

# WISCONSIN CRANBERRY BOARD, INC.

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## ANNUAL REPORT 2008-09

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Hello Wisconsin Cranberry Growers,

Here is the Wisconsin Cranberry Board's (WCB) 2008-2009 Annual Report for your review. It was a very productive year, and the Board was focused on spending your assessments wisely.

The past year has also resulted in constructive collaboration with numerous other funding organizations, and this synergy has resulted in more bang for your buck. We look forward to continuing strong relationships with other industry players going forward.

The audit demonstrates a strong financial position. The WCB's treasurer, Bill Wolfe, has done a great job collaborating with Jane Anderson and Clifton Gunderson in ensuring good numbers for the organization.

The WSCGA serves as the administrator for the Wisconsin Cranberry Board and Tom Lochner, WSCGA Executive Director has done an excellent job staying abreast of the market and well informed about the many issues to come before the Board. We growers are fortunate to have competent people working on our behalf.

I encourage you all to come to the March 30<sup>th</sup> budget meeting in Madison. The Wisconsin Cranberry Board is here for your benefit, and we the board members are always open to questions or concerns you may have regarding the mission of the WCB.

Here's to a productive 2010!

Sincerely,

*Stephen G. Brown*  
WCB President

# WISCONSIN CRANBERRY BOARD, INC.

## 2008 PROJECT REPORT SUMMARIES

The following progress reports were provided to the Wisconsin Cranberry Board, Inc. by the individuals and groups that received project funding during the 2007-08 fiscal year. These reports were presented to the WCB at or prior to the Budget Meeting on April 2, 2009. Copies of the full reports can be obtained from the authors or from the Wisconsin Cranberry Board, Inc. office.

### Crop Research

#### Pesticide Screening for Cranberries

**Principal Investigator:** Jed Colquhoun, UW Madison, Department of Horticulture

**Cooperators:** Dan Mahr, UW Madison, Patricia McManus, UW Madison, Jack Perry, UW Madison

**Objectives:** (1) The objective of the pesticide screening project is to identify and implement insect, disease and weed management strategies that adequately control pests while maintaining crop safety. Research focuses on new active ingredients and modes of action that are economical, manage the risk for resistance, reduce environmental and health safety risks, and would be supported in product registration by the agri-chemical industry and regulatory groups. Exploration of new, improved uses for currently registered products is also a component of this project's efforts. Grower education on efficacious and economical uses of registered pesticides is the applied component of this project.

**Summary:** In the 2008 growing season, a total of 38 field studies were conducted, including 21 herbicide evaluations, 12 insecticide evaluations, and 5 fungicide trials. Total pesticide treatments evaluated were nearly 200. Herbicide research focused on: 1) new pre-emergent and post-emergent herbicides; 2) control of specific problematic weeds, such as dodder, dewberry and Solomon's Plume; and, 3) a refinement of Callisto use in cranberry. Of particular note, a candidate herbicide that is currently in the registration process (but not yet legal for use) was identified that controlled dodder. This product will continue to be supported through the registration process. Insecticide research focused on new product evaluations for tipworm, fireworm, flea beetle, and fruitworm control, as well as a refinement of recently registered insecticides. Fungicide evaluations focused on potential products for fruit rot control.

In addition to the aforementioned research, time has been invested this season in supporting use of recently registered pesticides such as Callisto, as well as troubleshooting potential pesticide-related production issues. Research results will continue to be communicated to the industry through regional and national newsletters, grower meetings, and field workshops.

#### Breeding Cranberry for High Yields and Ease of Culture When Grown Under Wisconsin Conditions

**Principal Investigators:** Brent H. McCown, Department of Horticulture, UW-Madison; Eric Zeldin, Researcher

**Cooperators:** Wisconsin cranberry growers, Ocean Spray Cranberries, Inc.

**Objectives:** Whole project: (1) To develop cranberry cultivars that have a consistently higher fruit yield per acre than "Stevens" when grown in Wisconsin. (2) To reduce the sensitivity of the yield of high color "Ben Lear" types to flooding/late winter injury. (3) To isolate some of the genetically determined components of yield, pest resistance and ease-of-culture of cranberry by a detailed study of carefully designed populations of seedlings from highly focused crosses. (4) To determine the inheritance of herbicide tolerance genes previously inserted into cranberry and then integrate such genetic engineering successes into the conventional breeding program.

2007-08 year: (1) Provide support and monitoring of 'HyRed' growers and propagators. (2) Further scale up and evaluation of the A-X15 selection. (3) Evaluation of second generation selections. (4) Evaluation of a tetraploid plots.

**Summary:** (1) HyRed expansion continued but slowed in 2008. Previous nurse plantings were mowed in 2008. WARF has issued propagator's licenses to both vine and plug propagators and both types of stock were commercially available in 2008. Sites were visited and few problems reported. (2) A-X15 is sibling of HyRed selected for large berry size. This selection was scaled up to a ¾ acre nurse bed and then into 2 acres of a renovated bed. Observations showed the new planting took well and good establishment was documented. (3) Second generation selections replanted in performance plots were selected based on heavy fruiting and fruit set. (4) In 2006 two tetraploid progeny were planted in a 7,000 sq. ft. mini bed designed to be a better test for fertility. In 2008 there was considerable fruit set but the number of uprights was still too low to provide a re-producible harvest. Fruit size and seed number per fruit were large.

