

WISCONSIN CRANBERRY BOARD, INC.

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ANNUAL REPORT 2005-2006

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Dear Fellow Growers,

On behalf of the Board of Directors, I am pleased to present to you the annual report of the Wisconsin Cranberry Board, Inc. for our most recent fiscal year. The report contains a copy of our financial audit, a summary of progress reports from projects we funded previously and a list of projects we approved for funding in April of 2006. The audit and Annual Report were approved as part of our Annual Meeting on November 30.

Our financial position remains strong as we strive to responsibly invest your check off dollars in research, education and marketing activities. The board is focused on making funding decisions based on the merit of each proposal and as a result has been able to work with other groups to jointly fund important projects. We did make some adjustments to our funding to respond to needs within the industry. We will continue to evaluate all of our programs to make sure we obtain the best return for you on your check off dollars.

Wisconsin continues to provide leadership in providing support for research, education and promotion programs for the industry. We also continued our commitment to the support of research and communication projects on cranberry health. The partnership with the Cranberry Institute has resulted in a number of interesting and important discoveries about cranberry health. These results have also generated a great deal of publicity and information about the role of cranberries in improving the overall diets of people.

It is an exciting time for all of us in the industry. Markets appear to have recovered from their low levels in the late 1990 and early 2000. Reports on sales are encouraging especially in the international area. We have seen inventories and carryover levels decline as sales increase. We will be challenged to continue to expand this positive trend and to develop growing practices that allow Wisconsin to continue its leadership in providing the fruit for these markets.

These successes are due to the efforts of many across the industry. We appreciate all of the support of growers this past year which has allowed us to play a role in these successful ventures. We would invite all of you to participate in, and comment on, our programs.

Sincerely,

Edward J. Grygleski
WCB President

WISCONSIN CRANBERRY BOARD, INC.

2005 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 2004-05 fiscal year. These reports were presented to the WCB at or prior to the Budget Meeting on April 7, 2006. Copies of the full reports can be obtained from the authors or from the Wisconsin Cranberry Board, Inc. office.

Crop Research Project Reports

Pesticide Screening for Cranberries

Principal Investigator: Patricia McManus, UW Madison, Department of Plant Pathology

Cooperators: Dan Mahr, UW Madison, Jed Colquhoun, UW Madison, Teryl Roper, UW Madison, Jack Perry, UW Madison

Objectives: (1) Evaluate efficacy of new pesticides and growth regulators; (2) Collect residue data according to IR-4 standards; (3) Test use patterns (i.e. timing, rates, rotations) for new and existing products; (4) Pursue special registrations when justified.

Summary: The screening program conducted 8 treatments of pre-emergence herbicides, 10 treatments of post emergence herbicides, 11 treatments of fungicides, 17 insecticide treatments for Tipworm, 10 insecticide treatments for fruitworm. The project also applied for one Section 18 registration for Orbit and one Section 2ee registration for early season use of Bravo.

Weed Control in Cranberry Bogs

Principal Investigator: Bradley A. Majek, Extension Specialist, Rutgers Agricultural Research and Extension Center

Cooperators: Rutgers Blueberry/Cranberry Research Farm, various growers

Objectives: (1) Cooperate with IR-4, manufacturers, state and federal agencies to receive registrations for three specific products that are not phytotoxic to the crop, control troublesome weeds and are environmentally safe. (2) Integrate effective herbicides into the current cranberry practices to improve control of yellow loosestrife, sedges and other weeds, prevent crop phytotoxicity and maintain the longest possible pre-harvest interval. (3) Evaluate herbicides with potential to control specific weeds identified as troublesome in cranberries for efficacy, and phytotoxicity in the cranberry production system. (4) Screen herbicides registered on other crops and experimental herbicides for phytotoxicity to cranberries.

Summary: The herbicide screening program at Rutgers continued in 2005. The long term portion of the project focuses on applying registered herbicides at twice the labeled rate and monitoring the plots for damage and yield impact. No injury was observed in plots treated with Evital and Devrinol. Plots treated with Casoron and clopyralid when applied before bloom did show damage. Five additional products were screened to evaluate the compounds and their efficacy when tank mixed with other compounds. Research emphasis also shifted to new plantings and Devrinol use patterns that showed improved weed control but no increase in yield the third year after planting. New compounds showed promise in new plantings in providing control without a negative impact on first harvests after planting.

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: Irwin Goldman (Professor, Horticulture), 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. 2005-06

year: (1) To maintain established plots for the evaluation of new selections of cranberry. (2) Establish scale up plots of selected individuals as well as new plots of progeny from new crosses. (3) To continue breeding and evaluating polyploid cranberries. Begin field evaluation of polyploid plots established previously with controlled pollination conditions.

