

Sustainable cranberry production for a vibrant future: *the Wisconsin experience*

Sustainability is a hot topic. From business models to the food supply chain, sustainability is being measured, assessed and ultimately, marketed. For the Wisconsin cranberry growers, this is good news; they have made improvements in many aspects of economic, environmental and social sustainability.

In the fall of 2009, a survey was conducted of Wisconsin cranberry growers by the University of Wisconsin-Madison to quantify typical sustainability parameters. Growers were asked about themselves and the production practices they utilize on their farms. This report provides an overview of the Wisconsin cranberry industry and survey results. The complete survey results can be found at the end of the report. A total of 114 cranberry growers responded to the survey, representing 152 cranberry marshes or 13,274 acres of cranberries.



Economic sustainability

There are approximately 250 cranberry growers in the state of Wisconsin growing cranberries on 17,700 acres. The Wisconsin cranberry industry supports approximately 7,200 jobs. The entire cranberry industry contributes an estimated \$350 million annually to Wisconsin's economy. Some key businesses that the industry supports are 17 fruit processing facilities and receiving stations, 20 cranberry-focused retail and tourism businesses, and more than 175 agricultural businesses (fertilizer dealers, equipment and implement dealers, etc.).

95% of the Wisconsin's cranberry crop is processed, while only 3–5% is sold as fresh fruit. Processing consists of freezing, drying or producing cranberry juice or juice blends. The concept of processing has allowed cranberry growers to greatly expand the marketing of their fruit in scope and reach. Worldwide interest in cranberries and cranberry products, in combination with Wisconsin's optimal cranberry growing conditions, are contributing factors to Wisconsin's growing cranberry industry. Cranberry exports have increased from less than 10% to nearly 30% in the last 10 years. Wisconsin produces almost 60% of the nation's cranberry supply.

Wisconsin cranberry yields have steadily increased over the last 10 years. While improvements in yields due to research and education have helped, cranberries are also native to Wisconsin, and a combination of the soils and climate make this an ideal region for cranberry production. In 2008, Wisconsin growers averaged 70 barrels greater per acre in fruit yield than any other cranberry production region.

Survey highlights

Each cranberry marsh employs an average of 2 year-round employees and an average of 3 additional seasonal employees.

Around 70% of the year-round employees receive health and retirement benefits, demonstrating a long-term commitment to employees, their families, and rural community health.

Marsh owners and their employees are also civic leaders, involved in community leadership positions, school boards, and philanthropic activities.

Environmental sustainability

Cranberries are a unique crop since they naturally exist in bogs and can tolerate short periods of flooding. Contrary to popular myth though, cranberries are not grown in water season-long. Instead, the cranberry beds (production areas where the vines are grown) are typically flooded only to facilitate harvest and to make ice in winter that protects the vines from harsh temperatures. Since cranberry fruit float, corralling them in water allows for an easier harvest. Nearly all of the water utilized for harvest and winter ice is recycled after it flows out of the cranberry beds.

The United State Department of Agriculture Natural Resource Conservation Service (USDA-NRCS) in Wisconsin has a full time person devoted to working with cranberry growers on conservation issues and helping growers create conservation strategies. These may include a nutrient management, irrigation or pest management plan once the need is determined by the grower and conservationist.

Nutrient management plan: Water quality is important in a state with an abundance of lakes and rivers such as Wisconsin. In some production areas, agriculture can have a negative impact on water quality when fertilizer nutrients end up in the water. For example, the common nutrient phosphorous can cause excessive plant or algae growth in surface waters. When excessive amounts of these organisms biodegrade, they reduce the ecological quality of water bodies. A nutrient management plan is developed so that the nutrients applied match the uptake of the cranberry crop, and therefore leave no excess behind to run-off into the water. This involves testing both the soil and plant tissue of the individual grower's system, as well as timing fertilizer applications for optimum uptake.

Irrigation plan: Water quantity is also important for the environment and for the sustainability of the cranberry industry. Irrigation management plans are initiated with the grower analyzing all aspects of water use on the farm and determining any potential to reduce water use. A plan is usually put into place and changes are then made over time to optimize plant health and reduce water use.

Pest management plan: Although not required by law, cranberry growers are strongly encouraged to have a pest management plan. Pest management plans allow growers to determine pests that cause the most problems for their cranberry production and develop management plans that address these key pests. This targeted approach to pest management can reduce risk to non-target organisms, such as pollinators. Plans encourage the use of innovative management tools such as weather monitoring to predict the arrival of insect pests, which can potentially reduce unnecessary pesticide applications.



