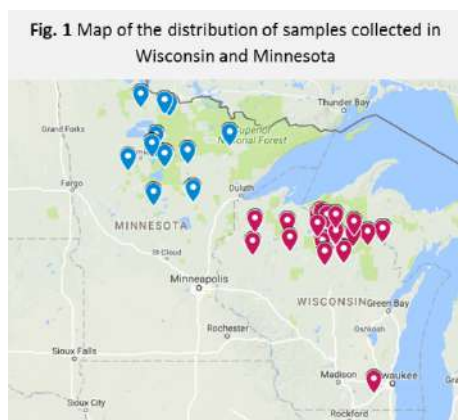


Table 1. Populations and samples collected by state

State	Populations	Samples
Minnesota	14	251
Wisconsin	22	318

Once collected, leaf material was frozen for DNA extraction and the rest of the samples were sent to the USDA Cranberry Genetics Laboratory for propagation in the greenhouse. DNA was extracted and analyzed using 32 molecular markers (Short Sequence Repeats, microsatellites). These markers have been used in multiple studies of genetic diversity because of their high reproducibility, ability to distinguish between clones, and the ability to be transferred between closely related species. Our results showed that our markers were able to clearly differentiate among cranberry (*V. macrocarpon*) and its sister species the small cranberry (*V. oxycoccos*) (Fig. 2).

Fig. 2 Euclidean distance dendrogram and principal component analysis (PCA) of cranberry (*Vaccinium macrocarpon* and *V. oxycoccos*) wild accessions. PC, principal component.

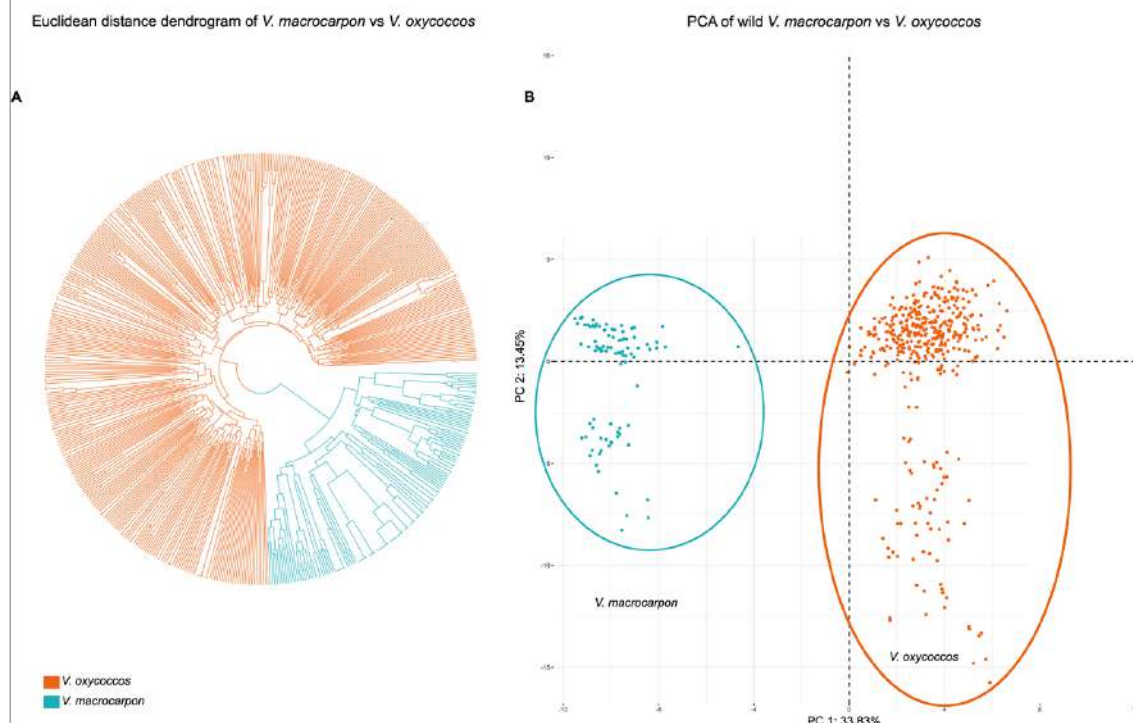


Table 2. Overall genetic diversity statistics for two cranberry (*Vaccinium macrocarpon* and *V. oxycoccos*) species

	<i>V. oxycoccos</i>	<i>V. macrocarpon</i>	
NA	902	284	Total number of alleles
Num	28.18	8.87	Mean number of alleles
H_O	0.81	0.51	Observed Heterozygosity
H_S	0.81	0.49	Heterozygosity Within Populations
H_T	0.83	0.64	Total Heterozygosity
G_{is}	0.00	-0.03	Inbreeding coefficient
G_{st}	0.02	0.22	Fixation index

which further confirm our heterozygosity results (Table 2).

In terms of the genetic diversity present in these populations, we observed high levels of genetic diversity for both *V. macrocarpon* and *V. oxycoccos*.

This is based on the values obtained from the heterozygosity coefficients (H_O, H_S, H_T), with *V. oxycoccos* exhibiting higher levels of heterozygosity (H_O=0.81) which can be explained by the polyploid nature of this species (Table 2.). We observed low levels of inbreeding based on the values obtained for the inbreeding coefficient (0.00 for *V. oxycoccos*, -0.03 for *V. macrocarpon*)

We then proceeded to take a deeper look at genetic diversity statistics by species and populations. In *V. macrocarpon* we observed that several populations including Chip, FRLK, GYPL, LL, PMW, and WABL exhibited the highest levels of heterozygosity (H_o) and inbreeding (G_{IS}) (Table 3).

Table 3. Genetic diversity statistics per population of *Vaccinium macrocarpon*

Population	¹ N	² Num	³ H_o	⁴ H_s	⁵ H_T	⁶ G_{IS}
BL	13	2.28	0.30	0.29	0.29	-0.01
Chip	20	2.50	0.51	0.34	0.34	-0.49
FRLK	3	1.65	0.58	0.37	0.37	-0.55
GYPL	13	3.25	0.58	0.52	0.52	-0.10
LL	7	3.41	0.55	0.59	0.59	0.07
LOLM	20	2.38	0.43	0.39	0.39	-0.09
LRL	17	3.13	0.48	0.52	0.52	0.07
PMW	6	2.25	0.58	0.49	0.49	-0.18
WABL	37	3.31	0.55	0.53	0.53	-0.05

1- Number of samples, 2- Mean number of alleles, 3- Observed Heterozygosity, 4- Heterozygosity within populations, 5- Total Heterozygosity, 6- Inbreeding Coefficient

Table 4. Genetic diversity statistics per population of *Vaccinium oxycoccos*

Population	¹ N	² Num	³ H_o	⁴ H_s	⁵ H_T	⁶ G_{IS}
BL	5	6.06	0.86	0.82	0.82	-0.04
FBF	7	6.18	0.81	0.75	0.75	-0.08
GL	18	11.3	0.82	0.82	0.82	0
GYPL	20	10.56	0.86	0.81	0.81	-0.05
JL	12	11.25	0.77	0.85	0.85	0.09
KLB	21	10.78	0.83	0.81	0.81	-0.02
KMP	12	6.53	0.83	0.78	0.78	-0.06
Locp	30	10.4	0.8	0.8	0.8	0
MWB	16	10	0.81	0.82	0.82	0.01
PMS	20	11.87	0.84	0.83	0.83	0
PMW	17	9.78	0.8	0.81	0.81	0
SEB	16	7.65	0.8	0.76	0.76	-0.05
SHPL	10	9	0.77	0.81	0.81	0.04
SR	17	9.75	0.77	0.79	0.79	0.02

1- Number of samples, 2- Mean number of alleles, 3- Observed Heterozygosity, 4- Heterozygosity within populations, 5- Total Heterozygosity, 6- Inbreeding Coefficient

For *V. oxycoccos*, all populations demonstrated high levels of heterozygosity (H_o) and low inbreeding values (G_{IS}) (Table 4). The results obtained from these estimators show great levels of diversity present in wild populations of cranberry. One of the interests of our laboratory is to be able to develop new cranberry varieties for growers in the state. Therefore, we wanted to see how the diversity present in the wild compared to the cultivars and selections currently used in the cranberry industry.

Table 5. Genetic diversity comparison among wild *V. macrocarpon* Wisconsin and Minnesota and cultivars.

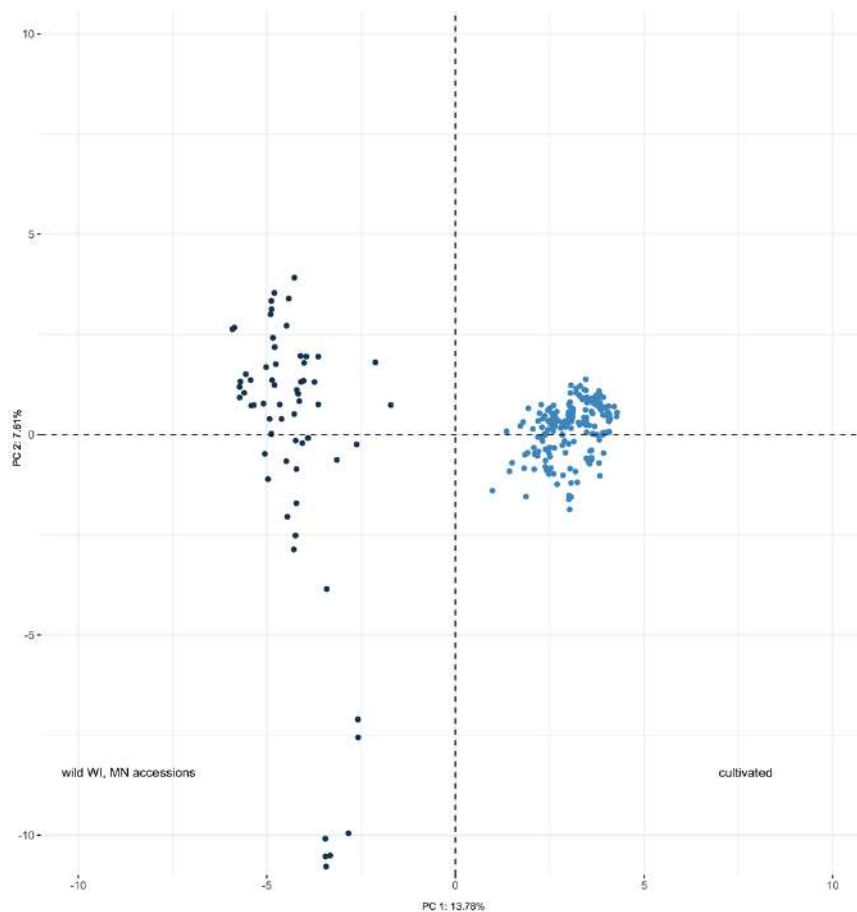
Population	¹ N	² Num	³ H_o	⁴ H_s	⁵ H_T	⁶ G_{IS}
Wild	139	10.87	0.99	0.76	0.76	-0.31
Cultivated	197	19.25	0.69	0.82	0.82	0.15

1- Number of samples, 2- Mean number of alleles, 3- Observed Heterozygosity, 4- Heterozygosity within populations, 5- Total Heterozygosity, 6- Inbreeding Coefficient

When comparing our wild vs cultivated samples (Table 5), we observed that even though we have high levels of diversity in our cultivars, there is still much more in the wild that could be incorporated into breeding programs. In Fig. 3, we can observe a clear differentiation between the wild populations, with a larger spread of these samples indicating the vast amount of diversity present in this group. Looking at

the data for cultivars (Fig. 3), most of the individuals cluster together due to their shared genetic background. As mentioned before most cultivars are derived from few native selections.

Fig. 3 PCA of wild vs. cultivated *V. macrocarpon*



The results of our study demonstrate the presence of untapped and previously undiscovered cranberry diversity in natural areas of the states of Wisconsin and Minnesota (Rodríguez-Bonilla et al., 2019). It will help us enhance the availability of genotypes and traits useful for the development of new breeding lines for cranberry production, especially unique adaptations that might be useful to the largest cranberry production area in the world, central Wisconsin. In the future, our laboratory will have the opportunity to screen for traits such as cold tolerance and disease resistance, as well as continuing the development of interspecific hybrids that can benefit cranberry growers and the industry.

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

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Research studies from our 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 research findings we started 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 experiment was set up as a split-plot design, consisting of three beds of 'HyRed', each one divided in 8 plots corresponding to 2 replicates per fall fertilizer treatment and 2 subplots for the summer fertilizer treatments (Table 1).

Table 1. N fertilizer treatments applied during fall and summer. Fall N treatment units were based on a percentage of the total N units to be applied during the growing season. All treatments were applied with ammonium sulfate.

Treatment	Fall	Summer	Total N Units (U)
Control	0 N Units (0%)	60 Units (100%)	60 (100%)
T1	6 N Units (10%)	54 N Units (90%)	60 (100%)
T2	12 N Units (20%)	48 N Units (80%)	60 (100%)
T3	24 N Units (40%)	36 N Units (60%)	60 (100%)
T4	6 N Units (10%)	60 N Units (110%)	66 (110%)
T5	12 N Units (20%)	60 N Units (120%)	72 (120%)
T6	24 N Units (40%)	60 N Units (140%)	84 (140%)

Fall treatments were applied on 9/22 in 2017, 10/30 in 2018, and 11/5 in 2019.

Results

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

Total Yield and Berry weight

Yield was estimated by harvesting all berries in a one sq. ft. area per plot and extrapolating these values to barrels per acre. The average yield values across all treatments were between 450 and 550 barrels per acre. There were no differences in yield among treatments (Fig.1). However, treatments that received 40% of N during the fall tended to have lower yields than the other treatments. Berry weight was higher in the treatments that received 40% of N in the fall compared to the control (Fig. 2).