Summary: The program continued the evaluation, commercialization and scale up of HyRed. New grower licenses were issued in 2005 and full bed acreage exceeded 12 acres this year. That acreage is expected to double in 2006 and again by 2008. Trial commercial propagation systems are in place for 2006. Field results showed yields for HyRed are in line with other major cultivars. A sibling selected at the same time as HyRed, A-X15, was scaled up to a $\frac{3}{4}$ acre bed to grow to a three acre bed in 2007 to allow evaluation of a full bed setting and to expand the cultivar by conventional means once it has proved itself. Another round of selection of second generation hybrids was performed in 2005. Plots demonstrating good vigor, very heavy fruit set and a high degree of flower bud set were selected to be replanted into 250 sq. ft. plots. Full establishment of the plots is expected in 2006 with evaluation to begin in 2007. Two populations of third generation hybrids have been generated to focus on specific yield parameters. The first seeks to combine high vigor and large berry size with the early flowering of HyRed. The other was derived from a cross of HyRed and an advanced Grygleski selection seeking to combine the good bud set of HyRed with the high berry set of the Grygleski selection. Evaluations of both are expected to begin in 2008. Two tetraploid selections were planted in the field in 2003 to be evaluated for a variety of potential problems. Despite known issues with pollination in mixed diploid/tetraploid plantings there was considerable fruit production in 2005. These results have given confidence to researchers that tetraploid cranberries are a viable concept. Tetraploid selections have been propagated for planting in 2006. They will be isolated from diploids to address pollination issues. Initial fruiting may be evaluated in the fall of 2007 and initial yield measurements in 2008.

Field tests of tannin bound protein fertilizer: a potential tool for combining nitrogen fertilization with weed management.

Principal Investigator: Kevin R. Kosola, UW Madison, Department of Horticulture

Objectives: 1. To carry out field tests of the potential for developing tannin bound protein as a fertilizer nitrogen source that would be available to cranberries but not most cranberry weeds. 2. To determine the growth response of cranberries and common weeds to tannin bound protein. 3. To survey the relative efficacy of several protein and tannin sources.

Summary: Experimental plots were established at one conventional and two organic marshes to evaluate whether or not tannin bound proteins could provide cranberry plants with needed nitrogen that would not be available to competing weeds in cranberry plantings. The trials tested a number of sources of the proteins including whey protein, powders and feather meal. The experiments indicate that tannin bound protein is not likely to be useful as a source of nitrogen available only to cranberry plants. One encouraging result was the potential for acid whey as a low cost source for cranberry fertilization. The researcher has submitted an application to the WCB to investigate this source.

Inexpensive tools for quantifying irrigation water replacement of fertilizer requirements in upland beds.

Principal Investigator: Kevin R. Kosola, UW Madison, Department of Horticulture

Cooperators: Beth Workmaster, UW Madison, Sarah Stackpoole, UW Madison

Objectives: (1) To document nitrogen inputs in irrigation water and contributions to cranberry N fertilizer requirements. (2) To determine irrigation system factors controlling spatial patterns of nitrogen inputs. (3) To write up a standard protocol for ion exchange resin column tests for cranberry irrigation water N input, suitable for analytical labs working with growers.

Summary: Four grower cooperators were given nitrate test kits, three Hach kits and one Spectraphysics. The growers sampled and tested their irrigation water during the growing season. Irrigation water sources at three additional marshes were collected. Ion exchange resin columns were installed and uprights and fruit were harvested from plots in September. The results showed that the test kits worked well in measuring NO₃, the Hach kits required more time than the Spectraphysics but were less expensive. The resin columns proved to be useful in identifying sources of excess water and N.

Using anion exchange membranes as an alternative to chemical soil testing to estimate plant available phosphorous in cranberry beds. - Final Report.

Principal Investigator: Teryl R. Roper, U W Madison, Department of Horticulture

Cooperators: Bill Schmitt, Armand Krueger, Research Technicians

Objectives: (1) Assess the application and effectiveness of anion exchange membranes (AEM) to measure P concentrations of cranberry soils under minimal disturbance conditions. (2) To determine the relationship if any between plant available P in soils determined by standard Bray extractant and AEM. (3) To determine the relationship between tissue test P and AEM extractable P. (4) To determine the relationship between yield and AEM extractable P.

Summary: The project completed the investigation of an alternative soil test to measure available P in cranberry soils. The currently used Bray 1 soil extraction test is not a reliable tool for measuring available P in most cranberry soils. This membrane alternative has shown promise in providing a new tool for growers to use. Progress includes determination of methodology for use of the anion exchange membranes and good data allow a correlation between P values in the soil test and tissue P concentrations. Analysis in the lab looked at P sorption in solution at varying levels of solution pH and concentrations of Al and Fe. The results indicated that the membranes do work similar to plant roots and can be a useful tool for measuring available soil P. Commercial products from Canada were evaluated with positive results.

Yield component analysis with emphasis on upright vigor

Principal Investigator: Teryl R. Roper, UW Madison, Department of Horticulture

Co-Investigators: Eric Zeldin and Bill Smith, UW Madison

Objectives: (1) To sample multiple cultivars at multiple sites for two years to investigate yield components on a fruiting upright basis. (2) To statistically determine the contribution of each yield component to total yield. (3) To make conclusions for the development of future research to advise growers how to maximize yields based on individual components. (4) To make conclusions for the development of new cultivars aimed at maximizing specific yield components.