Survey highlights

For every 1 acre in cranberry production, cranberry producers own another 6.3 acres of land not in production. Of the roughly 13,000 acres of production represented in this survey, over 83,000 acres are owned by growers but not in agricultural production. While a small percentage of this non-cropland supports cranberry production, much of it is natural wetlands and conserved habitats support a wide range of plants, wildlife and ecosystems.

Over 55% of the cranberry growers have created nutrient management plans with the NRCS agent. The nutrient management plan involves testing the soil and plant tissue so that





they do not over apply nutrients to the crop and contribute to water quality issues.

77% of cranberry growers hire a professional trained integrated pest management (IPM) consultant or scout. These scouts have extensive education and remain updated on and involved in current research. They focus on biological and ecological considerations in pest management. Cranberry acreage is scouted an average of 14 times throughout the growing season for insect, plant disease and weed pests. 97% of cranberry producers use pest thresholds to make informed decision regarding management, a 29% increase over 20 years ago.

88% of cranberry growers use alternative practices to pesticides to manage pests. This can include weather monitoring to predict the arrival of insects and schedule appropriate management tactics. 41% of growers have weather monitoring stations on their farms that can be used in the biological monitoring of crops and pests. Additionally, the growers support and subscribe to a weather forecasting system focused precisely on the cranberry production area. 95% of growers base pest management decisions on recorded weather data, an increase of 26% over 20 years.

88% of cranberry growers test their soil and cranberry plants to determine the amount of fertility inputs needed to fulfill the plant's needs but not oversupply in a wasteful or environmentally risky manner.

98% of cranberry growers calibrate their fertilizer and pesticide application equipment on a regular basis. This ensures that the intended amounts of fertilizers and pesticides are applied.

Responsible water use is important to cranberry growers. 36% of growers test the moisture of the soil to make informed decisions about when to irrigate the crop; this is a 27% increase from 20 years ago. Over 50% of growers also test the uniformity of the irrigation which also reduces the risk of wasting water. This practice has increased by 30% over the last 20 years.

Although the majority of cranberry growers still use fuel to run their irrigation systems, the number of growers using some electricity-powered irrigation systems has risen by 50% over the last 20 years. Several growers are investing in alternative energy sources, such as wind-powered irrigation pumps.

79% of growers participate in recycling programs, up 43% from 20 years ago. The number of cranberry growers participating in government programs emphasizing environmental conservation has steadily increased over the years.

Wisconsin's cranberry crop travels an average of 35 miles to processing facilities. Processing facilities located in the central production region help reduce food miles traveled to the initial processing facility, therefore reducing the final product's carbon footprint.

Social sustainability

Cranberry production in Wisconsin has positively impacted rural communities in many ways, and in a wider sense, cranberry research has revealed that the health benefits of cranberries reach the global community.

Locally, cranberry producers, through the Wisconsin State Cranberry Growers Association, have provided \$36,000 in endowment funds for student scholarships to several colleges including the University of Wisconsin's Stevens Point, La Crosse and Madison campuses, as well as the Wisconsin Technical Colleges.

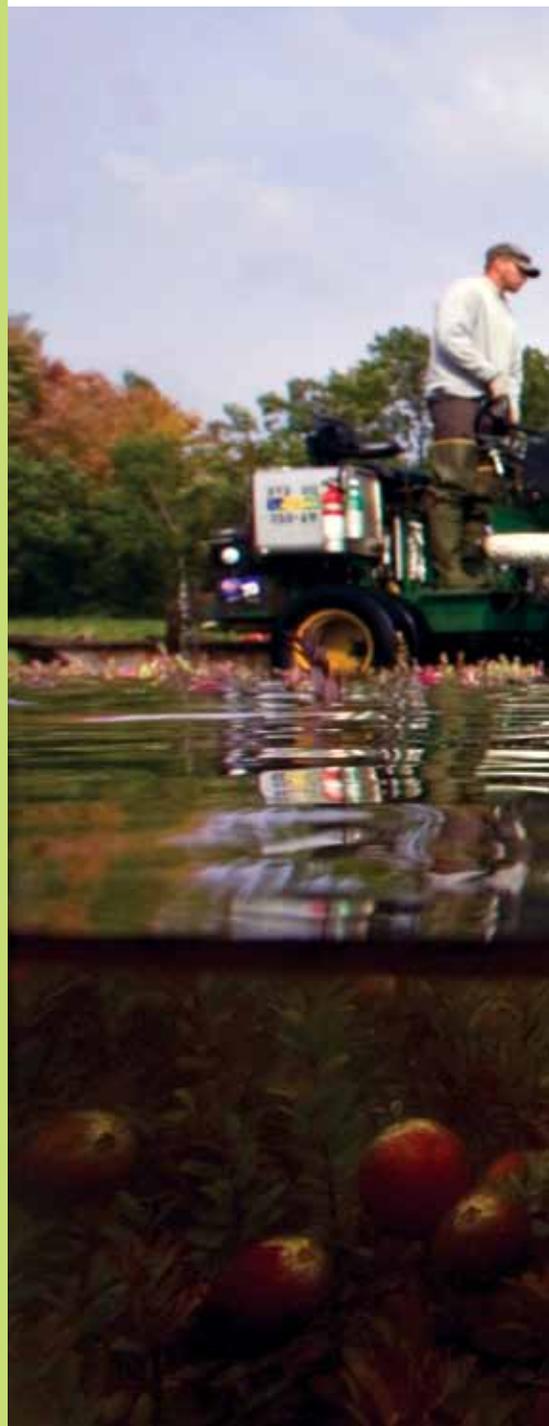
Cranberry production is a long-term commitment for the grower. This commitment results in a solid part of the local community and economy. Growers are very much a part of their community, usually in a wide range of leadership roles. Whether leading in best management practices or heading up a civic organization, growers are passionate about their role in the community.