### **Cranberry Weeds of Wisconsin**

**Principal Investigators:** Teryl R. Roper, Department of Horticulture, UW Madison; Jed Colquhoun, Department of Horticulture, UW Madison

**Objectives:** To create a weed identification handbook for Wisconsin cranberry growers.

**Summary:** This project is nearly complete, with delivery of the finished product to the Wisconsin Cranberry Board, Inc. anticipated sometime in late spring 2009. The finished product will be an electronic version of the book that will be printed and made available to growers through the Board. Highlights of the progress include: Several thousand high resolution photographs were taken in the 2007 and 2008 growing seasons throughout Wisconsin cranberry marshes and with collected live plant samples in a photo studio setting. These photographs include details of all pertinent stages of growth ranging from seedlings to flower and fruit structure. Descriptions of about 200 species have been written with the technical assistance of a taxonomist at UW-Madison. These short, practical descriptions focus on characteristics that separate closely related species of similar appearance. We have hired a publications layout specialist and editor that is completing the layout of the book. The book currently contains almost 200 species, arranged by flower color. We have also engaged a scientific illustrator that is drawing pertinent identification details such as grass ligules. We will review the completed draft extensively and share with cranberry growers and consultants prior to publication. The ultimate end result will be a book bound in a resilient cover featuring extensive photographs, descriptions, and illustrations that will allow for simple and feasible weed identification.

### **Assessing the Biological Impact of IPM Adoption by the Wisconsin Cranberry Industry**

**Principal Investigator:** Dan Mahr, UW Madison;

**Other Investigators:** Merritt Singleton, UW Madison; James Polashock, USDA ARS

**Objectives:** 1) Survey the beneficial natural enemies occurring in cranberry beds. 2) Determine if the adoption of IPM practices has resulted in the increase of natural enemies of cranberry pests. 3) Determine if the adoption of IPM practices has resulted in an increase in incidence of bluntnosed leafhopper or the false blossom disease.

**Summary:** To assess the biological impacts of IPM adoption, 14 cranberry farms were sampled (1) to determine the abundance of natural enemies present and (2) to survey for the potential presence of bluntnosed leafhopper, the vector of the causative mycoplasma of false blossom. Four of the farms were producing for the certified organic market and 10 were conventional farms. The conventional farms were spread along a continuum of degree of IPM adoption. Three sampling methods were used: sweep sampling during the pre bloom period, pitfall traps during the post bloom period, and yellow sticky traps throughout the season. Each farm was sampled once every two weeks.

For conventional farms, natural enemy numbers ranged from a low of 771 to a high of 2305 with an average of 1454. For organic farms, natural enemy numbers ranged from a low of 999 to a high of 2266 with an average of 1847. Organic farms averaged 27% more natural enemies than conventional farms. Correlation of natural enemy numbers in relation to Natural Enemy Toxicity Scores (based on insecticide products used and usage patterns for each farm) is still underway. The overall largest group of natural enemies was spiders, followed by parasitic insects, and then predatory insects. Total leafhopper counts (multiple species combined) sampled by yellow sticky traps varied from a low of 18 to a high of over 250 per farm. Numbers averaged 122 per conventional farm and 153 per organic farm. None of the leafhoppers caught in this survey were bluntnosed leafhopper, the vector of false blossom.

## **Annual Projects**

### **Wisconsin Cranberry Crop Management Newsletter – Volume XXI**

**Project Coordinator:** Teryl R. Roper, Department of Horticulture, UW-Madison

**Cooperators:** University faculty and staff, private cranberry consultants, Ocean Spray Cranberries, Inc., Cliffstar Corporation.

**Summary:** Ten issues of the CCM Newsletter were published between May and September of 2008. Copies were sent at no charge to managers of all known cranberry marshes in the state. The newsletter was also made available on the internet and the text was distributed via the cranberry e-mail list as well.

### **Wisconsin Cranberry School - 2009**

**Project Coordinators:** Wisconsin Cranberry Research and Education Foundation; WSCGA Education Committee; Teryl R. Roper, UW Extension.

**Objective:** To conduct a 2 day grower educational program for all Wisconsin cranberry growers focusing on improved farm management and business practices.

**Summary:** The WSCGA Education Committee met with UW Extension Faculty to evaluate previous schools and identify topics and speakers for 2009. The Wisconsin Cranberry School was held January 20-21 at the Stevens Point Holiday Inn Hotel and Convention Center. During the two day session topics relating to all aspects of cranberry production were presented with a Rutgers Entomologist Cesar Rodriguez-Saona as the featured speaker. Packets with relevant information were distributed to all attendees. Proceedings from the School are sent to all participants. The 2009 Wisconsin Cranberry School attracted over 450 growers and industry people.

### **Cranberry Weather Forecasts**

**Project Coordinator:** Wisconsin State Cranberry Growers Association

**Objective:** To provide Wisconsin cranberry growers with accurate, regional weather forecasts.

**Summary:** The WSCGA worked with a private weather forecasting consultant to develop regional cranberry weather forecasts. These forecasts were available to growers via a toll-free number and online at the WSCGA website [www.wiscran.org](http://www.wiscran.org). Service was available from April 15 through October 31.

### **Harvest Communications Program**

**Project Coordinator:** Wisconsin State Cranberry Growers Association

**Objectives:** (1) To provide targeted media with information on cranberries, cranberry products and information on the results of health related research on cranberry consumption. (2) Conduct fall harvest media campaign to educate the consuming public on the cranberry industry in Wisconsin.

**Summary:** The harvest communications program entailed working with a public relations firm to develop key messages and themes, strategies, a plan and execution of the planned activities. The activities included sponsorship of two Mr. Food episodes; a news release in conjunction with the crop projection announcement by USDA; an extended media outreach to target national and regional media including Associated Press; Cooperative effort with CMC to publicize tour by Japanese marketers; a general use of the website to communicate with media and track efforts and visits.

In 2008 the earned media efforts and Mr. Food segments generated more than \$7.7 million in publicity value, a \$6 million increase over last year's media effort. The efforts also resulted in \$2.57 million in advertising equivalency value, more than \$2 million over last year. Furthermore, the more than 650 media placements reached more than 20 million people, 4 million more people than in 2007. Additionally, these are conservative figures as some of the stories generated are not included in the value report, as the information was not available.