Summary: The project was discontinued by the Principal Investigator. When the plots were to be set up it was found that the HyRed plantings were not sufficiently mature to obtain valid data for comparison to other hybrid cultivars. The funds originally allocated to the project are to be used to reduce the cost of the PI's 2006 potassium research proposal.

Determining the correct phosphorous rate for productive cranberries

Principal Investigators: Carolyn DeMoranville, UMass–Amherst Cranberry Research Station, Teryl R. Roper, U W Madison, Department of Horticulture, Joan Davenport, Washington State University-Prosser

Objectives: (1) Establish plots in MA and WI to determine P rates needed for sustainable cranberry production. Compare slow release to traditional P sources. (2) Evaluate promising soil testing procedures for plant available P using cranberry soils from test plots. Evaluate relationship among soil test result, tissue P and yield.

Summary: Two plots comparing P rates and slow release were established in WI and two replicated plots in MA. In addition 3 plots comparing triple super phosphate (TSP) rates have been established in MA. There was no treatment effects of the rate or form of P applied on total yield in the WI plots. Tissue P in the WI plots varied with highest levels in the plots receiving 30 lb P and lowest in the control plots but in both cases levels were above the 0.1% critical level. In the short term there does not appear to be yield impacts at rates of P at 20lb P per acre per year if tissue P remains in the sufficient range. The anion exchange membrane work was coordinated with Dr. Roper as part of this project. Results are discussed in the report by Dr. Roper.

Annual Projects - Report Summaries

Extension Related to Cranberry Diseases and Disorders in Wisconsin

Project Coordinator: Patricia McManus, UW Madison, Department of Plant Pathology

Objective: Provide extension services to Wisconsin cranberry growers.

Summary: The grant allowed for the provision of extension services to Wisconsin cranberry growers. Activities by the Extension Specialist included participation in the Wisconsin Cranberry School, on site farm visits to

investigate specific problems, conducting diagnoses of problems, production of bulletins, participation in national meetings and leading project for pesticide screening at UW Madison.

Wisconsin Cranberry Crop Management Newsletter – Volume XIX

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

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

Summary: Ten issues of the CCM Newsletter were published between May and September of 2005. 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.

Methods to increase the availability of cranberry press cake components to Inhibit quality deterioration in muscle foods

Principal Investigator: Mark P. Richards, UW Madison, Department of Animal Sciences

Cooperators: Professor Jess D. Reed, Dr. Sivakumar Raghavan, UW Madison

Objectives: (1) Determine the ability of different cranberry extracts to inhibit lipid oxidation in mechanically separated turkey. (2) Determine the ability of different cranberry extracts to maintain red color in processed bacon after vacuum seal is broken. (3) Examine ability of β -glucosidase to de-glycosylate extracted polyphenolics and hence increase inhibitory efficacy of the extract. (4) Sub-fractionation and characterization of extracted polyphenols using a food grade resin (styrene divinylbenzene). (5) Selective incorporation of polyphenols into the membranes of MST, pork sausage and pepperoni products.

Summary: The work did not begin until mid October so the report represents about 5 months of work. Various extracts were prepared and effective ones identified. The efforts did produce early results which showed that direct addition of press cake can inhibit lipid oxidation. The practical use or development of commercial product is dependant upon reducing costs.

Nutrition education initiatives in 2005-2006

Principal Investigator: Sherry A. Tanumihardjo, UW Madison, Department of Nutritional Sciences

Objectives: (1) Support of reproduction of “How does your garden grow?” (2) Reproduction of the revised “Antioxidant Bulletin.” (3) Update approximately 50 displays. (4) To continue to incorporate cranberries in outreach activities including reproduction of fruit and vegetable cards for teachers.

Summary: 20,000 copies of the booklet “How Does Your Garden Grow” were printed and distributed throughout the state. The “Antioxidant Bulletin” was revised to be in line with the new USDA dietary guidelines. The fruit and vegetable display was also updated to include the new dietary guidelines. The fruit and vegetable cards have been reprinted and used in outreach activities.

Professional Improvement for Cranberry Research and Extension Workers

Project Coordinator: Matthew Lippert, Wood County and UW Extension

Objectives: To secure funding for state faculty to attend the North American Cranberry Research and Extension Workers conference (NACREW).

Summary: The funds were used in partial support of travel and participation in NACREW the biannual conference. The poster sessions, symposia and paper presentations allowed participants to be updated on current cranberry research.

Taste Test Kitchen Promotions

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

Objectives: Promote the use of cranberries year round and increase public awareness of emerging research on the health benefits of cranberry consumption.

Summary: Two cooking demonstrations were held on May 14 and November 19. An eight page recipe book is being compiled for distribution during 2006.

Cranberry Recipe Brochure

Project Coordinator: Wisconsin State Cranberry Growers Association

Objective: To develop, print and distribute a new printed material containing recipes and health information on cranberry consumption.

Summary: The WSCGA Education Committee developed a new recipe brochure that features recipes for use of both fresh and processed products. 20,000 copies were printed with distribution beginning at the 2005 State Fair.