Nationally, the Cranberry Institute consolidates cranberry industry funds and provides grants to researchers for cranberry research. The Cranberry Institute has provided research grants for the last 10 years, totaling \$1,591,000 in research funding for 48 projects. This research has discovered many health benefits of cranberries that has the potential to reach the global community (see sidebar: Health Benefits of Cranberries).



Survey highlights

Wisconsin cranberry producers have been in the business for an average of 26 years. 98% of cranberry operations are family owned, involving an average of 2 familial generations, although several operations have been in the cranberry business for as many as 5 generations. The long-standing tradition of family-owned cranberry production and commitment of the next generation of growers represents a significant



economic and social pillar supporting rural sustainability in Wisconsin.

Around 40% of growers either host or conduct research on their farms, and therefore are critical players in developing and implementing new, low-risk production practices. This percentage has stayed the same for the last 20 years.

The average age of cranberry beds in Wisconsin is 39 years old. The

oldest bed was reported to be planted 138 years ago.

Growers keep up with the latest research and industry trends to optimize their business and reduce risk of environmental impact. 85% attend grower education events, while 98% read cranberry trade journals. Educational opportunities focus on the latest production practices, environmental conservation strategies, market outlook, and worker health & safety.



Health Benefits of Cranberries

Cranberries are rich in antioxidants. Antioxidants are thought to play a role in preventing a wide range of diseases, including cardiovascular disease and cancer. Research has been conducted showing that the antioxidant components of cranberries could reduce free radicals in the brain which may help to sustain cognitive function longer in life and potentially reduce the effects of aging on the brain.

Cranberry consumption has been shown in many studies to help reduce the reoccurrence of urinary tract infections. In trying to understand the mechanism behind this effect, researchers discovered that some of the naturally occurring compounds in cranberries reduced the ability of harmful bacteria to adhere to urinary tract and cause disease. Researchers hypothesize that this same mechanism associated with cranberry consumption may reduce the occurrence of diseases, such as stomach ulcers or periodontal disease.

Consumption of cranberries, evidence suggests, may lower 'bad' cholesterol levels in the heart, reducing the risk of occurrence of arterial blocks. More research is needed to determine if there is a sustained effect on the reduction of cholesterol and the mechanism behind this positive effect.