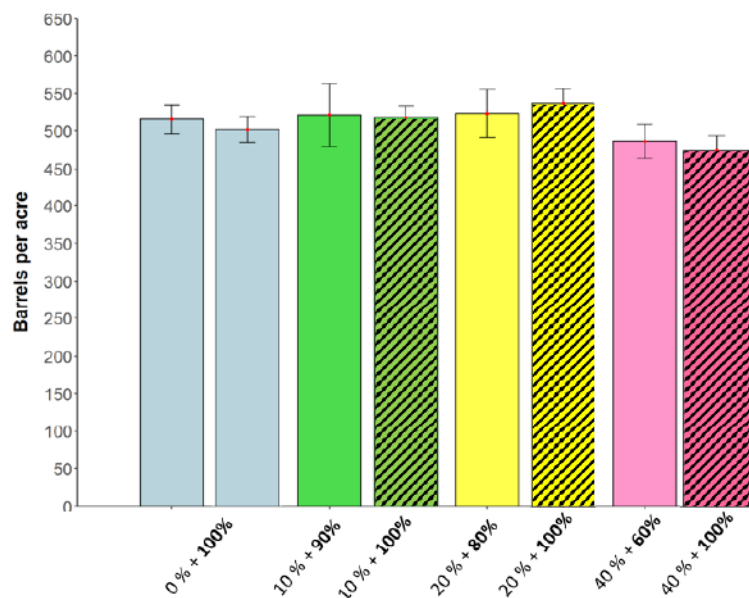


Figure 1. Effect of N Fall fertilization on yield for 2018 and 2019 seasons combined.

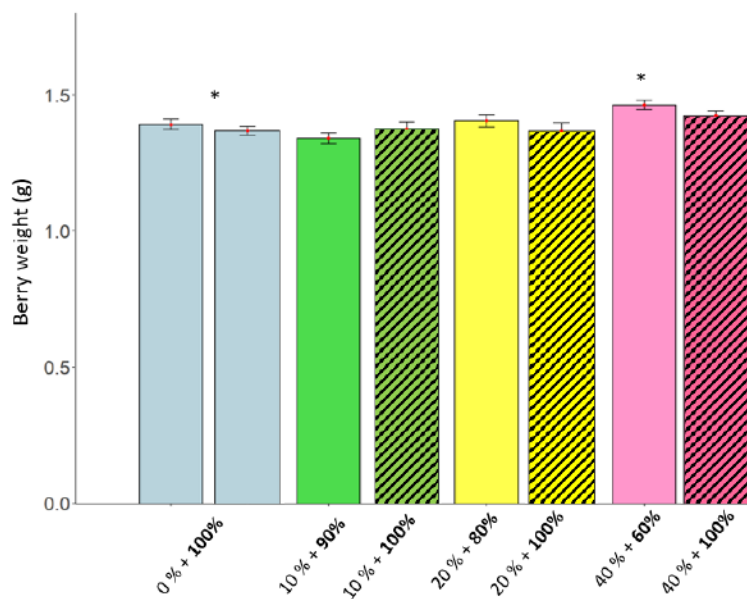
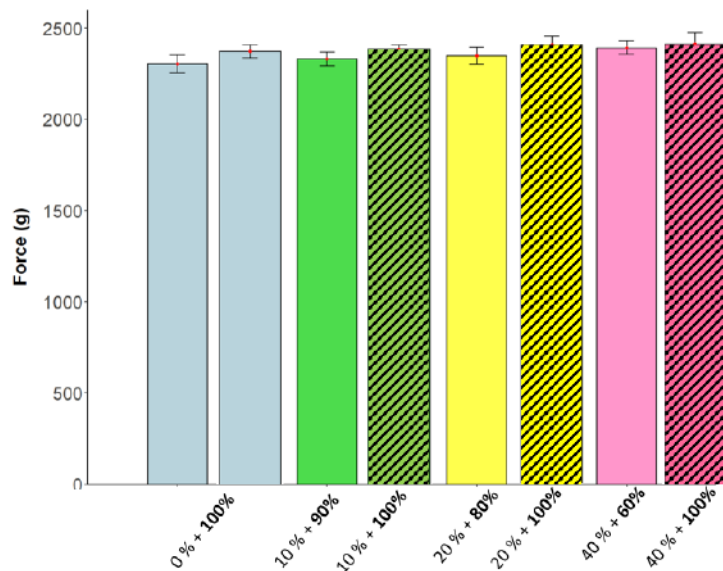


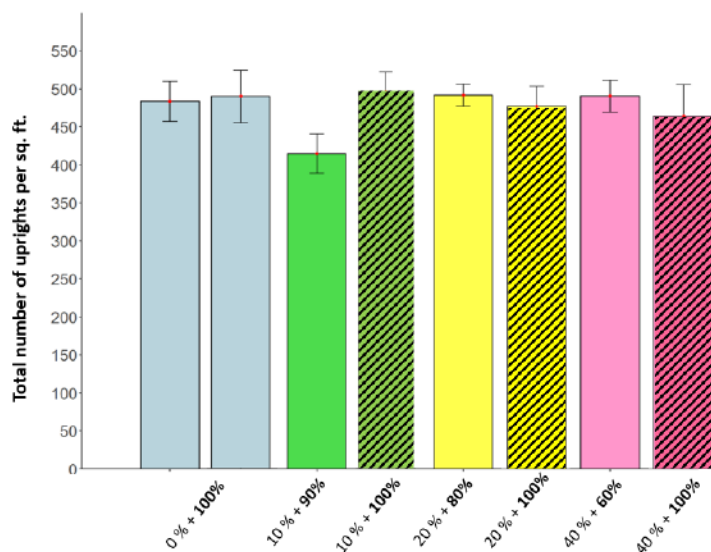
Figure 2. Effect of N Fall fertilization on berry weight for 2018 and 2019 seasons combined.



Fruit firmness

Fruit firmness was evaluated as the amount of force required to compress 20% of the fruit volume. Fruit firmness is expressed as force (g). The higher the force required to compress 20% of the fruit volume, the firmer the fruit. Firmness measurements collected using a texture analyzer machine for a sample of 50 fruits per plot. There were no differences on fruit firmness among treatments (Fig. 3).

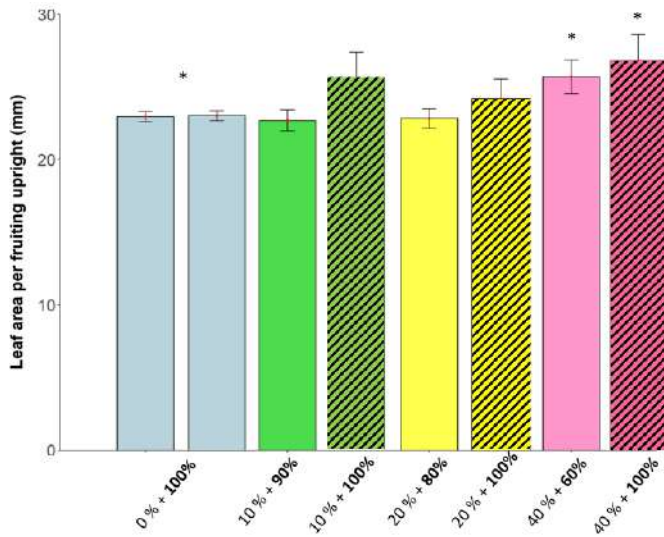
Figure 3. Effect of N Fall fertilization on fruit firmness for 2018 and 2019 seasons combined.



Upright density

Upright density was calculated by counting the total number of uprights in a sq. ft. area per plot (Fig. 4). No differences were observed among treatments, however upright density was higher in 2019 than 2018 regardless of the treatment.

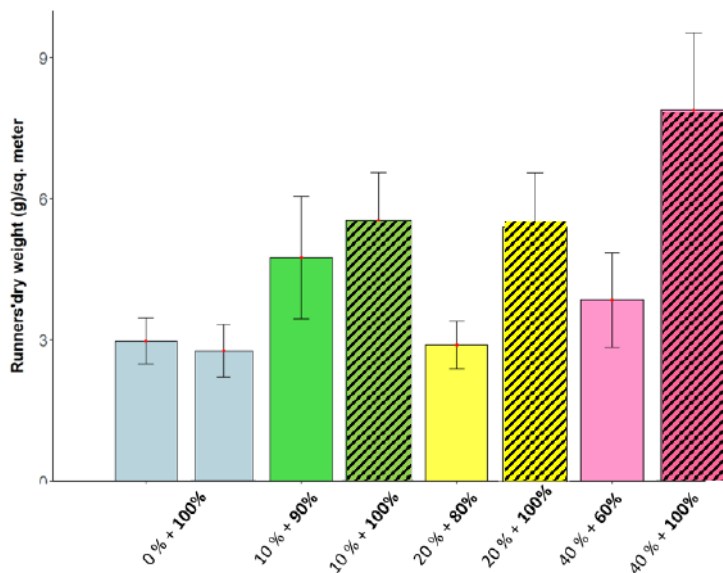
Figure 4. Effect of N fall fertilization on upright density for 2018 and 2019 seasons combined.



Leaf Area

Leaf area per upright (mm) was calculated as an average of the total leaf area of 20 uprights per plot. Treatments receiving 40% of N in the fall had larger leaf area compared to the control (Fig. 5).

Figure 5. Effect of N fall fertilization on leaf area in 2018.



Runner dry weight.

Total runner dry weight was estimated by collecting all runners in a one sq. meter area per plot. Runners were oven-dried for a week and final dry weight was recorded. All treatments that received fall fertilization plus 100% of N units during the growing season had higher runner dry weight than the control (Fig. 6).

Figure 6. Effect of N fall fertilization on runner dry weight for 2018 and 2019 seasons combined.

Conclusion

In summary, during the two growing seasons of this project there were no differences among nitrogen fall treatments in yield, fruit firmness, and upright density. Treatments receiving 40% of N in the fall had higher berry weight and leaf area compared to the control, and all treatments receiving over 100% of N units during the year had higher production of runners. Yield data will be collected in 2020 season.

We thank the funding support from the Wisconsin Cranberry Board, Cranberry Institute, and Ocean Spray. Special thanks to Mike Villars and Dan Hauke from Gottschalk Cranberry, and to the Gottschalk family.

WHAT SMELLS SO GOOD? A CRANBERRY OF COURSE!

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Insects, such as cranberry fruitworm and sparganothis fruitworm, rely heavily on plant host chemicals to identify and locate egg laying sites. Semiochemicals such as plant-produced chemicals and sex pheromones have been utilized to monitor the abundance and distribution of insect populations and to develop pest management strategies that manipulate insect behavior, including attract-and-kill, mass trapping, push-pull, or mating disruption. These semiochemicals may work alone or in combination and plant-produced compounds have been shown to often enhance or synergize insect responses to sex pheromones.

Our research aims at identifying relevant compounds from cranberry plants that are naturally attractive to our major insect pests to improve monitoring methods and to implement in pest management strategies, such as attract-and-kill, alone or in combination with sex pheromones. Semiochemicals that are attractive to female moths would be of particular value as, currently, only male moths are monitored using sex pheromone traps and are used as a proxy for monitoring insect populations.

Utilizing state of the art chemical ecology instruments, we have isolated twelve chemicals by gas chromatography and electroantennography (Fig 1) that triggered antennal responses (Fig 2) between the two important species of moths in cranberry: sparganothis fruitworm and cranberry fruitworm. Seven chemicals were detected by sparganothis fruitworm females and nine by cranberry fruitworm females with four overlapping between species. Sparganothis fruitworm responded to cranberry chemicals from all four phenological plant stages (before flowering, during bloom, during fruit set, during fruit growth), suggesting that sparganothis fruitworm females respond to cranberry chemicals regardless of the presence of reproductive structures on the plant. Cranberry fruitworm females responded primarily to chemicals from plants with reproductive structures and the attraction of females to plant

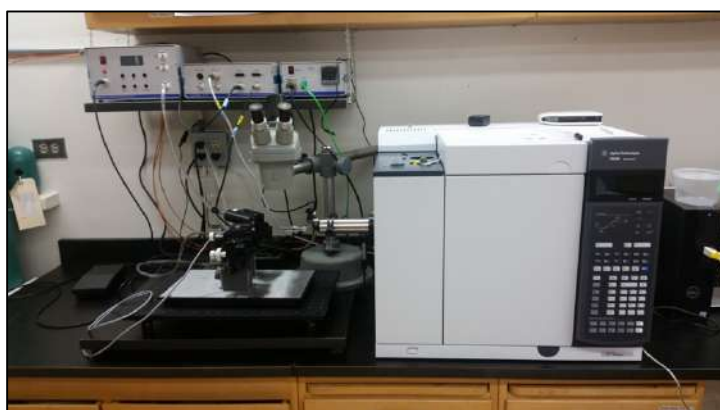


Figure 1. Gas chromatograph coupled with electro-antenna detector.

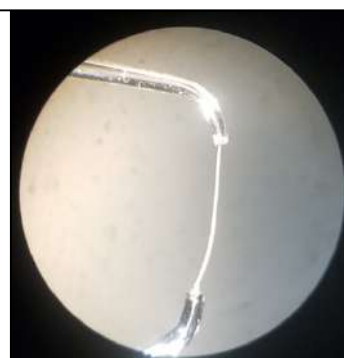


Figure 2. Moth antenna placed between two electrodes.

chemicals may be driven by flowers and fruit chemicals more than by green leaf volatiles. Using gas chromatography and mass spectrometry, the twelve chemicals have been tentatively identified and are being checked against standards to positively characterize their identities.

This summer we will determine which chemicals and blends of chemicals are attractive to sparganothis and cranberry fruitworms in the field and we will then optimize blends that can be used to attract each of these species. Thanks to funding from WCB we will continue this research with the ultimate goal to utilize these novel plant-based attractants to provide new environmentally sound IPM strategies for cranberry growers.

Thank you to all our collaborating growers, we could not do this without you!