Cranberry Communications Program

Project Coordinator: Wisconsin State Cranberry Growers Association

Objectives: This project included a number of separate activities all designed to provide the general public with information on cranberry production and cranberry consumption. The overall objective was to promote the use and consumption of cranberries and cranberry products. The specific objectives for each project were: (1) Increase demand for cranberries and cranberry products through a generic promotion program. (2) To provide information on cranberries and cranberry growing to visitors to the Wisconsin State Fair. (3) To provide targeted media with information on cranberries, cranberry products and information on the results of health related research on cranberry consumption. (4) Conduct fall harvest media campaign to educate the consuming public on the cranberry industry in Wisconsin. (5) Maintain a website with information for the general public and growers.

Summary: The Wisconsin State Fair promotion continued this year. The growers association contracts with Wisconsin State Fair Park for space in the Wisconsin Products Pavilion. A booth is set up which includes educational information on cranberry cultivation featuring a scale model cranberry marsh, display boards, cranberry vines and a videotape presentation on the Wisconsin cranberry industry. The other portion of the booth is utilized for sales of unique cranberry products. These products include cranberry white chocolate chunk cookies, cranberry muffins, chocolate covered cranberries, cranberry juice cocktail, sweetened dried cranberries, cranberry mustards, cranberry chutney and cranberry jams and jellies. The promotion also includes a cranberry mascot who appears each day in the parades and is in the booth at various times during the 10 day run of the Fair. A new mascot costume was produced for the State Fair as part of the grant. The association, through a public relations agency, also provides products to the various media outlets at the Fair. This led to discussion of the products on air and increased visits to the booth by people coming to the Fair. WSCGA also secured time slots on a demonstration stage in the Wisconsin Products Pavilion to conduct cooking demonstrations utilizing recipes from the recipe brochure.

The fall harvest communications program entailed working with a public relations firm to develop key messages and themes for the fall harvest promotion. The initial effort was a news release on crop projections to peak media interest in the annual harvest. The second release focused on international marketing efforts. A story about a new piece of harvesting equipment invented by a grower was of great interest to media and resulted in a national AP story.

WSCGA conducted a Satellite Media Tour (SMT) this year which reached 19 stations nationally, aired 122 times and resulted in almost three million impressions in major markets the week prior to Thanksgiving.

The WSCGA maintained the industry website at www.wiscran.org to provide information on cranberry growing for the general public and growers.

The fall communications efforts resulted in an estimated 9,960,000 impressions with an advertising value estimated at \$2,289,000.

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. Service was available from April 15 through October 31.

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 17,500 copies of the Fall harvest brochure and a second printing of 16,500 copies of the new recipe brochure.

Cranberry Digital Library

Project Coordinator: Wisconsin State Cranberry Growers Association

Objectives: Create a high quality digital library of photos of all aspects of cranberry production, generic products and industry interest.

Summary: The library will be incorporated into the Wetherby Cranberry Library at the Wisconsin Cranberry Discovery Center. Plans call for the library to be staffed and operating in Summer 2006.

Cranberry Marketing Program

Project Coordinator: Wisconsin State Cranberry Growers Association

Cooperators: Badger Sports Properties, 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 sponsors of the University of Wisconsin football and basketball teams for the 2005-06 seasons. This broadcast package featured four (4) :30 second commercials in each football radio broadcast on WTMJ, four (4) :30 second commercials in each men's basketball broadcast on WTMJ and one (1) :10 second live in game read on the entire radio network for each game. The Brewer promotion consisted 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. The website ad program is just getting underway and has not been completed in time for this report.

Cranberry Product Promotion

Project Coordinator: WSCGA Public Relations Committee

Objectives: To conduct an in store promotion in partnership with Wisconsin's largest grocery chain.

Summary: WSCGA worked with Roundy's Inc. the state's largest grocery chain to conduct a number of in store promotion activities. They included the development of a CD library for the stores to use for ads including images and recipes; the development of Point of Purchase materials with recipes and health information on them; copy for radio spots sponsored by Roundy's; conducting in store product demonstrations at two of the high end locations in Milwaukee.

Wisconsin Cranberry School

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 nutrient management, improved farm management and improved business practices.

Summary: The WSCGA Education Committee met with UW Extension Faculty to evaluate previous schools and identify topics and speakers for 2006. The Wisconsin Cranberry School was held January 24-25 at Chula Vista Resort in Wisconsin Dells. During the two day session topics relating to all aspects of cranberry production were presented with an emphasis on plant nutrition. Packets with relevant information were distributed to all attendees. Proceedings from the School are sent to all participants. The 2006 Wisconsin Cranberry School attracted over 350 growers and industry people. The evaluations by the participants were extremely positive and indicated that the quality of the program was "the best in years".

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 four 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 Research Advisory Committee of the Cranberry Institute which makes recommendations for projects deserving funds. Those projects deemed worthy of funding are then jointly funded by Wisconsin Cranberry Board, Inc. and the Cranberry Institute. The Cranberry Institute then manages the research projects. In 2005 projects totaling \$75,000 were funded by the WCB through the CI. The following are summaries of the reports of the projects funded by the partnership in 2005.