Survey results	2009	% change since	
		1999	1989
Cranberry production practices			
Percentage of acreage scouted for insect, plant disease and weed pests	67	+8	+15
Average number of times marshes were scouted per season	14	--	--
Percentage of acreage on which pest management decisions were influenced by scouting	92	--	--
Average number of miles the cranberry crop traveled to a receiving facility	35	--	--
Percentage of growers:			
that hired a professional scout	77	0	+22
using pest thresholds to make pesticide decisions	97	+4	+29
using non-chemical cultural practices for pest management	88	+6	+11
calibrating pesticide and fertilizer equipment	98	+8	+10
basing fertilizer inputs on soil tests	88	+14	+29
basing fertilizer inputs on cranberry tissue tests	88	+15	+32
with weather stations on the marsh	41	+11	+22
basing pest management decisions on recorded weather or pest data	95	+8	+26
that kept records for production practices, such as pest and nutrient management	97	+6	+16
utilizing soil moisture monitoring technology in irrigation scheduling	36	+12	+27
that tested the uniformity of their irrigation system	55	+23	+30
using electricity (rather than fuel) to power irrigation pumps	7	-3	-8
using both electricity and fuel to power irrigation	23	+2	-1
that have created a nutrient management plan	73	+60	+60
with a conservation plan	33	+26	+26
recycling plastics, cardboard, etc. from the farm	79	+20	+43
Grower education and experience			
Average number of years individual growers have been in the cranberry business	26	--	--
Percentage of growers:			
that participate in grower education events	85	-8	-1
that subscribe to cranberry trade journals	98	+5	+9
that host or conduct on farm research	43	+8	+6
that were certified pesticide applicators	96	+1	+14
Marsh structure and history			
Percentage of marshes that were family owned	98	--	--
Average amount of years the marsh has been in business	39	--	--
Average number of generations involved in the marsh	2	--	--
Total amount of respondents acreage in cranberry production	13,273	--	--
Total amount of respondents acreage owned but NOT in cranberry production	83,310	--	--
Average number of year-round employees per marsh	2.0	--	--
Average number of seasonal employees per marsh	3.0	--	--
Average number of employees receiving health insurance benefits per marsh	1.4	--	--
Average number of employees receiving retirement benefits per marsh	1.6	--	--
Percentage of growers providing employees with safety training	83	--	--

Beyond the Survey:

A Commitment to Food Safety

Cranberry processors are dedicated to food safety. Beyond what is required by law, cranberry processors also submit themselves to audits by AIB Incorporated to ensure the safety of processed cranberries. AIB Incorporated is an independent auditing agency that provides a rigorous standard of food safety. Cranberry processors voluntarily follow these additional regulations to ensure they are creating a healthy and safe product.

Fresh cranberry producers hold themselves to European GAP (Good Agricultural Practices) standards. European GAP standards are more stringent than most United States standards, therefore providing a higher standard for food safety.

Pest management inputs used for cranberry production are regulated by the Environmental Protection Agency (EPA). These pesticides are evaluated through a rigorous process. Before registering a new pesticide or new use for a registered pesticide, the EPA first ensures that the pesticide, when used according to label directions, can be used with a reasonable certainty of no harm to human health and without posing unreasonable risks to the environment. To make such determinations, the EPA requires more than 100 different scientific studies over several years on potential pest management inputs.

Grower Profile:



Copper River Cranberry Company

We live hand and hand with this land. We live among it and raise our children here.

Nature has a balance, and each critter and animal needs a house and food as much as we do. We obviously need to use the water to grow cranberries, but the wildlife and waterfowl depend on it too. We provide for the flora and fauna, and they provide for us, creating a perfect balance. Everything flourishes here.

The marsh has been in existence since 1943, and the water, grass and wildlife are more abundant than they were in yesteryear. We see a wide variety of wildlife including swans, geese, ducks, loons, bald eagles, timber wolves, bear, mink, fisher, otters, beavers, grouse, and the list could go on. We have 130 acres of cranberries. We own another 1,700 acres not in production; 640 of these acres are wetlands and a water reservoir with the remainder in upland and lowland woods.

All farmers are really sustainable; people have farmed Wisconsin for 150 years. Cranberry growers may have more at stake than other farmers because of our dependence on water. But that just means we spend extra time paying attention to the details and maintaining the quantity and clarity of our water. Sustainability is not anything new; we live and work on this land so preserving it is just a natural part of that relationship.

Ed Sabey





Authors: Jed Colquhoun and Heidi Johnson, Horticulture Department, University of Wisconsin-Madison

Editing and layout: Mimi Broske, Nutrient and Pest Management Program, University of Wisconsin-Madison

Photography: ©Andy Manis Photo (Madison, WI)



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Grower Profile:



Valley Corporation

My grandfather came to our marsh in the 1930s and over 20 years became full owner and steward. I am the third generation with my wife Ann, our three children, my sister Mary, her husband Bill and their three children. My father and uncle owned the marsh before us.

Multi-generational farming allows knowledge of farming to be passed to the younger generation, and provides a sounding board for the younger generation to propose new ideas. This back and forth between generations is the key to what makes this generational management so successful on our farm.

Multi-generational farming also creates a strong and vital cranberry industry. Growers want to see the farming life passed to the next generation. For this reason, multi-generational farmers are often industry leaders involved in associations or cooperatives. They know what they do on the farm, what decisions are made in the industry, and how much work they put in now will make a long lasting impact on their families future. I am involved on the Wisconsin Cranberry Board and serve on the Ocean Spray Board. My wife hosts several school tours and tries to promote cranberries with anyone she encounters.

Since multi-generation farms stay within the family, land stewardship and sustainability are at the forefront of many decisions made on the farm.

Ed Grygleski