CRANBERRY FRUIT TEXTURE AND QUALITY MEASURES

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A major component of fruit quality is fruit texture. Fruit texture is of particular importance to the cranberry industry since cranberries need to meet certain firmness standards in order to be processed into sweetened dried cranberries (SDCs). Quality standards for firmness, color, and fruit size all need to be met in order for cranberry producers to ensure a good-quality final product. Because of these standards, demand for high quality fruit that can be made into SDCs is increasing. To help with the creation of cranberry cultivars with high-quality fruit, our lab has investigated several firmness analysis methods for cranberry. Our goal was to define the best test conditions for measuring firmness in cranberry since there is currently almost no scientific literature on this topic. The texture analyzers we used in our data collection were the Stable Micro Systems TA.XT plus connect and the Stable Micro Systems TA.HD plus (Stable Micro Systems, Surrey, UK). We conducted five tests: a single compression test (50% strain), double compression test, puncture test, cutting test, and Kramer shear cell test. We tested 100 fruit from each of 10 cultivars known to vary in firmness from low to high using these five different firmness tests, and observed how each test ranked the cultivars and detected differences in firmness between the cultivars. The double compression test was the best test in terms of ranking cultivars according to their known firmness, while all of the other tests were unable to differentiate cultivars by firmness. Several strains (5-40%) and speeds (1-15mm second) were tested for the double compression test to find the combination which gave the more accurate results. Slow speeds of 2mm per second and strains between 10% and 20% were best to differentiate cultivars by firmness, while 5% was not enough strain and 40% was too much strain and it gave spurious results. By calculating maximum contact pressure (MCP), which takes the size of the fruit and its deformation into account, from the double compression test, we were able to gather more consistent results. To determine the sample size required to reduce error in our analysis, we conducted a double compression analysis on 'Stevens' using 300 fruit and used permutation tests to determine how sample size effects the variance of your measurements. Additionally, we collected measurements for external appearance (color and size), internal structure (locule size and flesh area), and firmness traits of each individual berry for 100 fruit from each of 10 cultivars, which allowed us to see how these fruit quality traits are related. Since all of these traits are associated with fruit development and maturity, we also investigated how traits relate to one another throughout the growing season. We found that early in the season fruit firmness, color and fruit size increase together, but late in the season firmness starts decreasing while size and color remain constant. Based on the gathered data, maximum firmness may be reached earlier than when the final size and color are reached. This indicates that growers may need to consider firmness independently from color and size when determining when to harvest. This information will be useful for the selection of cranberries with the best traits for SDC production and in the future will lead to the development of marker-assisted breeding strategies for fruit quality in cranberry through the effort of the VacCap project.

WILD BEES ON CRANBERRY MARSHES

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Wild bees are important pollinators of crops and supplemental wildflower plantings have been previously utilized in many agroecosystems to both improve pollination services to crops and reduce grower reliance on rented honey bees, through the attraction of wild bees. Our main objective is to assess the impact of wildflower plantings on wild bee abundance and diversity and how these affect yield in cranberry. As part of this study we also addressed two sub-objectives: 1) assess the impact of honeybees on wild bees, and 2) assess the impact of honeybees and wild bees on berry weight.

In 2018, we established quarter-acre plantings of native, perennial wildflowers using a commercially available seed mix on nine cranberry marshes in the Central Sands area of Wisconsin. At each marsh, we paired cranberry beds adjacent to the pollinator planting with another bed on the same marsh at least a kilometer away, to act as a control so we can better assess the impact of pollinator plantings under the same marsh management strategies. In each pair of beds, we sampled the bee fauna utilizing pan traps both within beds and pollinator plantings (or a corresponding dike edge, in the case of a “control” bed) before, during, and after the cranberry bloom period on a weekly basis. Bee samples were identified to species in the lab. Additionally, we conducted a yield assessment (berry weight and number of berries) in each pair of beds on every marsh prior to commercial harvest, to evaluate the impact of wildflower plantings on cranberry yield. The data presented here reflect what was collected during the cranberry bloom period of 2018 and 2019, as this is likely the period of greatest agricultural relevance and analyses of the data prior to and after bloom are still ongoing.

In our first two years of this study, we collected bees belonging to at least 98 different species from six bee families present in Wisconsin (Andrenidae, Apidae, Colletidae, Halictidae, and Megachilidae) during the cranberry bloom period (Fig 1). Of these, the most common taxon by far was the honey bee, *Apis mellifera* (blue in Fig 1).



Apidae



Andrenidae: Mining bees



Colletidae: Polyester bees



Megachilidae: Leafcutter bees



Halictidae: Sweat bees

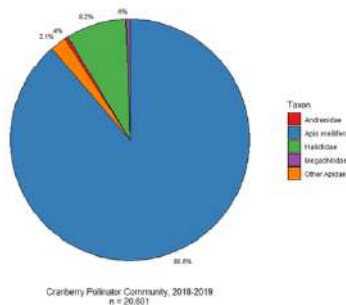


Figure 1. Bee community composition during cranberry bloom, 2018-2019. Note: Colletidae, not shown, accounted for <0.01% of overall community composition.

Our results up to this point show that year was the only factor responsible for structuring bee communities, rather than marsh, landscape composition around the marsh, or the presence of a pollinator garden (Fig 2). This is not surprising, considering that significant differences in bee fauna between control and wildflower planting areas are generally not observed prior to the third year in other cropping systems.

We found no statistically significant difference between the number of cranberries or mean berry weight between control and wildflower planting cranberry beds. Again, these results may reflect the lag in time between establishing a wildflower planting and seeing effects on bee communities and yield recorded in other cropping systems.

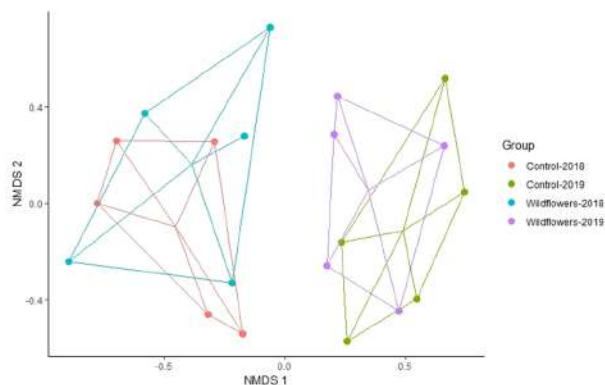
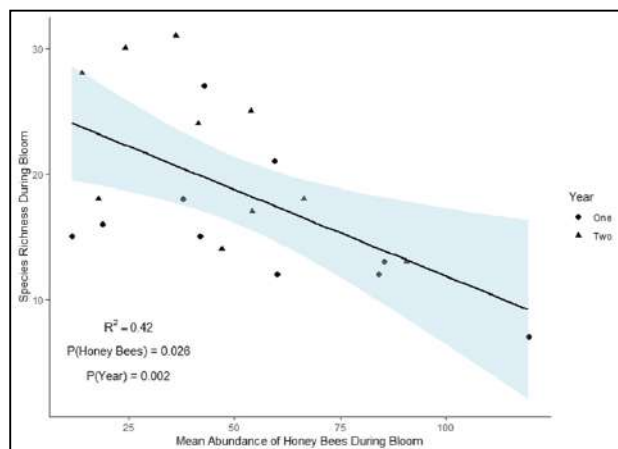


Figure 2. NMDS Ordination based on Bray-Curtis Distances for wild bee communities during cranberry bloom, as a function of year and treatment.



Sub-objective 1. Our data suggests that higher abundances of honey bees may be associated with a less diverse community of wild bees (Fig. 3) but not with lower wild bee abundance.

Figure 3. Correlation between mean honeybee abundance and wild bee species richness during cranberry bloom.

Sub-objective 2. The abundance of wild bees, but not honeybees, may be correlated with increased berry weight (Fig 4).

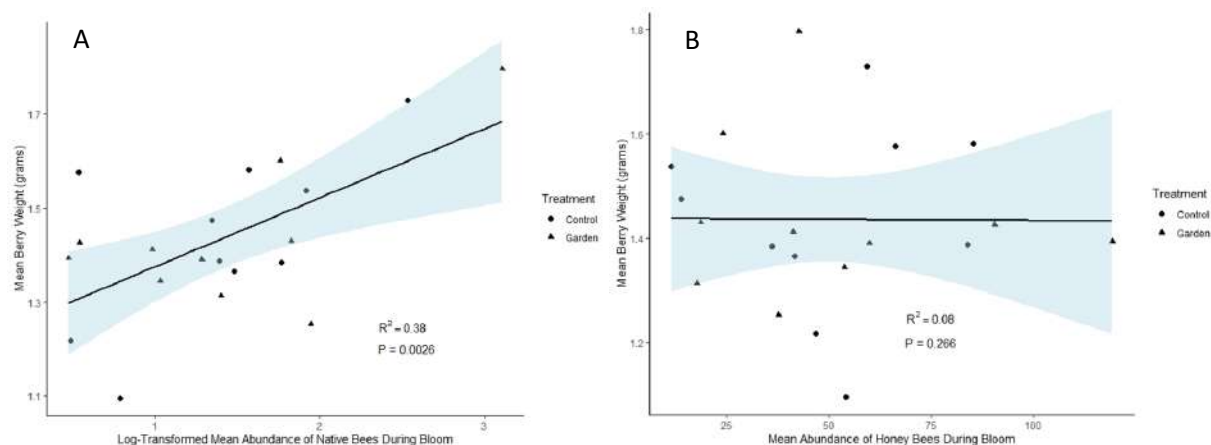


Figure 4. Correlation between A) mean abundance of wild bees and mean berry weight and B) mean abundance of honey bees and mean berry weight during cranberry bloom.

This summer, we will collect the 3rd year of data to assess the impact of wildflower plantings on wild bee communities around cranberry marshes in Wisconsin, and what impact these plantings and wild bees may have on cranberry yield. Our preliminary results suggest that honeybees may have a negative impact on wild bees though more research is needed to address this question more directly in the future.

We thank all the participating growers that helped with this project, planted and maintained wildflowers plantings and always welcomed us on their marsh, we couldn't do this work without your expertise and knowledge. Thank you for the support and funding from WCB and DATCP.

HONEYBEES: A GROWER COST OR VALUE ADDED ASSET TO CRANBERRY?

DAN ZIEHLI

Wisconsin Department of Agriculture, Trade, and Consumer Protection

ATCP 21.13 honeybee Import rules are taken very seriously by the Wisconsin Department of Agriculture Trade and Consumer Protection.

https://datcp.wi.gov/Pages/Programs_Services/BeekeepingRegulations.aspx

No person may ship live honeybees or used equipment without first reporting to the Wisconsin Department of Agriculture, Trade, and Consumer Protection (WI DATCP). An intent to import form can be found on the departments' website <https://datcp.wi.gov/Documents/HBImportReport.pdf>. This report not only protects the apiary industry but also helps the grower. It assures the grower is receiving healthy honeybee colonies for optimum pollination.

There are several pests that affect honeybee colony health. American foulbrood and Varroa mite are the most serious. Beekeepers use antibiotics and registered miticides to control most diseases and Varroa mites.

It is important the grower understands a beehive is the wooden boxes and frames where the honeybees live. A colony is the queen, adult bees and larvae. When talking with your beekeeper always insist on frames of brood (eggs, larvae, pupa) for optimum pollination. Frames of just bees is not always a guarantee of a strong pollinating colony. It is also important when talking to your beekeeper to keep a line of communication open should the need to remove honeybee's earlier or in other instances. A well-informed beekeeper of your marsh activities always affords a better partnership among grower and beekeeper.

Growers should always be vigilant of colonies placed on their marsh and watch for signs of weakening colonies and possibility of diseases. DATCP apiary inspectors are always available to assist growers and beekeepers. Apiary inspectors randomly inspect cranberry marsh honeybee colonies for compliance of Wisconsin state laws and scout for pest and diseases in honeybees. Apiary inspectors always welcome request from growers to perform free inspections on colonies placed on their marsh.

Always remember to be a good steward to your marsh and be a good neighbor when spraying pesticides, paying close attention to where your neighbor has honeybee colony placement.

If a grower has any question or concern, call WI DATCP Dan Ziehli apiary inspector 608 444 3209 any time, day or night. April Kustov apiary inspector for Northern Wisconsin 715 904 0143. Liz Meils state Apiarist is also available during regular business hours M-F at 608 224 4572.

2019 WSCGA COMMUNICATIONS OVERVIEW

ISAAC ZARECKI¹ and KATHRINE WHITLOCK²

¹WSCGA, ²Laughlin Constable

History

WSCGA maintains an evolving communications strategy, as industry opportunities and challenges shift, communication needs shift as well. Past focuses included: building/maintaining WSCGA's "social license" to operate in the state, developing a positive image of the cranberry industry/cranberry growers, educating about cranberry industry history, economic impact and sustainability, and promoting the consumption of cranberry products.

New strategic plan direction: Tell the story of Wisconsin cranberry growers through grower-centered promotion, outreach and communication strategies.

2019 Priorities

WSCGA maintained strong existing partnerships, content streams and media relationships through strategy shifts as a plan was developed, messages were refined and assets were created. WSCGA conducted public opinion research to drive new communications plan. WSCGA Public Education and Communications Manager Isaac Zarecki was hired. WSCGA developed a 2020 plan and began gathering assets for new grower-centered campaign.

2019 Highlights

WSCGA partnered with the Foreign Press Center and the London Embassy in May to bring seven journalists from the United Kingdom to Warrens for a press trip. The group toured the Cranberry Discovery Center, a cranberry marsh and a manufacturing facility to learn about cranberry growing process, cranberry heritage, technology and sustainability.

Several partnerships and event sponsorships were leveraged to provide consumer sampling and education opportunities. Partners included: American Birkebeiner, UW/Badger Sports Properties, Packers and the Wisconsin State Fair.

2019 harvest communication included limited, very targeted proactive outreach due to challenges facing industry. It capitalized on local opportunities to share positive harvest news, ensured accurate coverage by media, supported growers during their busiest season. Targeted efforts resulted in more than 240 print, online, radio and TV stories of a positive nature, totaling more than 9.5 million impressions.

WSCGA also grew and leveraged web and social media presence to reach consumers with cranberry facts, recipes, information and more. It also gathered assets for new grower-centric social media strategy.

Research Study

WSCGA conducted a public opinion survey with the help of Laughlin Constable and Lab42. The goals of the survey were to gain understanding of current awareness and perceptions of cranberry growing, understanding impact of third-party groups and partners and testing message effectiveness.

Key findings of the study included:

- More than 70% of WI residents are aware cranberries are grown in WI
- Among this group, the overall opinion of cranberry growing is very positive
- Awareness is highest among WI residents ages 35+ and those living in cranberry regions
- Awareness is lowest among Millennials and those in southeast and northeast regions
- Claims about economic and environmental impact are the strongest opportunity areas as they have the lowest familiarity but provide strongest positive impression
- 42-57% had an existing familiarity with industry facts
- 90-92% said industry facts present a very/somewhat positive impression
- Claims around health provide a high positive impression, but already have a high familiarity, and therefore less opportunity for growth
- Claims about industry heritage have a lower impact, except around the phrase “multigenerational family growers”
- For the Millennial target audience, environmental impact facts are most important to influence positive impression

To maintain and increase levels of positive overall opinion, WSCGA will focus communications on economic benefits of cranberry growing in Wisconsin, while adding an emotional dimension by incorporating language about multigenerational family growers and using health messaging as complementary/supplemental messaging.

To increase awareness, WSCGA will focus communications efforts on southeast and northeast regions and target Millennials and utilize key messages around environmental impact/sustainability with this subgroup.