### **Brochure Printing**

**Project Coordinator:** Wisconsin State Cranberry Growers Association

**Objective:** Provide members of the general public with information on cranberries through high-quality, professionally produced brochures.

**Summary:** The grant was used to print and distribute 17,800 copies of the 2008 Fall Harvest brochure, printing of 13,900 copies of the new recipe brochure and 9,350 copies of the Cranberry Activity Books.

### **Wisconsin State Fair Promotion Program**

**Project Coordinator:** Wisconsin State Cranberry Growers Association

**Objectives:** (1) Provide information on cranberries and cranberry growing to visitors to the Wisconsin State Fair. (2) Promote consumption and sales of cranberry products at the Wisconsin State Fair. (3) Increase overall awareness of cranberries and their economic, environmental and cultural importance to the state. (4) Educate the public on the health benefits of cranberry consumption. (5) Educate the public on the many cranberry products available and their uses.

**Summary:** WSCGA contracted with the Wisconsin State Fair Park for space in the Wisconsin Products Pavilion. The booth space (10'x30') was divided into two components: the first being an educational display, the second a sales area for cranberry products. The grant was used for promotion activities at the Fair including media drops of products, interviews on air, daily cranberry cooking demonstrations, appearance by the cranberry mascot daily at the Fair.

### **Stock Photos**

**Project Coordinator:** Wisconsin State Cranberry Growers Association

**Objective:** Acquire professional photographs and images to be used by media, researchers, in brochures and exhibits featuring cranberries.

**Summary:** WSCGA retained a photographer who shot photos of wildlife and cranberry blossom. The photos were added to the industry collection, catalogued and assembled in an electronic format.

### **Product Sample Products**

**Project Coordinator:** Tom Lochner, Executive Director, WSCGA

**Objective:** Provide promotional samples of cranberry products for distribution.

**Summary:** WSCGA worked with cranberry handlers to secure sweetened dried cranberries which were then packaged into sample packets by the ODC in Wisconsin Rapids.

### **Cranberry Marketing Program – Paid Advertising**

**Project Coordinator:** Wisconsin State Cranberry Growers Association

**Cooperators:** Milwaukee Brewer Radio Network

**Objectives:** (1) Conduct a paid advertising campaign to communicate health, environmental, tradition and economic messages on a regional basis. (2) Establish relationship between healthy sporting activities and cranberries. (3) Link cranberry growing tradition with other major state traditions. (4) Improve image of industry throughout the state.

**Summary:** Wisconsin's cranberry growers were again sponsors of an in game feature of each Milwaukee Brewer Baseball Radio broadcast on the statewide network. The feature "On Your Plate", the introduction of the umpires for each game was presented by Wisconsin's cranberry growers. The promotion also featured in game and post game mentions and Cranberry Night at Miller Park promotion.

### **Into the Outdoors**

**Coordinator:** Tom Lochner, WSCGA Executive Director

**Cooperators:** Discover Media Works, WSCGA Public Relations Committee, WSCGA Education Committee

**Objective:** Create a multi-media communication tool highlighting the Wisconsin cranberry Industry in an entertaining and educational format. Into the Outdoors goes from adventure to adventure across the state of Wisconsin. Joining a diverse group of kids and adults from all locations Into the Outdoors introduces fishing, camping, environmental concerns and outdoor safety - just to name a few topics.

**Summary:** The WSCGA named a working group of members of the Education and Public Relations Committees to work on the project. WSCGA began working with the ITO staff in June, 2008 on concepts for the four segments, ideas and opportunities. Following those initial discussions it was determined the segments would be based on a theme of the four seasons. The first segment would be on the fall harvest, the second on winter activities (ice making and sanding), the third on springtime, (frost watch and wildlife on the marsh) and the fourth on summertime (bloom and pollination with bees). The first two segments, fall harvest and winter activities, have aired.

### **Website Update and Redesign**

**Coordinator:** Tom Lochner, Executive Director, WSCGA

**Cooperators:** WSGA Education Committee, WSCGA Public Relations Committee

**Objective:** Provide Wisconsin cranberry industry with state of the art presence on the World Wide Web.

**Summary:** The project entailed a full evaluation of the current site, including identifying areas of improvement for site optimization, navigation, usability and the like. The WSCGA organized a working group that consisted of growers who were members of the WSCGA Public Relations and Education Committees. This group first began its work by reviewing key elements of the site, discussing site organization and sharing new ideas to consider such as adding video, a photo library and/or a media page, etc. The group then retained Zeppos and Associates to assist in the design and development of an upgraded site.

The new upgraded site debuted in April of 2008. It provided the industry with a tremendous resource to communicate with growers and the general public. The site includes a slide show featuring different scenes from cranberry growing season, the newly completed video "Wisconsin Cranberries Growing Strong" and regularly updated features of cranberries in the news. The site can be visited at [www.wiscran.org](http://www.wiscran.org).

### **Frost Hardiness of Cranberry Plant: A Guide to Manage the Crop During Critical Periods in Spring and Fall**

**Project Coordinator:** Jiwan Palta, UW Madison

**Cooperators:** Beth Workmaster, UW Madison

**Objectives:** Develop and print a comprehensive guide for management of cranberry and frost protection.

**Summary:** A nineteen page bulletin is at the printers and will be available in time for the 2009 growing season. The bulletin is based on research conducted by Dr. Palta with previous WCB grants.