Anti Viral Effects on Bacteriophages and Animal Enteric Viruses by Cranberry Juice

Project Coordinator: Steven Lipson, St. Francis College

Objectives: The objectives of this study are multifactorial. Firstly, our objective is to extend our *in vitro* experiments refining the effects of different proanthocyanidin extracts as an antiviral agent. Secondly, we wish to extend our studies to an animal model system. Such *in vivo* experiments are critical, as testing on the organismal level will significantly strengthen our hypothesis that cranberries and selected cranberry products inhibit enteric virus replication.

Summary: They are showing cranberry extracts with even more effect on reovirus infectivity than cocktail, and are looking hard at research into the mechanism of the cranberry effect. Also, he has obtained PACs from Amy Howell, and will be working with them in his cell culture model. His next step is to assess the reovirus activity of cranberry in a mouse model.

Anti-aging Effects of Cranberry: A Cross-species Study

Project Coordinator: Sige Zou, NIH

Objectives: This project is to examine anti-aging properties of cranberry by using multiple animal models. *Specific aim 1:* Assess the effect of cranberry on lifespan of the fruit fly, *Drosophila melanogaster*, an invertebrate model of aging. *Specific aim 2:* Examine the role of cranberry diet supplementation on age-related decline of neuronal function and behavior of the rat, a mammalian model of aging and behavior.

Summary: Effects of a cranberry extract on the lifespan of the fruit fly have not been positive, and the thinking is that they were likely not consumed as they were insoluble. Water soluble extracts have since extended life by up to 17%. Their next steps are to look at mid and older flies, and also to a mammalian (rat) model for efficacy.

Cox-2 Inhibition and Inflammation

Project Coordinator: Jess Reed, UW-Madison

Objectives: (1) Determine the effects of cranberry polyphenols on COX-2 expression and PGE2 production in a murine model of inflammation; (2) Determine the effects of the main classes of cranberry polyphenols on COX-2 expression in a macrophage cell culture model.

Summary: Results to date suggest that cranberry PACs may have an effect on COX-2 and other promoters of inflammation and these results need to be validated *in vivo*. A mouse model is planned for that purpose. Positive results would indicate that cranberry may have the potential to help reduce the symptoms of those diseases with an inflammatory component, including heart diseases, various cancers, arthritis, and Alzheimer's Disease.

Effects of Cranberry Juice Consumption on Vascular Health

Principal Investigator: John Polagruto, UC Davis

Objectives: To determine the effects of cranberry juice consumption on a) Endothelial function using Peripheral Arterial Tonometry; b) Platelet function assessed as ADP- and Epinephrine-collagen stimulated platelet reactivity using a platelet function analyzer (PFA).

Summary: He has recently received notification from the Institutional Review Board that the protocol for this study has been approved. In addition, he has conducted assessments on a variety of cranberry materials, and has

determined the optimum product for this study is a cranberry juice cocktail. Once that has been received, he will begin recruiting this month, with a timeline to completion of 6-9 months.

Do Cranberry Phytochemicals Promote Apoptosis in Breast Cancer and Prostate Tumors?

Principal Investigator: Cathy Neto, UMass-Dartmouth

Objectives: The objective of the proposed study is to determine the effects of whole cranberry extract and various polyphenolic and triterpenoid compounds from cranberry fruit on apoptosis and related events in models of breast and other cancers.

Summary: Her work continues, with a recent paper on the effect of cranberry compounds on breast, prostate, colon, and other cancers accepted by the Journal of Science of Food and Ag, and appearing on their website, which was reported in the media. The full text appeared in the December issue.

Potential for Oral Health Benefits of Cranberry Constituents

Principal Investigator: Daniel Granier, Laval University

Objectives: The specific aims of our project were to determine the effects of cranberry juice concentrate and extracts on i) biofilm formation, growth, and adherence of the principal periodontopathogen *Porphyromonas gingivalis*, and ii) production of pro-inflammatory cytokines and matrix metalloproteinases by fibroblasts and macrophages stimulated by lipopolysaccharides, a toxic bacterial component.

Summary: Research using a cranberry fraction suggests efficacy against periodontitis, and possibly other disease states due to helping control destructive inflammatory processes associated with heart diseases, pre-term low weight, and pneumonia. A poster on a portion of the work was presented at a professional meeting in Quebec in October, and a research report on this work was published in the Journal of Dental Research.

Effect of cranberry on polymorphonuclear function and epithelial cell colonization by *Staphylococcus aureus* and *E. coli*

Principal Investigator: Moussa Diarra, Ag and Agri-Food Canada

Objectives: (1) To evaluate the in-vitro anti adhesion activity of cranberry extract; (2) To investigate the immuno-modulatory activity of cranberry; (3) to evaluate the in vivo effect of cranberry extract in a broiler chicken model.