2020 Plan

WSCGA’s 2020 communication plan will focus on integrating high impact messaging, evaluating current partnerships and identifying new opportunities all with the data from the 2019 survey in mind.

WSCGA will release a series of videos throughout the year. Filming was conducted in October 2019. Themes will center on messages identified in the 2019 survey.

TEMPERATURE-BASED MODELS TO PREDICT PHENOLOGY

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Phenological predictions based on air temperature exposure represent an important tool for production management for cranberry growers. With this information, growers can anticipate the proximity of key phenological stages and be prepared for necessary field tasks. Current models based on growing degrees have not delivered precise predictions. One of the causes is the lack of experimental determination of the base temperature for cranberry, a goal which has proven to be problematic. Models not requiring this parameter could be a useful alternative. In this study, we assessed the precision of such a model, called the Developmental Index Model, to predict the rates of development to reach the phenological stages of bud swell and bloom. We first determined a Developmental Index rate to relate change in phenology to temperature using controlled experimental environments. Next, we applied this experimentally determined relationship to temperatures and bud observations in the field to test the prediction of bud swell and bloom.

Determination of the Developmental Indices for bud swell and bloom. Nine “sods” (approximately 18”x 24” blocks of vines with about 6” of soil) of each of the cultivars HyRed and Stevens were dug from beds at ice-off during Spring 2018. Three sods per cultivar were placed in growth chambers with 16-hour photoperiods at temperatures of 50, 59 and 68 °F. Thirty uprights with medium terminal buds (1-2 mm diameter) were selected and tagged on each sod. Buds were evaluated weekly for changes in phenological stage to identify the number of days required to reach the maximum percentages of both bud swell and bloom. Developmental Index rates were calculated for each growth chamber based on the hours required for reaching these phenological stages.

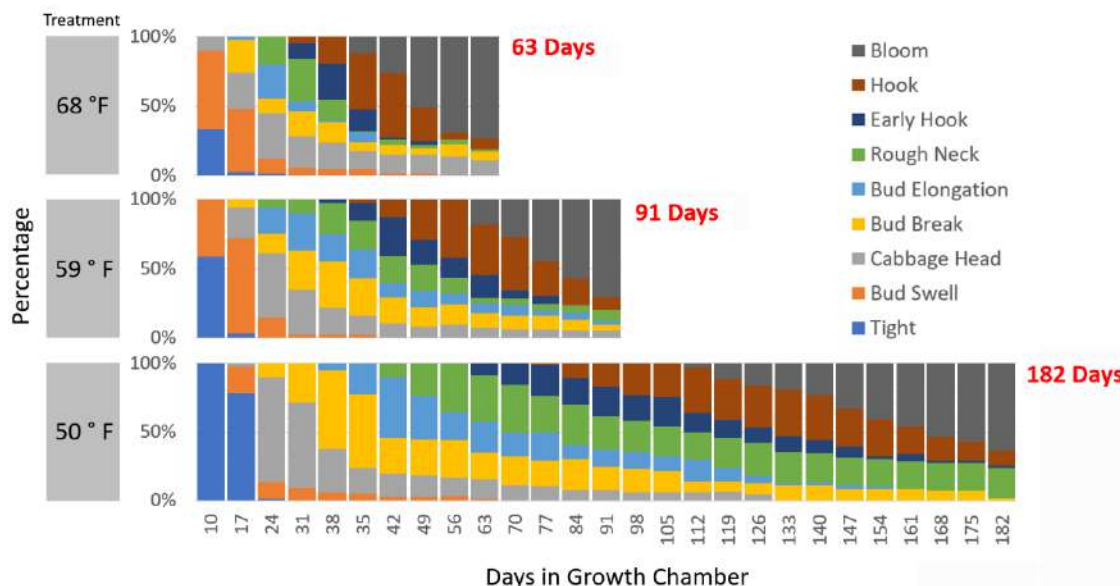


Figure 1: Progression of phenological development for HyRed samples using growth chambers maintained at 50, 59 and 68 °F.

In HyRed, the highest percentages of uprights in bud swell occurred within 17 days in the 50 °F and 59 °F treatments, while this stage was reached within 10 days in the 68 °F treatment (**Figure 1**). The time to reach maximum bloom differed noticeably for the three evaluated environments. For HyRed, uprights in the 50 °F growth chamber took 182 days to reach maximum bloom, in contrast to 91 and 63 days for the uprights in the 59 and 68 °F growth chambers, respectively. In the case of other advanced phenological stages, such as hook, rates of development also differed between the temperature treatments; it took 42, 70 and 133 days for the 50, 59 and 68 °F treatments to reach the hook stage, respectively.

Prediction of bud swell and bloom in the field. After the determination of the Developmental Index rates, a calculation of the time required to reach any phenological stage in the field can be applied. From our evaluation of phenological development between tight bud and 100% bloom, we determined development rates for critical phenological stages, such as bud swell and 80% bloom in 2018. Four predictive models for the field were constructed (one for each cultivar at each stage) using the hourly air temperature. To assess their precision, predicted dates were compared with the date each phenological stage was reached in the field. Bud swell occurred in the field on May 8, while the predicted date was +1 day for Stevens and -1 day for HyRed. The evaluation of 80% bloom for HyRed in the field occurred on June 26 and the predicted date was +4 days. For Stevens, 80 % bloom occurred in the field on July 1, while the predicted date was +2 days. This methodology for the construction of predictive models is promising, but requires validation across different environments and field conditions occurring at cranberry marshes.

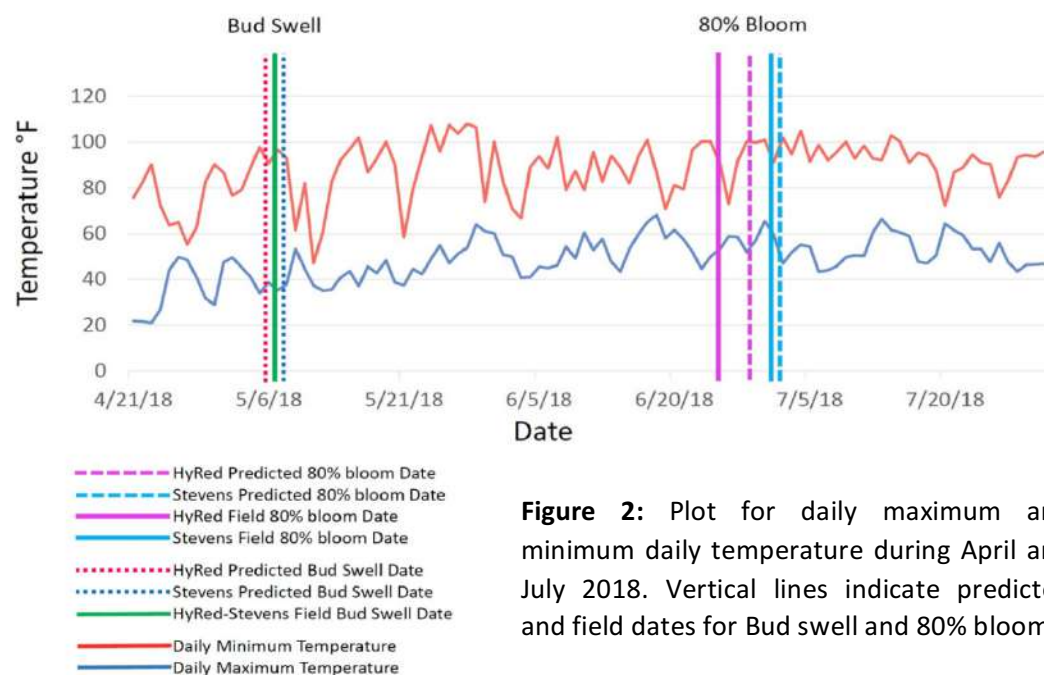


Figure 2: Plot for daily maximum and minimum daily temperature during April and July 2018. Vertical lines indicate predicted and field dates for Bud swell and 80% bloom.

CRANBERRY PEST MANAGEMENT PROGRAM – REVIEW OF 2019 FIELD TRIALS

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¹*Department of Horticulture*, ³*Department of Entomology*², *Department of Plant Pathology*

University of Wisconsin-Madison

FUNGICIDES & DISEASES

2019 Diseases Status – The 2019 weather was quite cool and exceptionally wet during April and May. Degree days lagged behind normal until mid-July. These conditions were not conducive to disease development. As a consequence, disease pressure was generally light across the Wisconsin cranberry productions area

- Proline and Abound + Indar are the industry standards
- In 2019, eight disease field trials were conducted: 3 trials for fruit rot, 3 trials for early rot, 2 trials for cottonball.
- Proline, Abound + Indar, Abound, Evito, Quilt Xcel, Quadris Top and Bravo provided good control of both fruit rot and early rot.
- Tilt/Orbit, Proline, Abound + Indar, Indar, Quilt Xcel, Quadris Top and Evito provided good control of cottonball
- Although 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.

New Fungicides for 2020

Quilt Xcel 2.2 L is a Syngenta package mix of Abound & Tilt/Orbit; tested at 21 floz/acre; has provided good control of fruit rots and cottonball in 2016 - 2019 research trials.

Quadris Top 2.7 SC is a Syngenta package mix of Quadris (=Abound) & difenconazole tested at 10 - 14 floz/acre; has provided good control of fruit rots and cottonball in 2016 - 2019 research trials.

Kenja 3.3 SC is a Summit Agro USA product; tested at 15.5 floz/acre; it did not provide acceptable control of fruit rots or cottonball

Registered Cranberry Fungicides – What Works for What

	Early Rot	Fruit Rot	Cottonball
Abound	++	++	++
Indar	+++	++	+++
Abd + Ind	+++	+++	+++
Bravo	++	++	+
Evito	++	++	++
Proline	+++	+++	+++
Oso	+	++	++
Regalia	+	++	++
Quilt Xcel	+++	+++	+++
Quadris Top	+++	+++	++
Tilt/Orbit	na	na	+++

na: insufficient control; +: 60-79 % control, ++: 80-90 % control, +++: >90 % control

Bravo Status. There is a likelihood that the registration of Bravo on all crops including cranberries will be revoked in the near future due to export residue concerns by the European markets. As of now, Bravo can be used on cranberries in 2020 if the crop is destined for domestic markets. To stay abreast of the registration status of Bravo check the Fruit.wisc.edu/cranberry web site and/or 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 pollinating 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.

Rotation of Fungicides Should we rotate fungicides within a season or in alternating seasons? From a prevention of disease pathogens developing resistance to a given fungicide standpoint this is a sound concept and worthy of considering. There is little evidence that rotation enhances the efficacies of products.

INSECTICIDES AND BUGS

2019 Insect Review - Insect pressures in 2019 were generally light probably because of the cool, wet spring and the delay in degree-day development. Fruitworms were present and required control measures. Registered products performed as expected. As seems to be the norm in recent years, fireworms were isolated problems and tipworms were scarce. Flea beetles were a major problem. Altacor continues to be the primary insecticide of choice for fruitworm control. Control of late season flea beetles is a challenge as control measures may be required relatively close to harvest - this precludes the use of several efficacious products that have longer pre-harvest intervals (PHI) and may have restrictions from handlers that may change PHIs from what is on the label, so be aware! In 2019, trials were conducted to evaluate registered and candidate insecticides for control of tipworms, fruitworms, fireworms, spanworms, flea beetles and leafhoppers. Insecticides evaluated in the 2019 trials were Altacor, Assail, Delegate, Diazinon AG600, Imidan, Intrepid, Confirm, Lorsban, Rimon, Cormoran, Venerate/Grandevo, Exirel and 4 experimental insecticides. The table below shows the performances of these insecticides on various target insect pests.

New Insecticides

Cormoran 1.5 SC is a package mix of Rimon (novaluron) and Assail (acetamiprid) from ADAMA. The cranberry use rate is 12 fl oz/acre and the label impressively list of 22 insect pests as controlled. This product has provided good control of most of our cranberry insect pests, except tipworms, in research trials.

Exirel 0.83 SE (cyantraniliprole) from FMC/Dupont. In our cranberry insecticide trials this product has provided excellent control of "worms". The cranberry use rate is 10 - 20.5 fl oz/acre. Chemically, Exirel is closely related to Altacor. It has a 14-day pre-harvest interval and a 12-hour re-entry period.

Movement 2 L (spirotetramat) from Bayer Crop Sciences. The cranberry use rate is 8 - 10 fl oz/acre. In our insecticide trials this product has provided excellent control of tipworms and limited control of leafhoppers. It is ineffective for the control of "worms" and flea beetles.

Spear-Lep (bio-insecticide) from Vestaron. Cranberry use rate 2 pt/acre. Spear-Lep controls "worms" only - cranberry fruitworm, sparganothis fruitworm, fireworm, spanworm.

Candidate Products: Four candidate insecticides were evaluated in 2019. All four had good activity on several of Wisconsin insect pests. Two of these are in-progress for registrations.

Registered Cranberry Insecticides – What Works for What

	Tip Worm	Fruit Worm	Sparg FW	Span Worm	Fire Worm	Flea Beetle	Leaf Hopper	Bee Toxicity
Altacor	+	+++	+++	+++	++	++	+	--
Assail	+	++	++	++	++	+++	++	xxx
Exirel	+	+++	+++	+++	++	++	+	xx
Cormoran	--	++	++	++	++	+++	++	xxx
Confirm	--	+++	+++	+++	++	--	--	--
Movement	+++	--	--	--	--	--	--	--
Delegate	+	+++	+++	+++	++	--	--	xx
Diazinon	+	+	+	++	+	+++	+++	xxx
Grandevo	--	++	++	+++	++	--	--	--
Imidan	--	+	+	+	+	+++	+++	xxx
Intrepid	--	+++	+++	+++	+++	--	--	--
Knack	--	++	+	+++	+	--	--	--
Lorsban	+	+	+	+	+	+++	+++	xxx
Rimon	+	++	++	+++	+	+	-	x
Venom	--	--	--	--	--	+++	+++	xxx

+++ >80% control, ++ 70-80% control, 60-70% control – inadequate control; x = bee toxicity

Flea Beetles Flea beetles are relatively easy to control although since they emerge from the soil over a long period of time, multiple insecticide applications may be required. Insecticides that effectively control flea beetles and are registered for use on cranberries are listed in the table below with their efficacy rating.