### **Operations and Promotions - Wisconsin Cranberry Discovery Center**

**Project Coordinator:** Lorry Erickson, Director, Wisconsin Cranberry Discovery Center

**Objectives:** Educate the public about Wisconsin's role as the nation's leading producer of cranberries.

**Summary:** The Cranberry Museum, Incorporated utilized the grant to support activities at the Wisconsin Cranberry Discovery Center in Warrens, Wisconsin. The funds were allocated toward general operations and promotion efforts. Over 22,600 visitors came to the Discovery Center in the 2008 season. These numbers are based on customer counts from the POS system at the Center. Special promotions were supported with the funding including a Cranberry Blossom Day, Public Harvest Tours, leisure tours, regular news releases (32 in total for the year) and other day to day activities at the Center.

### **Wetherby Cranberry Library Project**

**Project Coordinator:** Lorry Erickson, Director, Wisconsin Cranberry Discovery Center

**Objectives:** Organize and catalog current material housed in the Wetherby Cranberry Library, develop a searchable database via internet and actively seek the addition of new materials to the collection.

**Summary:** Since the hiring of a librarian to implement the project in May 2008, we have cataloged the existing materials at the Wisconsin Cranberry Discovery Center, a process that involved creating nearly 12,000 individual records; created the Wetherby Cranberry Library Digital Collection, the largest on-line repository of cranberry related items on the Internet. The collection features 400 unique objects, consisting of 2,500 .jpg images focusing on the history and importance of cranberry production in Wisconsin; established relationships with the Wisconsin State Historical Society, University of Wisconsin-Madison, Wisconsin Library Services and Wisconsin Heritage On-Line in order to further promote the importance of cranberry production in Wisconsin; integrated the Wetherby Cranberry Library Digital Collection into the Wisconsin Cranberry Discovery Center's Web site, thereby boosting the targeted audience's awareness of the Center and also making the collection more assessable and implemented both digital and archival protection strategies for the existing physical and digital collections.

### **Nutrition Education Initiatives 2008-2010**

**Project Coordinator:** Sherry Tanumihardjo, UW Madison

**Objectives:** (1) Support of reproduction of "How does your garden grow?" 2) Support to purchase fruit and juice for a human intervention trial to assess nutritional status of 59 women aged 19-30 years old. 3) Develop brochures on a variety of fruit for the intervention study that can be used by young women with a special emphasis on cranberry intake and urinary tract infection.

**Summary:** The project resulted in the printing and distribution of approximately 1000 booklets this year for education in 2009. Cranberry products were purchased and used in studies in women which ended September 2008. The third objective has been delayed as a result of a change in personnel in the lab. It will be reevaluated in 2009. Two papers as a result of the work have been accepted into peer reviewed literature. The educational objectives of both of these papers were supported by prior funding to the PI by WCB.

1. Tanumihardjo SA, Valentine AR, Zhang Z, Whigham LD, Lai HJ, Atkinson RL. Strategies to increase vegetable or reduce energy and fat intake induce weight loss in adults. *Exp Biol Med.* 2009; (In press). Will be published in May.

2. Valentine AR, Whigham LD, Tanumihardjo SA. Pedometers are perceived as useful tools for weight loss. *J Extension.* 2009; (In press). Will be published in April.

## **WISCONSIN CRANBERRY BOARD, INC. – CRANBERRY INSTITUTE HEALTH RELATED RESEARCH - PROJECT REPORT SUMMARIES**

The Wisconsin Cranberry Board, Inc. and Cranberry Institute have partnered for the past six years to fund a variety of research projects related to the health benefits of cranberry consumption. Under this partnership the organizations issue a joint request for proposals. Researchers submit applications to the Cranberry Institute. The applications are reviewed by a Health Advisory Committee of the Cranberry Institute which makes recommendations for projects deserving funds. Projects deemed worthy are then funded by Wisconsin Cranberry Board, Inc., the Cranberry Institute and other grower funding organizations. In 2008 the Wisconsin Cranberry Board, Inc. provided \$96,250 toward health related projects. The following are summaries of the reports of the health research projects that received funding from the Wisconsin Cranberry Board, Inc.

### **Bioassay to Detect Anti-Adhesive Properties of Cranberry Metabolites in Urine**

**Principal Investigator:** Terri Anne Camesano, Ph.D. Worcester Polytechnic Institute

**Summary:** Models previously showed that when E. coli bacteria are grown in either light cranberry juice cocktail, or proanthocyanidins that were extracted from the juice, the bacteria became impaired in their ability to form a biofilm. The experiments showed that bacteria grown without cranberry juice form biofilms within a few minutes, and the

density of cells increases up to about 30 hours. When bacteria are grown in cranberry juice cocktail or PACs isolated from cranberry juice cocktail, biofilm formation is significantly and greatly reduced. There is almost no biofilm formation for any of the cultures in cranberry product. However, when they re-expose the bacteria to normal growth media that does not contain cranberry, they immediately regain their ability to form biofilm. This confirms that cranberry's effects on bacteria are reversible. This may be useful in designing a clinical therapy for people, since we know that they must keep drinking cranberry juice in order to receive the benefits.

Clinical experiments were done in collaboration with Dr. Amy Howell from Rutgers University. A volunteer was asked to consume either 16 oz. of cranberry juice cocktail or 16 oz. of water. The volunteer's urine was collected and pooled over 6 hours. They then exposed the urine to clinically isolated pathogenic strains of *E. coli*, for fixed periods of time. Within two hours, they saw a statistically significant decrease in the adhesion forces between *E. coli*, when exposed to the urine of the volunteer who had consumed cranberry juice cocktail. This is the first time that a molecular level investigation of adhesion forces has demonstrated that urine of a volunteer who has consumed cranberry juice contains molecules that decrease *E. coli* adhesion.

A summary of this work will be published in the Journal of Medicinal Food as: Role of Cranberry on Bacterial Adhesion Forces and Implications for *E. coli*-uroepithelial Cell interactions.