Summary: Results against *S. aureus* suggest that cranberry extracts enhance the susceptibility of this organism to immuno-defense mechanisms, which can be beneficial in the treatment of infections. They also showed an interference with adhesion and biofilm formation, plus an increased sensitivity to salt. The implications are the cranberry could be a natural alternative to antibiotics formulated into commercial animal feeds. Additional studies are being developed.

2005-06 Funding

The Wisconsin Cranberry Board, Inc. is a national leader in funding research, education and promotion programs for the cranberry industry. This is consistent with the commitment of the industry in Wisconsin to invest in the future.

The WCB met on April 7, 2006 in Madison to make its funding decisions for use of check-off funds from the 2005 crop. The following summarizes their funding decisions:

Summary WCB Funding:

Continuing Production Projects:	\$ 65,772.50
New Crop Research Production Projects:	17,000.00
Annual Projects:	137,565.00
Health Related Projects:	<u>96,000.00</u>
Total Funding Approved:	\$ 316,337.50

Continuing Production Projects

Extension Related to Cranberry Diseases and Disorders in Wisconsin

Patricia McManus, UW-Madison

\$4,900

This grant will support the extension program of Dr. McManus related to cranberry production including travel, grower visits, supplies, participation in meetings, writing extension pest bulletins and other activities.

Pesticide Screening for Cranberries

Patricia McManus, UW-Madison, Robert (Jack) Perry, UW Madison

\$30,742.50

Pesticides have been the mainstay of pest control on cranberry in all regions for decades and will be important for the foreseeable future. However they are always at risk of being lost through regulatory decisions, manufacturer withdrawal and/or the development of resistant pests. New tools are being developed but before they can be used on cranberry they must be screened for efficacy, phytotoxicity and compatibility with existing practices. Data also needs to be collected and analyzed according to rigorous protocols required by IR-4 and EPA. In addition to new chemistries experimentation with existing products at different rates and timings will lead to more effective and economic pest management. Experiments will be conducted on commercial marshes in Wisconsin on important insect, disease and weed pests. Coordination with other screening programs will take place as well. The Cranberry Institute is co-sponsoring the project.

Breeding Cranberries for high yields and ease of culture when grown under Wisconsin conditions

Brent H. McCown, UW-Madison

\$22,768

The grant continues funding for the cranberry genetic improvement project at the UW Madison. Emphasis this year will be on the continued commercial scale up of HyRed, the further scale up and evaluation of A-Xa5 selection, the establishment and evaluation of second generation selections and new plantings of third generation progeny, continued field evaluation of tetraploids and maintenance of all breeding sites as needed.

Inexpensive tools for quantifying irrigation water replacement of fertilizer requirements in upland beds

Kevin Kosola, UW-Madison

\$7,362

The project is in its second year to provide growers with inexpensive methods to measure and document nitrogen inputs in irrigation water. Another objective of the study is to determine factors that control spatial patterns of inputs. The results should allow growers to better manage nitrogen and vine growth.

Determining the correct phosphorus rate for productive cranberries

Carolyn DeMoranville, U-Mass, Teryl Roper, UW-Madison, Joan Davenport, Washington State U.-Prosser

[\(WSCGA/NRCS Whole Farm Planning Project will fund \\$3,500\)](#)

The grant will support the ongoing national project on phosphorous rates needed for sustainable cranberry production. The funds will be used to support collecting and analyzing soil and tissue from plots that have received various treatments and rates of phosphorous. The study is also looking at the relationship between soil test results, tissue phosphorous levels and yield. The Cranberry Institute and the Cape Cod Cranberry Growers Association are providing support for the project along with the WSCGA. This project was submitted for funding to the WCB. Because of its applicability to the development of nutrient management plans for growers it is being funded from the USDA NRCS/WSCGA Conservation Planning Program.

TOTAL CONTINUING PRODUCTION PROJECTS - WCB:

\$65,772.50

New Crop/ Production Research

Scouting Wisconsin Cranberries for Early Rot

Patricia McManus, UW-Madison

\$2,500

In early 2005 early rot was discovered at five sites in central Wisconsin on new plantings. Because of limited time the focus was on these newer plantings and not on established plantings of standard cultivars. Therefore it is not known how widespread early rot was in 2005. This grant will be used to conduct a more thorough investigation into the incidence of this disease and to identify the pathogens associated with the field samples.

Rates and timing for potassium for cranberry nutrition

Teryl R. Roper, UW-Madison

(WSCGA/NRCS Whole Farm Planning Project will fund: \$30,750 – CI will fund: \$7,000)

This is the first year of a multi year national project to experiment on potassium rates needed for sustainable cranberry production. Management of potassium varies widely among growers and very little research has been reported in scientific or grower literature. There is extensive grower experience but little work has been conducted under controlled conditions. Because of its applicability to the development of nutrient management plans for growers it is being funded from the USDA NRCS/WSCGA Conservation Planning Program. The Cranberry Institute and Cape Cod Cranberry Growers Association are providing additional funding for the project.