Flea Beetle Control

Actara	+++
Assail	+++
Altacor	+
Cormoran	+++
Delegate	++
Diazinon	+++
Imidan	++
Lorsban	++
Orthene	++
Sevin	+++
Venom	+++

Lorsban Status. There is a likelihood that the registration of Lorsban on all crops including cranberries will be revoked in the near future due to export residue concerns by the European markets and concerns with farm worker safety and environmental impact in the United States and abroad. As of now, Lorsban can be used on cranberries in 2020 if the crop is destined for domestic markets. To stay abreast of the registration status of Lorsban and other pesticides check the Fruit.wisc.edu/cranberry web site, the Cranberry Pest Management in Wisconsin Guide, and your processor guidelines/restrictions.

WEEDS & HERBICIDES

The objectives of 2019 herbicide trials were 1) to seek control for weeds that are escaping our current herbicide programs; and 2) to integrate preemergent and post emergent herbicides.

Escapes. Weeds that are currently not being controlled by our herbicides programs are maples, willows, popples, oaks, dewberry, northern St Johnswort, leatherleaf, poison ivy and mosses. Wiper applications of Callisto will control willows, popples, and oaks. The key to successful control is to not wait until late season for application. Early season applications are most effective. Callisto temporarily hurts maples but does not kill them. Glyphosate works well but the kill is slow. For the control of maples, leatherleaf and other weeds a three-way wiper mix of glyphosate (1:2 or 1:3 ratio glyphosate-to-water) + 2,4-D + a silicone surfactant (1% v/v) works well. Caution: Not all glyphosate products allow the use of a surfactant. Be sure to read the labels and select a product that does not restrict the use of a surfactant.

Sphagnum Moss. Two copper-based products, two generic products and two commercial copper-based fungicides were evaluated for moss control in 2019. Although all products provided initial toxicities to moss, none eradicated the moss. Residual toxicities on moss persisted longest with the copper-based products. The two fungicide products, both pending registrations for moss control in cranberries, were somewhat effective for moss control. The search for moss control continues.

New Herbicides. There are few new herbicides being brought into the market. There are three candidate products pending cranberry registrations.

Generic Callisto. There are a number of generic formulations of mesotrione (Callisto) available. To note some: Bellum (Rotam North America), Explorer (Syngenta), Incinerate (Winfield Solutions), Sotrion (Growmark) and Mesotrione 4SC (Willowood) and there are others. In field trials there have not been demonstrated significant differences between the generic products and Callisto or among the generic products.

Future for Cranberry Pesticides

Currently there are three new insecticides, three new herbicides and three new fungicides at some stage of the registration process.

Some products in our pesticide arsenal are under scrutiny for export and/or registration.

Bravo	Export residues; short-term reprieved
Evito	Export residues
Proline	Export residues
QuinStar	Export residues
Belay	Threat to bees; cancelled
Assail	Threat to bees
Lorsban and other organophosphates	Threat to the environment Export residues

ALWAYS REMEMBER TO: 1) Read the label and 2) Check with the processor for approval to use.

2020 CRANBERRY SCHOOL GROWER SURVEY RESULTS

CHRISTELLE GUÉDOT¹, AMAYA ATUCHA², and ALLISON JONJAK³

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Results of the live survey of growers present in the room at the 2020 Cranberry School are presented below. The survey was conducted using ParticiPOLL software and attendee smartphone hardware. 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. The “count” column indicates the number of growers that responded and the “percent” column indicates the % of respondents. Thank you for participating!

In 2019 yields were:	Count	Percent
Higher than average	5	13
Lower than average	31	82
Similar to previous years	2	5
Totals	38	100
In 2019 fruit size was:	Count	Percent
Larger than average	0	0
Smaller than average	22	56
Similar to previous years	17	44
Totals	39	100
If yields were lower in 2019, did you:	Count	Percent
Reduce fertilizer applications	14	70
Reduce herbicide applications	0	0
Reduce insecticide applications	2	10
All of the above	4	20
Totals	20	100
For next growing season to reduce production costs will you:	Count	Percent
Reduce fertilizer applications	8	53
Reduce herbicide applications	3	20
Reduce insecticide applications	0	0
All of the above	4	27
Totals	15	100

Do you fertilize with Phosphorus (P) every year?	Count	Percent
Yes	31	86
No	5	14
Totals	36	100

I determine the rate of P applications based on:	Count	Percent
Tissue test results	6	17
Soil test results	5	15
Previous year's yield	2	6
All of the above	19	56
I don't know to estimate P rates	2	6
Totals	34	100

The most common P fertilizer blend I use is:	Count	Percent
14:14:14	13	45
6:24:24	2	7
10:10:20	12	41
0:46:0	2	7
Totals	29	100

In the last 3 years have you:	Count	Percent
Reduced P applications	9	24
Increased P applications	2	5
Haven't changed P rates	26	70
Totals	37	100

On average how much P do you apply to a new bed (0-3 years)	Count	Percent
0-5 lb/ac actual P (0-11 lb/ac P2O5)	1	3
5-10 lb/ac (11-22.5 lb/ac P2O5)	1	3
10-15 lb/ac (22.5-33.7 lb/ac P2O5)	7	23
15-20 lb/ac (33.7-45 lb/ac P2O5)	9	29
>20 lb/ac (>45 lb/ac P2O5)	13	42
Totals	31	100

I'm interested in reducing P applications	Count	Percent
Yes, to reduce production costs	3	9
Yes, I'm concerned about water quality	3	9
A & B	10	30
No, what I do works	5	16
Maybe, I need more evidence it won't impact yield	12	36
Totals	33	100

Do you use the fungicide chlorothalonil?	Count	Percent
Yes	8	30
No	19	70
Totals	27	100
If you do use chlorothalonil, do you feel confident in alternative fungicides?	Count	Percent
Don't use chlorothalonil	20	72
Use chlorothalonil, but yes, we have good alternatives	4	14
Use chlorothalonil, and no, not confident in the alternatives	4	14
Totals	28	100
Have you reduced fungicide use in the last 3-4 years because of low crop prices?	Count	Percent
Yes	5	16
No	19	59
We have never or only rarely used fungicides	8	25
Totals	32	100
If you have reduced fungicide use in the last 3-4 years, has this coincided with reduced yields?	Count	Percent
Yes, definitely	1	4
Maybe, but so many factors at play that it's hard to tell	13	54
No, yields are good despite cutting back on fungicides	3	13
We have never or only rarely used fungicides	7	29
Totals	24	100
Have you used the fungicide Proline (prothioconazole)?	Count	Percent
Yes, good results	28	72
Yes, fair to poor results	5	13
No, have not used it	6	15
Totals	39	100
Do you use more than one class of fungicides to control fruit rot diseases?	Count	Percent
Don't use fungicides	5	14
We use different fungicides, but not sure if they are in different classes	5	14
Yes, we use more than one class of fungicides	27	72
Totals	37	100

Have you heard of cranberry false blossom disease?	Count	Percent
Yes and am concerned	15	38
Yes but don't know much about it	24	60
No	1	2
Totals	40	100

When I buy plants from out of state, I ask the seller if they screen plants for viruses and/or phytoplasma pathogens.	Count	Percent
No	6	15
Yes	12	31
Don't but plants from out of state	21	54
Totals	39	100

Are you confident that you can identify berry scarring associated with viruses?	Count	Percent
Yes	14	39
No	22	61
Totals	36	100

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?	Count	Percent
Herbicides	3	8
Insecticides	33	84
Fungicides	3	8
Totals	39	100

Do you have moss on your marsh?	Count	Percent
Yes, but only in a few beds	30	76
Yes, extensively across the marsh	5	12
No moss on my marsh!	5	12
Totals	40	100

Do you feel that your weed pressure impacts cranberry yield?	Count	Percent
No impact	11	28
Yes, by 10% or less	24	62
Yes, by 11 to 25%	4	10
Yes, by greater than 25%	0	0
Totals	39	100

For your weed control program in 2019, did you:	Count	Percent
Use pre-emergent herbicides only	1	3
Use post-emergent herbicides only	0	0
Use pre- and post-emergent herbicides	35	92
I didn't use any herbicides	2	5
Totals	38	100

Do you use Stinger in your cranberries?	Count	Percent
Yes, as a spot or wiper treatment only to needed areas	18	46
Yes, as a broadcast application	1	2
No, I don't use Stinger	21	52
Totals	40	100

Robotic weeding technology is advancing rapidly. Would that be of interest to you for cranberry weed control?	Count	Percent
Very interested	17	40
Somewhat interested	14	34
Thanks, but no thanks	11	26
Totals	42	100

When considering surfactants with your pesticides:	Count	Percent
I use the same surfactant product every year, if possible	18	53
I use whatever the dealer delivers with the pesticide	11	32
I'm not that concerned about which surfactant brand I use	5	15
Totals	34	100

Are you concerned about the development of herbicide-resistant weeds on your marsh?	Count	Percent
Very concerned	18	46
Somewhat concerned	18	46
Not at all concerned	3	8
Totals	39	100

The most economically important insect pest on your marsh in 2019 was:	Count	Percent
Sparganothis fruitworm	12	32
Cranberry fruitworm	16	42
Black-headed fireworm	1	3
Red-headed flea beetle	6	15
Tipworm	2	5
Other pest species	1	3
Totals	38	100

The second-most economically important insect pest on your marsh in 2019 was:	Count	Percent
Sparganothis fruitworm	10	28
Cranberry fruitworm	11	31
Black-headed fireworm	3	8
Red-headed flea beetle	10	28
Tipworm	2	5
Other pest species	0	0
Totals	36	100

Are degree days recorded at your marsh for insect control?	Count	Percent
Yes	19	47
No	17	41
I don't know, ask my scout!	5	12
Totals	41	100

Would you be interested in using degree days for precisely timing your sprays to improve insecticide efficacy?	Count	Percent
Yes	37	92
No	3	8
Totals	40	100

What was the main yield reducing pest of the 2019 crop?	Count	Percent
Insects	17	59
Disease/Rot	11	38
Weeds	1	3
Totals	29	100

In 2019 we reduced these inputs:	Count	Percent
We didn't	17	47
Number of bee hives	5	14
Fertilizers	9	25
Herbicides	1	3
Fungicides	3	8
Insecticides	1	3
Totals	36	100

Was your insect pressure in 2019:	Count	Percent
Up from 2018	8	20
Down from 2018	11	28
Similar to 2018	21	52
Totals	40	100

How many honey bee hives per acre did you bring in 2019?	Count	Percent
0	4	10
1	3	7
2	15	38
3	14	35
4-7	4	10
8 or more	0	0
Totals	40	100

How many bumblebee colonies per acre did you bring in 2019?	Count	Percent
0	22	60
1	9	24
2	2	5
3	1	3
4	2	5
6 or more	1	3
Totals	37	100

The main reason for not using bumble bee colonies is:	Count	Percent
Cost of colonies	10	31
Availability of colonies	0	0
Cost in labor to set up and dispose of colonies	3	9
Lack of experience with bumble bees	7	21
More research is needed to convince me	5	15
Other	8	24
Totals	33	100

The main reason for using honey bees is:	Count	Percent
Cost of hives	1	3
Availability of hives	2	6
My beekeeper takes care of all the logistics and the bees	8	24
Consistent and reliable pollination	19	58
Other	3	9
Totals	33	100

How many insecticide sprays did you apply in the 2019 growing season?	Count	Percent
0	0	0
1-2	12	31
3-4	23	59
5-6	4	10
More than 6	0	0
Totals	33	100

Was your number of insecticide sprays in 2019?	Count	Percent
Up from 2018	6	16
Down from 2018	12	32
Same as 2018	20	52
Totals	38	100

How much did you spend in 2019 on insecticides per acre?	Count	Percent
\$0-40/acre	10	30
\$41-80/acre	16	49
\$81-120/acre	3	9
\$121-160/acre	1	3
\$161-200/acre	3	9
More than \$200 per acre	0	0
Totals	33	100

How much did you spend in 2019 on pollination services per acre?	Count	Percent
\$0 per acre	1	3
\$1-40 per acre	1	3
\$41-80 per acre	7	23
\$81-120 per acre	5	16
\$121-160 per acre	11	36
More than \$200 per acre	6	19
Totals	31	100

Would you consider changing your management practices to protect pollinators?	Count	Percent
Yes	38	93
No	3	7
Totals	41	100

In terms of pesticide use, would you consider reducing pesticide applications during bloom to protect pollinators?	Count	Percent
Yes, I would consider reducing insecticide applications	7	17
Yes, I would consider reducing fungicide applications	1	2
Yes, I would consider reducing both types of pesticide applications	27	66
No, I wouldn't consider reducing either type of application	6	15
Totals	41	100

Are you considering planting a pollinator garden to attract wild pollinators on your marsh?	Count	Percent
Yes	16	37
No	8	19
I already have one	16	30
I am waiting to get more info before implementing on my marsh	6	14
Totals	46	100

How many sprays were specifically for cranberry fruitworm in 2019?	Count	Percent
0	2	5
1	21	51
2	15	37
3	3	7
4 or more	0	0
Totals	41	100

How many sprays were specifically for sparganothis fruitworm in 2019?	Count	Percent
0	8	20
1	21	51
2	9	22
3	3	7
4 or more	0	0
Totals	41	100

How many sprays were specifically for tipworm in 2019?	Count	Percent
0	32	76
1	8	19
2	2	5
3	0	0
4 or more	0	0
Totals	42	100

How many sprays were specifically for flea beetle in 2019?	Count	Percent
0	16	39
1	13	31
2	8	20
3	4	10
4 or more	0	0
Totals	41	100

Was the flea beetle population on your marsh in 2019:	Count	Percent
Up from 2018	8	19
Down from 2018	14	33
Same as 2018	20	48
Totals	42	100

What insecticide did you use for flea beetle control in 2019?	Count	Percent
Assail	0	0
Diazinon	22	73
Rimon	5	17
Altacor	3	10
Actara	0	0
Other	0	0
Totals	30	100

Did you use Lorsban in 2019?	Count	Percent
Yes	21	49
No	22	51
Totals	43	100

How many applications of Lorsban per year did you apply in 2019?	Count	Percent
0	23	51
1	22	49
2	0	0
Totals	42	100

Did you use Phosmet (Imidan) in 2019?	Count	Percent
Yes	2	5
No	40	95
Totals	43	100

Did you use cyantraniliprole (Exirel) in 2019?	Count	Percent
Yes	0	0
No	42	100
Totals	42	100

Do you typically flood in spring (mid- to late May) for insect control?	Count	Percent
Yes	15	36
No	27	64
Totals	42	100



WISCONSIN STATE CRANBERRY GROWERS

— *Association* —



2019 ANNUAL REPORT



ANNUAL MEETING

January 22, 2020

Agenda

10:30 AM

Call to Order

Minutes from the 2019 Summer Meeting

- *Rocky Biegel, Secretary*

Election of Directors

- *Steven Bartling, Chair - Nominating Committee*

Report of the President

- *Tyler Walker*

Report of the Executive Director

- *Tom Lochner*

Other Business

11:00 AM

Adjourn



From the President

Welcome to the 2020 Wisconsin Cranberry School and WSCGA Winter Meeting and Winter Trade Show. We hope you enjoy our new location this year at the Wilderness Resort- Glacier Canyon Conference Center in Wisconsin Dells.