### **Investigations into the Antiviral Effects of Store-Purchased and Pure Cranberry (Vaccinium Macrocarpon) Juice Drinks on the Infectivity of Rotavirus**

**Principal Investigator:** Steven M. Lipson, St. Francis College

**Objectives:** The objectives of this study are to determine whether there are differences in the inhibitory effect of rotavirus infectivity in cell cultures by (manufacturer-supplied and store-purchased) cranberry juice drinks using post-treatment testing, the polymerase chain reaction, and cell physiological (e.g., tight junction integrity) testing methodologies.

**Summary:** The work has progressed to studies describing the antiviral effects of cranberry juice on the molecular level. Continued studies are underway to identify that minimal rotavirus titer which can be detected among cranberry juice pre treated post treated cell culture monolayers. These studies will add to the understanding and validity of their assay as a powerful tool to measure the anti-viral effect of cranberry juice in comparison to isolation of infectious virus in cell culture.

### **Cranberry Proanthocyanidins and Gut Immunity**

**Principal Investigator:** Jess Reed, UW Madison

**Summary:** The results show that cranberry PACs maintain anti-inflammatory bioactivity in a cell culture model. These results are relevant to gut health because PACs readily complex with proteins in the food and gut and these complexes are not reversible. The results suggest that PAC/protein complexes could modulate the induction of gut immunity. Future research will focus on testing this hypothesis.

### **The Effects of Cranberry on Delaying Pathogenesis of a Mouse Model of Alzheimer's Disease**

**Principal Investigator:** Sige Zou, National Institute on Aging, National Institutes of Health

**Objectives:** This proposal is to assess the potential beneficial effects of cranberry on delaying the pathogenesis of Alzheimer's Disease (AD), a common neurodegenerative disease in elderly population. We will achieve this goal through the following three specific aims by employing a mouse genetic model of AD: 1) Evaluate the effect of cranberry on cognitive function of the AD mice. AD is characterized as a decline of cognitive function. 2) Assess the effect of cranberry on accumulation of  $\beta$ -amyloid plaque, a hallmark of AD. 3) Investigate the effect of cranberry on inflammatory response in the AD mice. Alterations of inflammatory response have been associated with the progress of AD.

**Summary:** To investigate the beneficial effects of cranberry on accumulation of  $\beta$ -amyloid plaque in AD mice, 3-month old AD mice and wild type control mice have been fed 1% cranberry extract in their drinking water daily for six months. There are totally four groups of animals including the controls for this project. Each group has more than six mice. Samples have been collected from these animals for molecular biology, biochemical and pathological analyses. Additional animals will be treated to obtain enough number of animals (approximately 10 per group) for completing the project. The project should be completed before the end of 2009.

**Action of Cranberry Proanthocyanidins Against Bacterial Adhesion to Biomaterials and Mammalian Cells; Implications for Mitigation of Urinary Tract Infection, Prostatitis and Endocarditis**

**Principal Investigator:** Natalie Tufenkji, McGill University

**Objectives:** The goals of the project are: (i) to examine the metabolic response of bacteria to PAC exposure; (ii) to investigate the antiadhesive and antiinvasive activities of PAC against bacterial pathogens interacting with endocardial, uroepithelial, and prostate epithelial cells; and (iii) to examine the influence of cranberry PAC on biofilm formation.

**Summary:** The experimental protocols have been improved to obtain high quality samples of bacterial RNA for the planned analysis. The first complete experiment with *E. coli* CFT073 should be completed by April 1, 2009. Current work also includes the development of fluorescence microscopy based techniques for imaging bacteria inside of and outside the kidney cells. The plan is to complete the imaging of the cells by April 1 to be able to submit findings for publication by the beginning of the summer.

**Cranberry Flavonoid Consumption and Biomarkers of Lipid Peroxidation and Inflammation in Subjects with Metabolic Syndrome (MeS)**

**Principal Investigator:** Arpita Basu, Oklahoma State University

**Summary:** Six subjects with metabolic syndrome are currently enrolled in the study; 3 each in the control and placebo groups. Subjects are tolerating the placebo and juice well and have no complaints in the study. No changes in safety parameters like liver, renal or CBC we noted. Blood draws, anthropometrics and blood pressure are being done at initiation, 2 and 4 weeks of the study. The target date for completion is February 2010.

## 2008-09 Funding

The Wisconsin Cranberry Board, Inc. is a national leader in funding research, education and promotion programs for the cranberry industry. In April of 2009 the board met to develop a budget for funding programs from the 2008 crop. The following summarizes their funding decisions:

In general the funds were allocated in the following program areas:

Continuing Crop Production Projects	\$ 110,624
New Crop Production Projects	\$ 87,500
Education Projects	\$ 39,130
Promotion Projects	\$ 99,250
Health Related Research Projects	<u>\$ 100,000</u>
<b>Total funding</b>	<b>\$ 436,504</b>

## Continuing Crop Production Projects

### **Cranberry Pest Management Program**

*Jed Colquhoun and Jack Perry, UW Madison*

Total Cost: \$80,000

WCB Support

\$50,000

Cranberry production relies on good pest management practices to control insects, weeds and diseases that plague production by reducing crop yield and quality. Pesticides have been the mainstay of pest control on cranberry in all growing regions and will be important in the future. Pesticide registrations are always at risk and new technologies and chemistries are resulting in the discovery of new, safer crop protection compounds. These new tools need to be evaluated and then go through a rigorous registration process at the US Environmental Protection Agency. The first step in the process is to evaluate potential compounds for efficacy, phytotoxicity and compatibility with existing practices. Following this screening process candidate compounds must then be analyzed using protocols required by IR4 and EPA to become registered for use. In addition to the to collecting the data necessary for registration the project also evaluates use patterns, rates, timing etc to maximize the usefulness of the compound in cranberry IPM programs.