Canaries in Cranberries: weed population susceptibility to glyphosate

Jed Colquhoun, UW-Madison

\$7,500

Weed management in cranberry production is challenged by few control options. Future registrations of herbicides are limited in minor crops for a variety of reasons so it is critical to protect and maintain the utility of current management tools. The objective of this study is to manage the risk for potential herbicide resistance development by determining the susceptibility of common cranberry weeds to glyphosate and to evaluate the potential for resistance to the herbicide.

Writing and publishing an Extension Bulletin on managing cranberry crop for frost protection

Jiwan Palta, UW-Madison

\$7,000

The funds will be used to write and produce an Extension Bulletin to help growers manage the crop for frost protection. The information in the bulletin will be based on work funded previously by the WCB. In addition to the printed version the bulletin will be available in electronic form.

TOTAL NEW CROP RESEARCH PRODUCTION PROJECTS - WCB:

\$17,000

Annual Projects

Wisconsin Cranberry Crop Manager Newsletter, Volume XX

Teryl R. Roper, UW-Madison

\$1,200

The grant will be used to print and distribute ten issues of the CCM newsletter to all known Wisconsin cranberry Growers. Ocean Spray Cranberries, Cliffstar Corp. and Clement Pappas as well as the UW are providing additional support.

Cranberry Weather Forecasts

WSCGA

\$8,950

The association will continue to provide specialized weather forecasts for cranberry growers via a toll free telephone call and online at www.wiscran.org.

Brochure Printing

WSCGA

\$5,000

The grant will be used to print and distribute copies of the WSCGA Cranberry Activity Books, recipe brochure and 2006 harvest brochure.

Wisconsin State Fair Promotion Program

WSCGA \$15,000

The grant will be used to conduct a number of promotions at the 2006 Wisconsin State Fair in West Allis in August. Activities include daily cooking demonstrations, mascot participation in parades and appearances at booth, drops of cranberry products to media at fair, advertising in state fair program book and story pitches to media.

Cranberry Marketing – Paid Advertising Program

Milwaukee Brewer Radio Network

WSCGA \$25,500

Cranberry growers will continue to sponsor statewide radio broadcasts of Milwaukee Brewer Baseball. The promotion also includes Cranberry Night at Miller Park on July 28.

Harvest Communications Program

WSCGA \$47,000

The objectives for the project are to provide targeted media with information on cranberries, cranberry products and the health benefits of cranberry consumption. By conducting the fall media campaign the WSCGA is able to take advantage of the interest in harvest to promote the state’s largest fruit crop. Specific activities include sponsorship of a “Mr. Food” program to air nationally during Thanksgiving week as well as photo opportunities and story pitches to media throughout the region. News releases about the upcoming harvest are issued also.

New Display Boards

WSCGA \$12,000

The grant will be used by the association to develop a set of new displays for use at State Fair and various harvest festivals.

Stock Photos

WSCGA \$3,000

The funds will be used to purchase exclusive rights to a set of images for use by the industry in future promotions.

2007 Wisconsin Cranberry School

WCREF (*Wisconsin Cranberry Research & Education Foundation*) \$7,500

The WCB will provide funds to cover a portion of the costs associated with the annual two day educational program for Wisconsin growers.

Compendium of Blueberry, Cranberry and Ligonberry Diseases

Frank Caruso, U-Mass Cranberry Station \$1,000

The funds will be used provide support for a new edition of this important publication.

Manitowish Waters Cranberry Tours

Little Trout Lake Water Cooperative \$1,415

The grant will be used to support this education and promotion conducted by the Manitowish Waters Cranberry growers and the Manitowish Waters Chamber of Commerce.

Operations and Promotions

Cranberry Museum, Inc. – Wisconsin Cranberry Discovery Center \$10,000

The grant will be used to support the promotional and educational activities of the Discovery Center in Warrens.

TOTAL ANNUAL PROJECTS - WCB: \$137,565

Health Related Research

The Wisconsin Cranberry Board, Inc. continued its partnership with the Cranberry Institute to fund research to explore the health benefits of cranberry consumption.

<i>Jess Reed and Mark Cook</i> , University of Wisconsin - Madison Cranberry Proanthocyanidins, cyclooxygenase-2 inhibition and inflammation	\$25,000
<i>Dr. Walter Hopkins</i> , University of Wisconsin – Madison Chemoprevention of prostate inflammation and preneoplasia by cranberry proanthocyanidins	\$25,000
<i>Dr. Carlo Selmi</i> , University of California - Davis Effects of cranberry juice constituents on the antibody response to influenza vaccine in the elderly: a randomized controlled study (Canadian Cranberry Growers Association \$20,000)	\$ 26,000
<i>Dr. Helen Kim</i> , University of Alabama – Birmingham The molecular basis of the neuroprotective actions of cranberry (Cranberry Institute \$42,000)	\$ 20,000
<i>Dr. Rui Hai Liu</i> , Cornell University, Ithaca, NY Role of cranberries in the prevention of breast cancer (Canadian Cranberry Growers Association \$30,000 – Cranberry Institute: \$8,300)	-0-
<i>Dr. Catherine C. Neto</i> , University of Massachusetts - Dartmouth How do cranberry constituents regulate apoptosis and proliferation in models of prostate cancer? (Cranberry Institute: \$10,000)	-0-
TOTAL HEALTH RELATED PROJECTS - WCB:	\$96,000

WISCONSIN CRANBERRY BOARD, INC.