I would like to extend a special thank you to the WSCGA staff, the Education Committee, and the Board of Directors for their tireless efforts and hard work they put in to making this event successful. The planning required to organize everything for this event is immense and it would not be possible without each of them, thank you again to all that contributed to make it possible.

I know there is an abundance of information and resources available over these two days, please take the time to absorb and utilize as much as possible. One of the most significant opportunities an event like this provides is to establish relationships with people. Researchers, vendors, associates, and growers of all kinds have the opportunity to come together, share ideas, and network.

This event marks the end of my service as Board President and will wrap up my last term as a WSCGA Board member. It has been an honor to serve on the WSCGA Board of Directors for the past nine years and to be able to be part of such a great organization. I would like to thank all of the people that I have had the privilege of working with over the years. It is a testament to our industry that so many people have been able to come together year after year for the betterment of everyone. I would also like to thank all past and present directors for their service, and Tom, Alex, Crystal, and Isaac for the exemplary work they do, they truly are the heartbeat of the WSCGA. Thank you to all of those that made it possible to serve the industry as I have and for all your support these past nine years. Lastly, but certainly not least, I would like to thank my wife, Amanda, and our kids for their unending support of me.

The WSCGA continues to work to provide as much benefit to Wisconsin Cranberries as possible by providing legislative and education support to the growers. Thank you for participating in the events this year. I wish you all the very best for 2020 and beyond.

From the Executive Director

2019 was an important year for your growers association. Based on the work done in the development of the strategic plan for all three of the Wisconsin cranberry grower groups, we have been working to implement changes identified in the plan and move to accomplish the identified initiatives to achieve the desired outcomes. We are on track to achieve those objectives within the projected timeline.

The Board has created a new staff structure and reorganized the Association committees to be more effective and efficient. The Board has also committed to a more focused mission statement and a set of guiding principles. As always, there are challenges for our organization much like those that you face in your farming operations. WSCGA, due to its leadership both current and past, is positioned to meet those challenges.

We face the financial challenges that are reflected in the current economy. We rely on dues support and revenues from trade shows, advertising and providing administrative services to the Wisconsin Cranberry Board, Inc. and the Wisconsin Cranberry Research Foundation for the revenue that funds our operations. With the tight economy, we have seen pressure on that income. The Board, however, has maintained its commitment to steward these resources to insure the organization is economically and financially sound.



That stewardship coupled with strong grower commitment to the organization has allowed us to meet and exceed the expectations in the past year.

We conducted more and higher quality education programs for growers to improve management practices focused on economic and environmental sustainability. Our promotion and communications program continue its success in putting growers out front to tell the story of growing cranberries in Wisconsin as well as conducting promotions and partnerships with audiences targeted in the strategic plan.

In the public policy and advocacy arena, we have been vigilant in issues at the local, state and federal level.

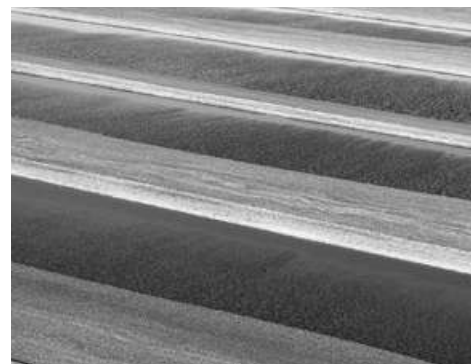
We worked to obtain both cranberry purchases and grower payments as part of the Trade Mitigation program set up by USDA to counter the effects of the retaliatory tariffs from the EU and China. We also secured additional funding for the USDA ARS Cranberry Research program, which will be used for support of the existing positions in Genetics and Genomics, Entomology and the new Plant Physiology program. USDA ARS has also initiated the process for a fourth position in Food Science.

At the state capitol, our legislative team has been active advocating on your behalf in the larger discussion about water, as well as budget initiatives to secure funds in support of research and extension programs to provide solutions and BMPs to address the critical issue of both water quality and conservation.

We have also increased our outreach to local groups and governments to provide educational presentations on cranberry growing and the stewardship of our family of growers. Developing relationships and exchanging accurate, science-based information with these groups helps to address concerns while demonstrating the environmental ethic of our growers.

The development of the Cranberry Research Station by the Foundation is probably the most significant event of the past decade. The vision of the Foundation and its leadership to invest and secure resources for this world-class facility is testament to the progressive and forward thinking that characterizes Wisconsin cranberry growers. The vision is to create a source of sound science, to provide growers with information and tools to farm in an economically and environmentally sound manner. It will also serve as platform for grower and public education programs in BMP adoption, workforce development and cranberry growing in general.

I am optimistic about the upcoming year. We will start to see some of the changes we have implemented to (pardon the pun) bear fruit. We will, as always, have the prosperity of the Wisconsin Cranberry Grower foremost in our efforts.



WSCGA Annual Report

The Wisconsin State Cranberry Growers Association was formed in 1887 to serve the state's newly emerging cranberry industry. Some 130 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 2019 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.

WSCGA Service to Industry Award

The WSCGA Board of Directors presents the Service to Industry Award to individuals or groups who have provided outstanding service to the industry and Association. The award is the highest recognition that the WSCGA provides. This year the Association is pleased to provide recognition to:

Patricia McManus

Patty McManus was raised in Brodhead, WI. She earned a Bachelor of Science degree at the University of Wisconsin-Madison and graduate degrees at Michigan State University. In 1995, she joined the Department of Plant Pathology at UW-Madison, where she was a professor and extension specialist until her retirement in 2019.

McManus had responsibilities for fruit crops grown in Wisconsin and published studies on fungal, bacterial, and viral diseases of cranberry, apple, cherry, and grape. Her group was the first to link bacteria with cranberry stem gall and the first to study the epidemiology of cranberry viruses. In 2005, she initiated an interdisciplinary, industry-supported program to conduct pesticide trials on cranberries, and she oversaw the program for three years. This program has yielded the data needed to register several pesticides and to use them effectively and efficiently.

McManus served on numerous editorial boards, grant panels, and committees to advance the fruit industries and the discipline of plant pathology, and she chaired her department at UW-Madison for five years. Past recognition includes the Pound Award for Excellence in Extension from UW-Madison CALS; the Lee M. Hutchins Award for excellence in fruit pathology from the American Phytopathological Society; and three named professorships.





William Hatch

Bill, along with his wife Sandy, currently live on the marsh and operate Cranberry Creek Cranberries, Inc. (CCC) located near Finley, WI. CCC was founded in 1984 by Bill's parents William H. and Jean Hatch.

Prior to cranberries, Bill was employed for 19 years by the Arthur Overgaard Company, a highway contractor in Elroy, Wisconsin. During that time, he performed various duties ranging from laborer, equipment operator, and supervisor. The last eight years he served as Vice President. In 1990, he joined his parents, Bill and Jean, in running CCC.

Bill served two years on the Board of Directors for the Wisconsin Road Builders Association. Locally he served as a supervisor for the Armenia Town Board and on the Necedah Area School District Board for over 10 years. He was a member of the Wisconsin State Cranberry Growers Association- Administration Committee, Public Relations Committee, and Personnel Committee; served as a WSCGA Board Director for nine years, serving a term as President in 2001. Bill has actively worked with DNR and ACOE to help bridge communication and permitting discussions. Currently he serves on the WCREG Board, the WSCGA Campaign Fund Committee, WSCGA Administration Committee and on the St Francis Assisi finance committee among other industry and service duties. As a result of serving on the WSCGA Campaign Fund Committee, growers will be receiving a personal thank you envelope from him in the form of a campaign request.



Enjoying what you do is essential in everyday life. Bill enjoys working in the cranberry industry and serving to help the industry achieve success in all the areas it touches. The Wisconsin growers association has proven over and over to be extremely valuable to every grower in the state. It is a resource that needs to be supported and growers need to determine as a whole how it can continue to serve cranberry growers.

Bill was born and raised in Pittsville, Wisconsin. He attended Madison Area Technical College in Madison where he received a degree in Civil Highway Technology.

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 (WCREG) – agreed to jointly sponsor a strategic planning process. The WSCGA last conducted strategic planning in 2009. Several key initiatives from that plan, including launching a Leadership Development program and establishing a Research Station for cranberries in Wisconsin, have been successfully completed.

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.



This article summarizes some of the main concepts of the plan and progress made by the three organizations since the plan was adopted 12 months ago. A copy of the entire plan is available through the offices of each of the organizations.

Guiding Principles

Although the WSCGA, WCB and WCREP have distinct mission statements and areas of focus, they are connected by common Guiding Principles.

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

Mission Statements

Each organization reviewed their mission statements and their core missions. This discussion was aimed at identifying in a focused manner how each organization worked to meet the needs of Wisconsin's Cranberry growers and setting a standard to determine how and what programs would be developed.

WSCGA

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.



Wisconsin Cranberry Board, Inc.

The Wisconsin Cranberry Board (WCB) promotes excellence in cranberry production and acts as a steward of grower resources. WCB invests in projects that will advance the current and future success of the Wisconsin cranberry industry. Guided by Wisconsin's Cranberry Marketing Order and the priorities established by growers, the WCB invests in research, grower education, consumer awareness, public communication and promotion of Wisconsin cranberries and cranberry growers.

Wisconsin Cranberry Research and Education Foundation

The Wisconsin Cranberry Research and Education Foundation (WCREF) owns and operates the Research Station. WCREF promotes excellence in cranberry production through education, leadership training and professional development for cranberry growers. As a non-profit, 501(c)(3) charitable foundation, WCREF provides a platform for private and government funds to be invested in strengthening the Wisconsin cranberry industry.

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.

These goals will be accomplished through collaboration and cooperation across the three organizations. The initiatives will be interwoven with the ongoing work and core functions of the three organizations in grower education, public affairs, governmental affairs, investment of grower resources, research, marketing and outreach, and Research Station operation.

Education

Grower education is central to the mission of the WSCGA. WCB and WCREF also contribute to grower education through funding and sponsorship of programs including the Leadership Development Program, January Cranberry School, and mini-clinics.

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 Association approached this initiative by reviewing and improving content of current programs to meet grower needs and also looking at the platforms that information is delivered through.



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 and member social media and new projects including workforce development and workshops as needed for owners and managers and customized workforce development opportunities. She also helps coordinate the Wisconsin Cranberry Leadership and Development Program and the WCREF Cranberry Open Golf Outing and the Sporting Clay Shoot.

The Boards 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 sub committees to focus on planning the content of the 2019 Nutrient Management Planning Workshop, the Pesticide Users Workshop, the May Mini-clinics and the 2019 WSCGA Summer Meeting Mini-sessions. 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.

The committee is investigating the use of new technologies for distance learning, podcasts with featured speakers of interest to growers and webcasts of different educational events.

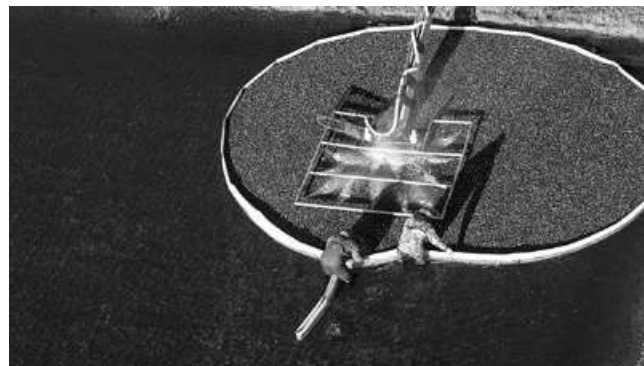
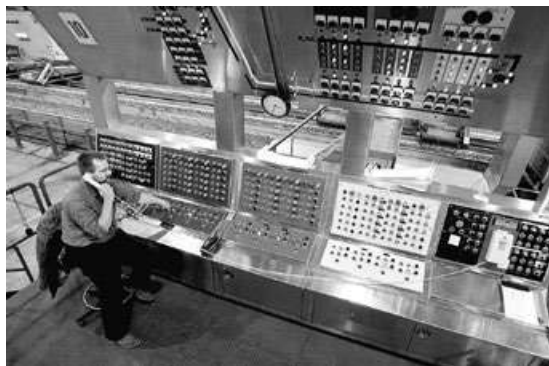
2. Explore marketing Wisconsin cranberry grower education to other growing regions and other agricultural producers as new revenue – generating service offering.

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.

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.

Through the survey and retreat, growers and Board members shared their perspectives on the highest priority research topics and the greatest opportunities to enhance grower adoption and use of research findings, as well as opportunities to engage more growers in research. The grower survey also revealed a need to strengthen connections between growers' operations, research topics and projects, and research findings. Research is most useful to growers when it can inform grower practices, and conversely, grower practices should be key inputs into shaping the research planning process. A more effective connection needs to be established between growers and researchers.



Structural Changes

A major change was made to move the responsibilities for the Research Roundtable to the Wisconsin Cranberry Research and Education Foundation. The program for the roundtable was revamped to provide 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 Wisconsin Cranberry Board, Inc. will also be utilizing survey tools to allow growers to continue to identify priority research topics and areas.

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

1. Focus support for research on topics of greatest relevance for Wisconsin growers.

The Wisconsin Cranberry Board, Inc. utilized results of the grower survey as well as discussions and recommendations from the Research Roundtable to set their request for proposals in the 2018-19 and 2019-20 funding cycles. Close attention was paid to aligning the projects funded with grower priorities.

Initial design and work at the Research Station is also aligned with priorities in cranberry genetics and genomics, pesticide screening, improvements in IPM and protection of water quality and water conservation.

2. Expand grower adoption of, and participation in Research

The Boards have been engaged and affirmed their support for the priorities. Dissemination of research information and transfer of knowledge has taken place through Spring Mini Clinics, NMP training sessions, Wisconsin Cranberry School and the Summer Meeting and Field Day. Meeting agendas have been developed to allow growers to network with researchers and each other on important research and management practices.