In the recent past the program has focused on weed management. In the last year several new candidate insecticides have been identified. Future fungicide work will look at the fruit rot complex.

The project conducts its work on cooperator marshes and coordinates with other screening programs nationally. The Cranberry Institute provides support of \$30,000 for the project.

### **Breeding Cranberry for High Yields & Ease of Culture when grown under Wisconsin Conditions**

*Brent H. McCown and Eric Zeldin, UW Madison*

WCB Support

\$10,750

This grant continues the WCB support for the genetic improvement program at UW Madison. The focus in 2009-10 will be continued support of HyRed growers and propagators along with the further evaluation of the AX-15 selection. The project will also continue evaluations of second and third generation progeny, the evaluation of existing tetraploid plots and maintaining breeding sites as required.

Ocean Spray Cranberries, Inc. the Gottschalk Chair for Cranberry research and licensing fees from HyRed will provide additional funding for the project

### **Assessing Biological Impacts of IPM Adoption**

*Daniel L. Mahr, UW Madison*

WCB Support

\$49,874

IPM seeks to enhance the benefits of the natural enemies of pests thereby improving biological control and reducing pesticide use to a minimum. IPM results in the use of pesticides only when necessary thereby reducing impacts on these beneficial insects. The cranberry industry has adopted IPM over the past twenty years and now uses chemicals on an as needed basis. In addition new compounds are much more selective for specific pests. These newer reduced risk compounds are selective in nature and are generally safer to beneficial insects. This side effect may have resulted in greater biological control in cranberry.

An unfortunate side effect of IPM adoption can be the increase in certain pests that had been previously (and unknowingly) controlled by broad spectrum pesticides. This project will also look at the possibility of increases in potential pests due to this side effect.

Marshes will be surveyed for populations of beneficial natural enemies, determine whether the adoption of IPM has resulted in the increase of these natural enemies and to determine if the adoption of IPM has resulted in an increased incidence of blunt nosed leafhopper and false blossom disease.

**TOTAL WCB SUPPORT FOR CONTINUING CROP PRODUCTION PROJECTS:**

**\$110,624**

## **New Crop Production Projects**

### **Cranberry Production for a Sustainable Future**

*Jed Colquhoun, UW Madison*

WCB Support

\$30,000

This is a new project funded this year to quantify the positive economic, social and environmental impacts of cranberry production and to communicate these positive impacts to the general public, buyers, retailers and public agencies. The project will also identify areas for potential improvement and needed research that would further promote industry sustainability.

Sustainability is a current buzzword in discussion of food production whether from environmentally concerned groups, consumers, buyers or retailers. Several companies and organizations are currently proposing standards for sustainability and certification programs. These efforts are largely aimed at improving future environmental, social and economic sustainability in general but may not be appropriate to the specialized cranberry industry or recognize past accomplishments and improvements that make the industry sustainable.

The first phase of this project is to document the sustainable practices already in place in cranberry and communicating those efforts to receive credit for them. The outcome would be a publication written in language for the general public that documents where cranberry production contributes to environmental economic and social sustainability. The document would rely on credible data based information and would also identify areas where the industry and University researchers are working on improvements.

### **Cranberry Fruit Rot Control in New and Established Plantings**

*Patricia McManus, UW Madison*

WCB Support \$45,000

Cranberry fruit rot has become increasingly important in Wisconsin over the past five years. In established plantings bitter rot is the major pathogens and early rot has become a concern in plantings of newer hybrids. Efforts to deal with the emerging problem in Wisconsin are largely based on models developed in eastern growing regions and utilize older fungicide chemistries. Newer chemistries of reduced risk and safer compounds have become available and have shown promise for control. There is a need to determine how fungicides and cultural practices, especially evaporative cooling, can best be used to manage fruit rot in an environmentally and economically sound manner.

This project will look which fungicides are effective, review evaporative cooling practices as a cultural control and develop a manual/website to assist in diagnosis.

### **Validation of Degree Day Model for Cranberry Fruitworm Control**

*Jayne Sojka, Lady Bug IPM*

WCB Support \$12,500

The project has two objectives. The first is to validate a degree day model for timing cranberry fruit worm control that has been developed at Rutgers University. The second is to document the efficacy of using pheromone traps and Intrepid to control fruit worm.

**TOTAL WCB SUPPORT FOR NEW CROP PRODUCTION RESEARCH PROJECTS: \$87,500**

## **Education Projects**

### **Wisconsin Cranberry Crop Management Newsletter, Vol XXII**

*Matt Lippert, Dan Mahr, Patty McManus, Jed Colquhoun, UW Madison*

*Private Pest Management Consultants in Wisconsin*

Total Cost \$2,625

WCB Support \$1,600

The grant will be used to print and mail ten copies of the CCM Newsletter to all known Wisconsin Cranberry growers free of charge. Ocean Spray Cranberries, Inc. Cliffstar Corporation, Decas Cranberry and Clement Pappas are providing additional financial support.

### **2010 Wisconsin Cranberry School**

*Wisconsin Cranberry Research & Education Foundation*

WCB Support \$7,500

The WCB will cover a portion of the costs for the annual two day educational program for Wisconsin growers. The funds will be used to partially offset registration costs.

### **Wisconsin Cranberry Discovery Center – Education & Promotion**

*Lorry Erickson, Director, WCDC*

\$15,000

The funds will be used in support of education and promotion programs at the Wisconsin Cranberry Discovery Center in Warrens, WI operated by the Cranberry Museum, Inc. Promotions include “Cooking with Cranberries” demonstration programs, “Make and Bake” classes and programs in the exhibit hall.