Statements of Financial Position Fiscal Year Ended August 31, 2006

ASSETS	
Cash	66,675
Other temporary investments	197,091
Interest Receivable	1,792
Assessments Receivable	<u>339</u>
TOTAL ASSETS	<u>\$ 265,897</u>
LIABILITIES AND NET ASSETS	
LIABILITIES	
Administrative Services Payable	\$ 14,109
Grants payable	<u>141,888</u>
Total Liabilities	155,997
NET ASSETS	
Unrestricted	<u>109,900</u>
TOTAL LIABILITIES AND NET ASSETS	<u>\$ 265,897</u>

Statement of Cash Flows Fiscal Year Ended August 31, 2006

CASH FLOWS FROM OPERATING ACTIVITIES	
Changes in net assets	\$ 21,479
Adjustments to reconcile changes in net assets to net cash used by operating activities:	
Effects of changes in operating assets and liabilities:	
Interest receivable	98
Assessment receivables	772
Administrative services payable	12,765
Grants payable	<u>(26,979)</u>
Net cash used by operating activities	8,135
CASH FLOWS FROM INVESTING ACTIVITIES	
Net (increase) decrease in investment in certificates of deposit	<u>(349)</u>
NET DECREASE IN CASH	7,786
CASH, BEGINNING OF YEAR	<u>58,889</u>
CASH, END OF YEAR	<u>\$ 66,675</u>

Statements of Activities Fiscal Year Ended August 31, 2006

UNRESTRICTED REVENUES	
Grower assessments	\$ 366,757
Interest income	<u>10,687</u>
Total Unrestricted Revenues	<u>377,444</u>
MANAGEMENT & GENERAL EXPENSES	
Administration – WSCGA	30,570
Administration - Dept of Ag	3,854
Audit and tax preparation fees	2,570
Meeting and miscellaneous	512
Refund to growers	292
Bonding	500
Office supplies	0
Printing and copying/typing	529
Post office box rent	40
Filing fee	10
Total management and general expenses	<u>38,877</u>
Excess of unrestricted revenues over expenses before grant disbursements	<u>\$ 338,567</u>
PROGRAM EXPENSES - GRANT DISBURSEMENTS	
Wis State Cranberry Growers Association	116,450
University of Wisconsin	107,067
Cranberry Institute	85,500
Bradley A. Majek – Rutgers University	16,000
Cranberry Museum, Inc.	10,000
Wis Cranberry Research & Education Foundation	7,500
Matt Lippert-UW Extension	800
Wis Academy of Sciences, Arts & Letters	<u>750</u>
Total program expenses – grant disbursements	<u>344,067</u>
(Deficit) excess of unrestricted revenues over expenses and grant disbursements	(5,500)
Decrease (increase in grants authorized but unpaid)	<u>26,979</u>
CHANGE IN UNRESTRICTED NET ASSETS	21,479
UNRESTRICTED NET ASSETS, BEGINNING OF YEAR	<u>88,421</u>
UNRESTRICTED NET ASSETS, END OF YEAR	<u>\$ 109,900</u>

SUMMARY OF SIGNIFICANT ACCOUNT POLICIES

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. Significant accounting policies followed by the Organization are presented below.

BASIS OF PRESENTATION

In accordance with generally accepted accounting principles, net assets and revenues, expenses, gains and losses are classified based on the existence or absence of donor-imposed restrictions. Accordingly, net assets of the Organization are classified and reported as follows:

Unrestricted net assets - Net assets that are not subject to donor-imposed stipulations. Designated unrestricted net assets are those assets set aside for specific purposes by the Board.

Temporarily restricted net assets - Net assets subject to donor-imposed stipulations that either expire by passage of time or can be fulfilled and removed by actions of the Organization pursuant to those stipulations. The Organization does not have any temporarily restricted net assets.

Permanently restricted net assets - Net assets subject to donor-imposed stipulations that they be maintained permanently by the Organization. The Organization does not have any permanently restricted net assets.

USE OF ESTIMATES IN PREPARING FINANCIAL STATEMENTS

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.

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, 2006.

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).

NOTES TO FINANCIAL STATEMENTS – AUGUST 31, 2006

Note 1 – Grants Payable

The following is a summary of grants authorized and payable at August 31, 2006:

University of Wisconsin research	\$ 83,973
Cranberry Institute research	48,000
Wisconsin Cranberry Research & Education Foundation	7,500
Little Trout Lake Water Co-op	1,415
Frank L. Caruso, University of Massachusetts	1,000
	<u>\$ 141,888</u>

Note 2 – Related Parties

During the year ended August 31, 2006, the Organization reported assessment revenue from board members of \$20,454. As of August 31, 2006, the organization was not owed anything from board members.

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

Annual Report