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 has 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 new hire. On September 3, Isaac Zarecki was brought on to fill the new position.

His responsibilities will include developing and implementing a communication plan annually, developing content for the public side of the Wiscran.org website, and Wisconsin Cranberries social media, writing and editing various communications, materials, news releases and managing industry partnerships and promotions. He works with the WSCGA Public Relations Committee on these projects along with other members of the WSCGA Staff Team.

The Boards identified three Public Affairs/Community Engagement Initiatives 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 and WCB conducted baseline market research to understand current perceptions of cranberries, cranberry growers and cranberry growing in Wisconsin. The research also measured the perceptions of local, sustainable agriculture and what drives consumer purchasing decisions. The results of the research were used to develop consistent, aligned messages and to train grower spokespeople to be “out in front” delivering the message during the annual harvest media and communications efforts.

In the upcoming year, the research will be used to target promotions and activities toward identified demographics with important messages about cranberries and cranberry growing in Wisconsin. The WSCGA has stepped up efforts to put growers out front in delivering these messages.

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 eco-tourism to 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. As the research station development is completed, the facility will be utilized by various school and postsecondary 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 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.

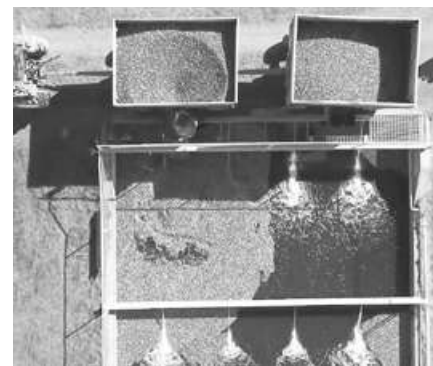
1. Support development of new traditional or innovative cranberry products

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 cranberry 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 of the WSCGA, WCB and WCREP.



THE TEAM – WSCGA Board of Directors 2019

Tyler Walker –President

Tyler works with his family at Walker Cranberry Company in the town of Cranmoor, west of Wisconsin Rapids. He was elected to the Board in 2011. He serves on the Public Policy Committee and the Personnel Committee.

Steven Bartling, Vice President

Steven and his family own and operate Bartling's Manitowish Cranberry in Manitowish Waters. Steven chairs the Education Committee and serves on the Technology Subcommittee, Personnel Committee, Nominating Committee and Research Committee. He also worked as the WSCGA representative on the Strategic Planning Committee in 2018. Steven 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 - Secretary

Rocky Biegel is part of Dempze Cranberry Co. in Wisconsin Rapids and King Cranberries LLC in Augusta. Rocky joined the Board in 2017 and serves on the Education Committee.

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 Administration Committee and the Associate Member Committee. She participated in the 2013-14 Wisconsin Cranberry Leadership Development Program.

Mike Bretl

Mike serves as the area manager for Farmland Management Services in 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.

Tom Gardner

Tom is part of Gardner Cranberry and Hay Creek Cranberry located near Pittsville. Tom joined the Board in 2012 and serves on the Personnel Committee. Tom was the President of the Association in 2017.

Mark Mahoney

Mark joined the Board in 2011 and is part owner of Owen Rock Cranberries in Adams County- which served as the host site for the 2012 Summer Meeting, Field Day and Trade Show. Mark serves on the Research Committee. He held the office of President from 2013 through 2016.

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. He is the chair of the Public Policy Committee, and serves on the Administration Committee and Nominating 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 and serves on the Nominating Committee.

WSCGA Committees

Public Policy Committee

The Public Policy 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 official to help them understand the concerns of Wisconsin cranberry growers.

Karl Pippenger- Chair
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
Craig Scott

Administration Committee

The Administration Committee advises the WSCGA Board on the internal operations of the Association. Its major responsibility is development of a recommendation for an annual budget for the WSCGA.

Jenna Van Wychen- Chair
Bill Hatch
Mike Moss
Karl Pippenger

Fran Podvin
Russ Rifleman
Scott Schultz
John Stauner

Education Committee

The main emphasis of the WSCGA mission is education, both of 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.

Steven Bartling- Chair
Christelle Guedot- Cranberry
School Program Chair
Rocky Biegel
Jim Bielmeier
Alex Billman

Danielle Faber
Steve Hahn
Nicole Hansen
Jason Hatch
Matt Lippert
John Moss

Andy Reitz
Russ Sawyer
Jayne Sojka
Pamela Verhulst
Lindsay Wells-Hansen



Public Relations Committee

The Public Relations Committee is responsible for development and implementation of 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
Danielle Faber
Amy Gebhardt
Mike Gnewikow
Fawn Gottschalk

Leroy Kummer
Amber Bristow
Gabriella Liddane
Beth Oemichen
Jessica Rezin

Scott Schultz
Mary Smedbron
Robert Detlefsen
Nodji Van Wychen

Research Committee

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
Suzanne Arendt
Steven Bartling
Alex Billman
Amber Bristow
Stephen Brown
Robert Detlefsen
Danielle Faber
Mike Gnewikow

Fawn Gottschalk
Edward A. Grygleski
Jeff Habelman
Nicole Hansen
Gabriella Liddane
Mark Mahoney
John Moss
Doug Rifleman
Ben Ryner

Dustin Sawyer
Russ Sawyer
Scott Schultz
Jayne Sojka
Pamela Verhulst
Lindsay Wells-Hansen
Bill Wolfe

Associate Member Committee

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 Wyche - Chair
Tom Altmann
Amy Bosen

Derek Johnson
Casey Koback
Paul Roberts

Dawn Ruiter
Nicki Ryner
Jay Weidman



Personnel Committee

The Personnel Committee is responsible for conducting the performance review of the Executive Director on an annual basis and preparing a recommendation for the Board of Directors for the review.

Tyler Walker – WSCGA President and Chair

Steven Bartling – WSCGA Vice President

Tom Gardner - Immediate WSCGA Past President

Nominating Committee

The Nominating Committee is activated by the Board annually in advance of the Winter Meeting. The members work to identify candidates for election to the Board of Directors.

Steven Bartling

Karl Pippenger

Rusty Schultz

Strategic Plan Committee

The Strategic Plan Committee is responsible for reviewing progress on implementation of the Strategic Plan for the Wisconsin Cranberry Industry including work plans and making recommendations to the Board for updates and changes to the plan, as well as progress on achieving Strategic Initiatives.

Steven Bartling – WSCGA

Mike Gnewikow – WCB

Danielle Faber - WCREF

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

Steven Bartling

Danielle Faber

Russ Sawyer

Pamela 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 the Wisconsin cranberry grower. 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 WCREP 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 the publication of the WSCGA NEWS, 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.

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 WSGA. The new staffing structure is designed to accomplish these goals.

Isaac will lead 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 joins WSCGA after serving as an editor of a local newspaper in Hot Springs, South Dakota.

In this role, Isaac will work 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 will also develop content for and manage the wiscran.org website and the Wisconsin Cranberries social media channels content and strategic ad program, write and edit various communications materials, including newsletter articles, annual reports, program books, news releases, pitch letters, talking points, articles and blog posts.

In addition, Isaac will conduct 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 negotiation. He will also coordinate and market the Made with Wisconsin Cranberries program.



Association Consultants

DeWitt LLP Law Firm

Dewitt, LLP

DeWitt LLP is a full service law firm with experienced attorneys in virtually all areas of practice. Throughout the firm, there are attorneys who have developed expertise in niche areas but still understand the big picture.

The Government Relations team of DeWitt LLP is the largest lobbying group in Wisconsin. Because they are located directly on Madison's Capitol Square, often times WSCGA strategizes with Legislative Counsel Jordan Lamb, who later heads to the Capitol for meetings.

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 major voice for us in the development and current rewrite of the State non-point source pollution program in NR151 and ATCP50. She played a major role in the development of Wetland Reform Legislation in last session of the Legislature and in developing protocol for dealing with floodplain issues with FEMA, DNR and county zoning offices. She has provided leadership on issues related to groundwater, drainage, artificial and navigable water bodies to name a few.



Laughlin Constable, Communications and Public Relations

LAUGHLIN CONSTABLE

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 and social media programs for WSCGA.

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 has earned her national accreditation from the Public Relations Society of America (PRSA), and has been honored on numerous occasions from PRSA for her communications work to support Wisconsin's cranberry industry.

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

Alicia Wilson is an Account Coordinator at Laughlin Constable where she helps manage WSCGA's social media communications, event coordination, media relations and other efforts. She is a graduate of Marquette University in Milwaukee and has been with Laughlin Constable for three years.



WSCGA Program Activities

Public Policy Advocacy

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. Public Policy Program position statements and activities 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 use of 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 lead 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.



Annual State Legislative Update

By Jordan Lamb, DeWitt LLP

The 2019-20 Wisconsin State Legislative session is nearing its end. The Legislature is expected to adjourn for the 2020 elections in the early spring of 2020. However, the WSCGA advocacy team continues to work on the following legislative issues throughout the end of this session and 2020.

Support for State Integrated Specialists. UW Cooperative Extension was recently reorganized and moved under the UW-Madison structure where it is now known as the UW Division of Extension. Wisconsin farmers rely on Extension to provide them with emerging applied agricultural research. State Integrated Specialists are UW faculty with joint appointments at Extension and UW-Madison or a UW-System campus. Since 1993, the number of state integrated specialists has fallen by 45%. As a result, there are fewer agricultural research projects aimed at addressing some of the most pressing questions facing Wisconsin farmers today, including water quality, pest management and farm economics.

These researchers also *teach* farmers at association-sponsored summer and winter meetings, hold on-farm mini clinics, field days, and workshops and provide other direct instruction to Wisconsin farmers on a daily basis. Their value to the agricultural economy as teachers is well-documented, but their work teaching farmers unfortunately, cannot be used to satisfy the statutory “teaching hours” reporting and monitoring obligations required under current law for UW-Madison and UW-System faculty.

During the 2019 budget process, the WSCGA and several other commodity trade associations asked the Legislature to support extension – one of the core functions of the UW System by (1) providing additional funding to our state specialists for applied agricultural research and (2) ensuring that any performance metrics used to evaluate those specialists take into account their “teaching” of our farmer members. Unfortunately, these issues were not supported in the biennial budget bill, which was signed by Governor Evers in July 2019.

However, this fall, **State Representative Amy Loudenbeck (R-Clinton) and State Senator Howard Marklein (R-Spring Green) introduced Assembly Bill 556 and Senate Bill 497 to address the performance metric issue for state specialists.** This legislation requires the Board of Regents to recognize track the time spent by state specialists in the field of applied agricultural research at UW-Platteville, UW-River Falls and UW-Madison, teaching graduate students and teaching Wisconsin farmers. This legislation will help Wisconsin farmers retain our invaluable UW faculty researchers and will allow them to continue to support Wisconsin’s farm economy.

In addition, **Representative Nancy Vander Meer (R-Tomah) and Senator Howard Marklein (R-Spring Green) introduced Assembly Bill 627 and Senate Bill 563, which would provide additional funding for applied agricultural research projects.** 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.

The WSCGA supports both of these bills and urges the Legislature to pass this legislation this session.



Support for Cranberry Research Funding. In October, both Senator Patrick Testin (R-Stevens Point) and Representative Nancy VanderMeer (R-Tomah) separately visited the Cranberry Research Station (Robinson Creek Cranberry.) At each visit, the legislator toured the farm and met with growers to discuss the importance of ongoing cranberry research in Wisconsin. The WSCGA had worked Senator Testin, Representative VanderMeer and other legislators during the budget process to seek support for search funding for cranberries. Despite the fact that the budget bill did not provide any funding for research, we continued that work with legislators this fall.

In November, **Senator Testin and Representative VanderMeer introduced Senate Bill 564 / Assembly Bill 628, which would provide \$500,000 for cranberry research funding to the cranberry marketing board** at DATCP. This funding is directed to be used by the marketing board to fund cranberry research projects. Given the timing and nature of this legislative session, it is unlikely that this legislation will move forward this session. However, the introduction of this proposal will help us work to secure research funding in the 2021-22 biennial budget bill.

We very much appreciate the leadership that Senator Testin and Representative VanderMeer have shown toward the cranberry industry in Wisconsin. In addition, this legislation was co-authored by Senator Luther Olsen and Representatives Mark Born, Jimmy Edming, Scott Krug, Jeff Mursau, Loren Oldenburg, Ken Skowronski and Ron Tusler.

Focus on Developing Nitrate Standards for Agriculture. On July 31, Governor Evers announced that he was directing the Wisconsin Department of Natural Resources (DNR) to pursue the development of targeted performance standard for the application of nitrates over permeable soils. Accordingly, the DNR drafted a "Scope Statement" to be used by the DNR to define the **development of an amendment to Wis. Admin. Code s. NR 151 and propose a new, "targeted" performance standard regulating nonpoint source pollution from the application of nitrates to farmland.** The Scope Statement is the first step in the administrative rules process in Wisconsin.

At the September Natural Resources Board (NRB) meeting, the NR Board directed the DNR staff to take the proposed Scope Statement to public hearings in November. The Department held three public hearings across the state and received written comments. The majority of the public testimony came from those seeking a solution to high nitrate levels rural drinking water in certain areas and supported the Scope Statement.

At their December 11, 2019 meeting, the NRB approved the Scope Statement, which formally authorized the DNR staff to begin working on a draft rule. Several NRB members were clear in their comments at the meeting that they expected the Department to engage the farm community in the development of this rule revision.

It is expected that the Department will form a stakeholder committee, which should include farmers and other agricultural industry experts, to assist with the rule development. We anticipate that the development of this rule could affect our grower members and we are engaged in this process. The WSCGA has requested to be a part of this process and to have a representative on the committee. It is expected that the development of a targeted performance standard for nitrates (proposed revision to Wis. Admin. Code s. NR 151) will continue for all of 2020-21. The administrative rules process in Wisconsin takes approximately 30 months. As such, WSCGA will be providing members with updates as the process unfolds.



2019 Communications & Marketing Highlights

By Isaac Zarecki, WSCGA

The WSCGA Communications Program is a team effort with the organization's Public Relations Committee, the team at Laughlin Constable and new member of the WSCGA team, Isaac Zarecki. Moving forward, Zarecki will take over Laughlin Constable's role in daily PR and communication efforts, including social media management, website management, media outreach and sponsorship opportunities. Laughlin Constable will remain on retainer for strategic advising and crisis management. In 2019, the overall objectives of WSCGA's communications efforts were to promote the purchase and consumption of cranberries and cranberry products by emphasizing their taste, versatility and health benefits, and to continue to build on the positive image of cranberry growing and cranberry growers in Wisconsin.