### **Wisconsin Cranberry Discovery Center – Wetherby Library Project**

*Lorry Erickson, Director, WCDC*

\$7,880

The grant will support the continuing programs at the Wetherby Library housed at the Wisconsin Cranberry Discovery Center in Warrens, Wisconsin. The library was established through a gift from the Wetherby Cranberry Company. The library is home to a large collection of historical and archival materials. This grant will be used to continue to catalog and digitize that collection as well as seeking additional acquisitions for the collection. The library serves as a gateway to this information and other on line information on cranberry culture in Wisconsin and beyond.

### **Cranberry Weather Forecasts**

WSCGA

WCB Support

\$7,150

The association will continue to provide specialized weather forecasts for Wisconsin's cranberry growers. The four regional forecasts are provided via a toll free number and on the web at [www.wiscran.org](http://www.wiscran.org). In 2009 the service will utilize a new provider. There will be an upgrade to the web based portion of the service to better recognize the needs of growers for information beyond frost to manage their crop.

**TOTAL WCB SUPPORT FOR EDUCATION PROJECTS:**

**\$39,130**

## **Promotion Projects**

### **General and Ongoing Communications Programs**

WSCGA

WCB Support

\$49,000

The grant will fund activities of the association to provide targeted media with information on cranberries, cranberry products and information on the results of health research on the benefits of cranberry consumption and to celebrate cranberry harvest. News releases will be issued throughout the year on timely activities in the industry. A media event on a marsh, news releases aerial photo opportunities will be part of the promotion program during the harvest season to obtain publicity about the state's largest fruit crop.

### **Paid Advertising Program - Milwaukee Brewer Radio Network**

WSCGA

WCB Support

\$28,000

Cranberry growers will once again be sponsors of the statewide Milwaukee Brewer Radio network. The promotion includes all Brewer baseball broadcasts with an in game feature "Cranberry Grower Umpire Report". The promotion also includes Cranberry Night at Miller Park, web presence on the WTMJ website and the Sports Bubbler website launched last year.

### **Wisconsin State Fair Promotion Program**

WSCGA

WCB Support

\$15,000

These funds will be used to conduct a number of promotional activities at the 2009 Wisconsin State Fair in West Allis, WI. These activities include daily stage cooking demonstrations, visits to onsite media and product delivery, daily appearance of cranberry mascot, advertising in the program book, grower interviews and media pitches throughout the fair. Additional support is provided through revenue generated at the WSCGA product sales booth in the Wisconsin Products Pavilion.

### **Brochure Printing**

WSCGA

WCB Support

\$2,750

This grant supports the printing and distribution of Cranberry Activity Books and the cranberry harvest brochures.

### **Stock Photos**

WSCGA

WCB Support

\$3,000

The funds will be used to acquire high quality professional photographs and images to be used by media, researchers, in brochures and exhibits.

### **Product Sample Packets**

WSCGA

WCB Support

\$1,500

This grant will be used to develop sample packets of sweetened dried cranberries to be used as a promotional item. Cranberry handlers will be contacted to provide product. The grant funds will be used for packaging and distribution.

**TOTAL WCB SUPPORT FOR PROMOTION PROJECTS:**

**\$99,250**

## HEALTH RELATED RESEARCH

### **Cranberry Proanthocyanidins and Gut Health: Integrated Cranberry Research at UW Madison**

*Jess Reed, UW Madison*

WCB Support:

\$75,000

This project consists of two components. The first is to develop an integrated cranberry health research program at the UW Madison that will bring together research faculty from across the College of Agricultural Life Sciences, the School of Medicine and all other campus departments and colleges to develop integrated research programs. The funding will support a grant writer to develop proposals for larger sources of funds for cranberry health research and create a pool of seed money to attract grants and research faculty.

The second is to begin a project that looks at developing a novel mouse model to investigate the interactions between cranberry proanthocyanidins and gut associated lymph tissue. Low bio availability of cranberry polyphenols suggests that their health benefits arise through bio activity in the gastrointestinal tract. The preliminary data from this study will be used as to improve competitiveness of future grant applications.

### **Cranberry Proanthocyanidin Inhibition of *Escherichia coli* Invasion of Prostate and Intestinal Epithelial Cells in Vitros**

*Dr. Walter Hopkins, UW Madison*

WCB Support

\$25,000

USDA CMC will provide an additional \$7,385 in support for the project.

The overall objective of the proposal is to investigate the role of cranberry compounds to inhibit cellular invasion by *E. coli* in tissue culture models. The results could be used to further enforce the anti adhesion benefits of cranberry.

**TOTAL WCB SUPPORT FOR HEALTH RELATED PROJECTS:**

**\$100,000**

# WISCONSIN CRANBERRY BOARD, INC.

## Statements of Financial Position Fiscal Year Ended August 31, 2009

<b>ASSETS</b>	
<b>CURRENT ASSETS</b>	
Cash	\$ 179,965
Other temporary investments	98,000
Interest Receivable	<u>2,890</u>
Total current assets	280,855
<b>LONG TERM INVESTMENT</b>	<u>98,000</u>
<b>TOTAL ASSETS</b>	<u>\$ 378,855</u>

## LIABILITIES AND NET ASSETS

<b>LIABILITIES</b>	
Administrative Services Payable	\$ 22,257
Refunds payable	8,849
Grants payable	<u>286,724</u>
Total liabilities	317,830
<b>NET ASSETS</b>	
Unrestricted	<u>61,025</u>
<b>TOTAL LIABILITIES AND NET ASSETS</b>	<u>\$ 378,855</u>

## Statement of Cash Flows Fiscal Year Ended August 31, 2009

<b>CASH FLOWS FROM OPERATING ACTIVITIES</b>	
Changes in net assets	\$ (27,808)
Adjustments to reconcile changes in net assets to net cash used by operating activities:	
Effects of changes in operating assets and liabilities:	
Administrative services payable	7,276
Refunds payable	8,849
Grants payable	<u>60,751</u>
Net cash provided by operating activities	<u>49,068</u>
<b>CASH FLOWS FROM INVESTING ACTIVITIES</b>	
Decrease (increase) in other temporary investments	98,000
Decrease (increase) in long-term investment	<u>(98,000)</u>
Net cash provided by investing activities	0
<b>NET INCREASE IN CASH</b>	49,068
<b>CASH, BEGINNING OF YEAR</b>	<u>130,897</u>
<b>CASH, END OF YEAR</b>	<u>\$ 179,965</u>

## Statements of Activities Fiscal Year Ended August 31, 2009

<b>UNRESTRICTED REVENUES</b>	
Grower assessments	\$ 442,080
Specialty Crop Block Grant	16,932
Interest income	<u>7,019</u>
Total Unrestricted Revenues	<u>466,031</u>

## MANAGEMENT & GENERAL EXPENSES

Administration – WSCGA	29,941
Administration - Dept of Ag	3,449
Audit and tax preparation fees	4,300
Meeting and miscellaneous	679
Bonding	500
Printing and copying/typing	8,190
Post office box rent	44

Total management and general expenses 47,103

Excess of unrestricted revenues over expenses before grant disbursements \$ 418,928

## PROGRAM EXPENSES - GRANT DISBURSEMENTS

Wis State Cranberry Growers Association	106,400
Specialty Crop Block Grant Projects	16,932
University of Wisconsin	140,148
Cranberry Institute	49,625
Cranberry Museum, Inc.	22,880
Jayne Sojka	12,500
Dr. Starr	30,000
Wis Cranberry Research & Education Foundation	<u>7,500</u>
Total program expenses – grant disbursements	385,985
Excess (deficit) of unrestricted revenues over expenses and grant disbursements	32,943

Increase in grants authorized but unpaid (60,751)

**CHANGE IN UNRESTRICTED NET ASSETS** (27,808)

**UNRESTRICTED NET ASSETS, BEGINNING OF YEAR** 88,833

**UNRESTRICTED NET ASSETS, END OF YEAR** \$ 61,025

# NOTES TO FINANCIAL STATEMENTS – AUGUST 31, 2009

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## **NOTE 1: SUMMARY OF SIGNIFICANT ACCOUNT POLICIES**

### **NATURE OF OPERATIONS**

The Wisconsin Cranberry Board, Inc. (the “Organization”) is a not-for-profit corporation operating in Wood County, Wisconsin. They are an agricultural marketing and research organization authorized under the Wisconsin Agricultural Marketing Act which became effective September 1, 1983. The Organization collects grower assessments mandated by the Cranberry Marketing Order and uses those funds to promote market research and development and industrial research and educational programs. The Organization’s fiscal year ends on August 31.

### **BASIS OF PRESENTATION**

The Organization prepares its financial statements in accordance with Statement of Financial Accounting Standards (SFAS) No. 117, *Financial Statements of Not-for-Profit Organization*. Under SFAS No. 117, the Organization is required to report information regarding its financial position and activities according to three classes on net assets: unrestricted net assets, temporarily restricted net assets, and permanently restricted net assets. As of August 31, 2009, the Organization has no temporarily or permanently restricted net assets.

### **USE OF ESTIMATES**

The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amount of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

### **CASH EQUIVALENTS**

The Organization considers all liquid investments with a maturity of three months or less when purchased to be cash equivalents.

### **OTHER TEMPORARY INVESTMENTS**

Other temporary investments consist of certificates of deposit with original maturities from three months to one year. These investments are stated at cost, which approximates market.

### **LONG TERM INVESTMENT**

For the year ended August 31, 2009, long-term investment consisted of a certificate of deposit with an original maturity of 41 months and is stated at cost, which approximates market. This certificate of deposit expires in November, 2012.

### **REVENUE RECOGNITION**

Grower assessments are recognized in the period they are due. Assessments are based on barrels of production. The charge was ten cents per barrel for the fiscal year ended August 31, 2009.

### **GRANT DISBURSEMENT AND PAYABLE**

Grants to others are recognized as an expense and as a liability when the promise is made.

### **INCOME TAXES**

The Organization is a not-for-profit organization exempt from state and federal income tax under Internal Revenue Code Section 501(c) (5).

## **NOTE 2: GRANTS PAYABLE**

The following is a summary of grants authorized and payable at August 31, 2009:

University of Wisconsin research	\$ 260,624
The Cranberry Institute research	0
Matthew P. Lippert, UWEX	1,600
Dr. Starr	17,000
Wisconsin Cranberry Research & Education Foundation	<u>7,500</u>
	<u>\$ 286,724</u>

## **NOTE 3: RELATED PARTIES**

During the year ended August 31, 2009, the Organization reported assessment revenue from board members of \$27,380. There were no amounts owed to the board members as of August 31, 2009, nor were there any amounts owed by board members as of August 31, 2009.

The Organization receives administrative services and office space from the Wisconsin State Cranberry Growers Association (WSCGA) under an annual agreement. WSCGA charged the Organization \$29,941 during the year ended August 31, 2009.

## **NOTE 4: SUBSEQUENT EVENTS**

Management evaluated subsequent events through November 3, 2009, the date the financial statements were available to be issued. Events or transactions occurring after August 31, 2009, but prior to November 3, 2009, that provided additional evidence about conditions that existed at August 31, 2009, have been recognized in the financial statements for the year ended August 31, 2009. Events or transactions that provided evidence about conditions that did not exist at August 31, 2009, but arose before the financial statements were available to be issued have not been recognized in the financial statements for the year ended August 31, 2009.

**WISCONSIN CRANBERRY BOARD, INC.**  
**PO Box 1351**  
**Wis RAPIDS, WI 54495-1351**

*Annual Report*