Research Study

WSCGA partnered with Laughlin Constable and Lab42 to conduct public opinion research. Goals for the project included: understanding current awareness and perceptions of cranberry growing, understanding credibility and affinity of third-party groups and potential partners, and testing potential messages' effectiveness, believability, and likeability.

Key findings included:

- More than 70% of WI residents are aware cranberries are grown in WI
 - Among this group, the overall opinion of cranberry growing is very positive
- Awareness is highest among WI residents 35+ and those living in cranberry regions
- Awareness is lowest among Millennials and those in South East and North East regions
- Claims about economic and environmental impact are the strongest opportunity areas as they have the lowest familiarity but provide strongest positive impression
- 42-57% had an existing familiarity with industry facts
- 90-92% said industry facts present a very/somewhat positive impression
- Claims around health provide a high positive impression, but already have a high familiarity, and therefore less opportunity for growth
- Claims about industry heritage have a lower impact, except around the phrase "multigenerational family growers"
- For the Millennial target audience, environmental impact facts are most important to influence positive impression

Data from this study will be used to guide WSCGA's communications moving forward with the goal of maintaining the industry's good favor in the state and expanding awareness to millennials and residents of the North East and South East regions of the state.

Partnerships/Sponsorships

WSCGA uses grants from the Wisconsin Cranberry Board, Inc. for partnerships and sponsorships with the UW Badger Sports, Green Bay Packers and American Birkebeiner.

As part of the UW sponsorship, WSCGA sampled dried cranberries and cranberry juice at various Badgers events, including basketball, volleyball and hockey games. WSCGA also sampled cranberry products at the Green Bay Packers 5K Run, Training Camp and a Green Bay Packers preseason game and talked with guests and families about Wisconsin's cranberry heritage. WSCGA will sponsor the American Birkebeiner in 2020, which will include product sampling as an exhibitor at the Birkie expo.



Wisconsin State Fair

For more than two decades, Laughlin Constable has helped support the Wisconsin Cranberries booth at the Wisconsin State Fair. To boost booth traffic and interest in 2019, WSCGA worked with “Made with Wisconsin Cranberries” partner O&H Danish Bakery on a cranberry product from 2018 – the “Cranberry Cannoli.”

Laughlin Constable promoted the product with a pre-fair announcement, media deliveries and media pitching, as well as WSCGA social media efforts. The Cranberry Cannoli was one of the most popular products in WSCGA Fair history and helped generate media interest and social media buzz.

The product helped spur booth traffic and boost product sales across the board. The booth also featured the popular mini marsh, four-season model marsh, educational video and displays, and the cranberry mascot.

New for 2019 was the “Meet a Grower” experience, which gave fairgoers a chance to interact directly with a Wisconsin grower each day. Grower volunteers staffed the booth every afternoon of the 11-day event, from 3-5 p.m. Guests at the booth were able to talk to and learn from our hardworking growers. The activation was extremely successful!

Social Media

Laughlin Constable managed WSCGA’s social media accounts through mid-September until Isaac Zarecki was hired. Channels include Facebook, Instagram, Twitter and YouTube. Social media management includes drafting and posting fun, engaging content, managing comments and questions from consumers, and coordinating sponsored posts and ads to boost engagement.

In 2017, WSCGA launched an Instagram channel with a goal of better reaching the next generation of cranberry consumers. In 2019, Instagram reached more than 684,000 people. Reach and engagement on Facebook – WSCGA’s core platform – continues to remain strong as well. Facebook page likes increased 14% in 2019 to more than 31,600. In total, Facebook posts reached nearly 2.7 million people in 2019. Twitter reached more than 130,000 people.

UK Media Tour

WSCGA partnered with Foreign Press Center and London Embassy in May to bring seven journalists from the United Kingdom to Warrens for a press trip. The group toured Cranberry Discovery Center, cranberry marsh and manufacturing facility to learn about cranberry growing process, cranberry heritage, technology and sustainability.

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. In total, about 30 individual assets will be produced for a wide range of platforms, including: YouTube, Facebook and Instagram. The videos will begin to be released in the spring of 2020.

Fall Harvest Efforts

In years past, Laughlin Constable assisted with WSCGA’s media relations efforts surrounding the annual cranberry harvest. This year, Laughlin handled the first half of harvest communications, with Isaac Zarecki taking over later in the season. Due to a number of challenges facing the industry this year, the PR Committee made the decision to adjust its harvest communications efforts from previous years, with a slightly less proactive media strategy.



Despite these challenges, WSCGA took part in a number of positive efforts. Including, FOX11 live and in-studio segments and a Voices of America European visit.

WSCGA and grower members participated in a number of media interviews and marsh visits throughout the harvest season. These efforts combined resulted in more than 240 print, online, radio and TV stories across the country. Overall, media relations efforts during harvest resulted in 9.5 million impressions.

WSCGA Federal Governmental Issues – 2019

The WSCGA Federal advocacy program was very active in calendar-year 2019. Federal activities include working with agencies, members of congress, and the Congressional Cranberry Caucus. The following is a list of issues addressed by the WSCGA during calendar-year 2019. These include work by Broydrick and Associates on behalf of WSCGA along with direct activities by WSCGA with other state and national groups.

USDA Purchases of Cranberry Products

WSCGA has been a leader in efforts to encourage USDA to use its authority under Section 32 to purchase cranberry products for school lunch programs and other feeding programs that the agency supports. The Association has worked with other groups to secure letters from members of the Congressional Cranberry Caucus and written directly to USDA requesting action.

USDA Tariff Mitigation Program

The Trump administration announced tariffs on steel and aluminum imports which resulted in retaliatory tariffs on cranberries by the EU, China, Mexico and others. The administration announced a package of 12 billion dollars to offset the losses to agriculture from the tariffs.

WSCGA joined with grower groups from Massachusetts and New Jersey to support additional purchases of cranberries, funding for future market development grants and to seek direct payments to growers to mitigate the impact of the tariffs on growers.

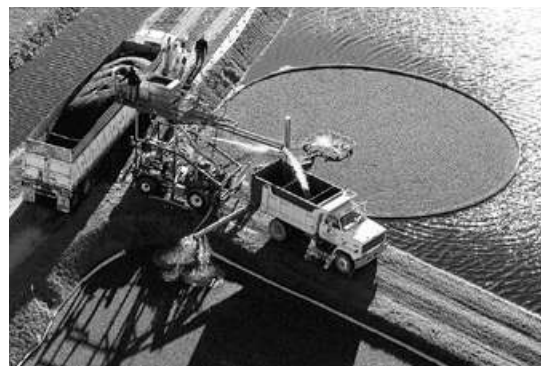
The effort was successful in supporting \$32 million in purchases as well as funding for the market development grant program

In 2019, WSCGA worked with USDA and Rep. Duffy to secure Market Facilitation program Payments for cranberry growers of \$641 per acre to offset the impacts of the retaliatory tariffs by China and The European Union. Grower started receiving payments in October and November.

Research Funding

In 2015, WSCGA was able to secure an increase in the budget for the USDA ARS Cranberry Research Program of \$750,000. Since the budget increase, the WSCGA has been providing support to the Wisconsin Cranberry Research and Education Foundation to develop a cooperative agreement to make the funds available for the establishment of a cranberry research station. In September of 2016, a final agreement was signed to secure the funds for the project. In 2019, an amendment to the agreement was negotiated to provide \$421,000 in additional support for renovation work at the Research Station. All told, the agreements will provide about \$1.7 million for the project.

WSCGA partnered with the Cape Cod Cranberry Growers Association and the American Cranberry Growers Association (New Jersey growers) in an effort to increase the USDA ARS commitment to cranberry research. As a result of support from members of the Wisconsin, New Jersey and Massachusetts Congressional Delegations, the effort secured a \$2 million increase in the USDA ARS Base Budget for the Cranberry



Research Programs in each of the states. The additional funding will be used to enhance the support of USDA ARS programming at UW Madison by about \$600,000 each year. This will raise the annual budget at UW Madison for the ARS Cranberry research program to almost \$2 million per year.

In the recently passed appropriations bill, we worked with Rep. Pocan and Senator Baldwin to obtain an additional \$750,000 for the USDA ARS Cranberry Research Program.

Pest Management Tools

WSCGA has adopted a general policy to support the development of a toolbox of management practices for growers to use in their farming operations. These practices include cultural – such as flooding for pest control or sanding – as well as the use of chemical control options. The chemical control options may include new, softer pest specific compounds and traditional broad spectrum control. The organization encourages integrated use of these tools by growers through IPM.

As a result, WSCGA advocates continuing registrations for pesticides as long as their judicious use does not present an environmental or food safety risk. The Association works with the Cranberry Institute and other organizations to monitor proposals by EPA and others that impact grower use of pest control products and strategies. During the past year the WSCGA was active on a number of proposals including a meeting with EPA on issues in the registration process review.

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.

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.

Wisconsin Cranberry School

The 2019 Wisconsin Cranberry School was held at the Holiday Inn Hotel & Convention Center in Stevens Point, WI. With more than 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 CLKR 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 the hand-held device, and could see an immediate summary of the results, which showed the percentages for each answer of each question.

Presentations by session speakers covered a diverse array of topics, from plant and insect phenology to cranberry variety improvement research, disease issues, soil moisture monitoring, cold tolerance, nutrient management and research on pollination. There were also updates on the effect of fungicide applications on bee fidelity, pheromone mating / moth birth control in cranberries, cranberry pest management reports, and problematic weed management strategies. The Education Committee also incorporated more interactive grower panels to discuss production and management practices.

Nutrient Management Training

In early-April, just over 60 people attended the Nutrient Management training sessions held in Wisconsin Rapids and co-sponsored by the WSCGA, USDA / NRCS, and UW-Madison Division of Extension.

The half-day workshop was designed to help cranberry farmers write their own nutrient management plans to meet DATCP requirements. Wisconsin DATCP also 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; Amaya Atucha, UW-Madison Division of Extension; Stephanie Schneider, DATCP and Pam Verhulst, Lady Bug IPM. 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.

Early Season Grower Workshops

The WSCGA and UW-Madison Division of Extension co-sponsored two early season grower workshops – one at Valley Corporation in Valley Junction, and the other at Elm Lake Cranberry in Wisconsin Rapids. More than 150 participants attended the two workshops, available to growers at no charge.

These events are held each spring 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: Observations from the Field by Crop Consultants, Growing Degree Days and Insecticide Application, Standardized Terminology- “Getting on the Same Page to Make Decisions”, Enhancing Pollination on Cranberry, Bravo Transition Strategy, Potential Alternative Crops for the Cranberry Marsh and a Grower Panel on Seasonal Activities.



Pesticide Applicator Workshop

The WSCGA sponsored a Pesticide Applicator Workshop in April in Wisconsin Rapids. A working group of the Education Committee developed the program. Approximately 90 people gathered to learn about various aspects of pesticide use and safety.

In addition to the workshop and networking, Gempler's provided a PPE and compliance display, the WSCGA had various publications available for purchase, and attendees had the opportunity for respirator fit testing.

Topics included: Use of Pesticides on Your Farm, EPA Worker Protection Standards Review, Feedback from Recent Inspections, Pesticide Storage Requirements, Special Local Needs Registrations, Surfactants Use in Cranberry & New Product Registrations Available in 2019, How to Implement Additional Simple Training For Workers.

Summer Meeting, Field Day and Trade Show

The 132nd Summer Annual Meeting, Field Day and Trade Show was held in Junction City, Wisconsin at DuBay Cranberry Co. Bus tours of the marsh were held from 9:00 a.m. – 3:00 p.m. There were also five mini sessions for growers to attend and 61 on-site exhibits. More than 700 lunches were served between 11:00 a.m. and 1:00 p.m.

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 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 2019 include:



Winter Trade Show

This event is held in conjunction with the Wisconsin Cranberry School and the WSCGA Winter Meeting. The 2019 Winter Trade Show took place on Wednesday, January 23 at the Holiday Inn Hotel and Convention Center in Stevens Point, WI. There were 64 Associate Members represented at this annual event, as well as the WCREF and the Wisconsin DATCP.

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

Summer Trade Show

This event is held in conjunction with the WSCGA Summer Meeting and Field Day. Over 700 people attended, taking part in a busy program of marsh tours, educational mini-sessions, the WSCGA annual Summer Meeting, and summer trade show.

The trade show was comprised of 61 exhibitors who provided inviting displays and shared information on new products and services. Cranberry growers and their families had the opportunity to experience the host marsh and take part in the above activities, as well as renew connections with the Associate members that made the trade show possible.

New Membership Benefits

As part of sustaining the Associate member program, the staff and Associate Member Committee recognize that financial constraints are effecting everyone's decisions on marketing and advertising dollars. With this in mind, the staff and Associate Member Committee conducted an evaluation of Associate Membership benefits.

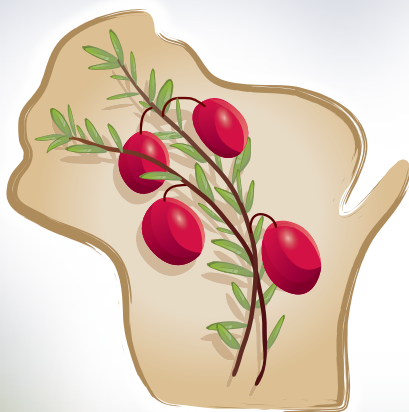
With the start of the 2018 membership year, there have been revisions of the existing benefits and the introduction of several new programs to bring more value to the investment in WSCGA Associate Membership:

- Grower-Direct Outreach (revised)
- Member Logo Use Program (new)
- Vendor Corner in WSCGA News (new)
- New Member introduction article in WSCGA News (new)

WCREF Fundraising Activities

The Wisconsin Cranberry Research and Education Foundation hosts annual fundraising activities including the Cranberry Open Golf Outing and the Sporting Clays Shoot. The Associate Membership of the WSCGA has a strong history of supporting these events through participation and sponsorships, as well as monetary and raffle donations.

Proceeds from past events have been used for scholarship funds at UW-Madison, UW-Stevens Point, UW-La Crosse, UW-River Falls, WWTC Foundation, and provided support for the Wisconsin Cranberry Discovery Center, WCREF and UW Koller Fund for Graduate Studies.



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.