

WISCONSIN CRANBERRY BOARD, INC.

2006 PROGRESS 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 2005-06 fiscal year. These reports were presented to the WCB at or prior to the Budget Meeting on March 28, 2007. 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: Patricia McManus, UW Madison, Department of Plant Pathology

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

Objectives: (1) Evaluate efficacy and test use patterns of new pesticides and growth regulators; (2) Collect residue data according to IR-4 standards; (3) Pursue special registrations when justified.

Summary: The screening program conducted trials on both pre and post emergence herbicides and new formulations for an existing registration; four potential new bio fungicide candidates and 11 candidate insecticides.

Scouting Wisconsin Cranberries for Early Rot

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

Cooperators: Jack Perry, UW Madison, Eric Zeldin, UW Madison and Brent McCown, UW Madison

Objectives: (1) Scout newer cranberry beds in Wisconsin for symptoms and signs of early rot. (2) Identify pathogens associated with field samples.

Summary: Early rot in cranberry caused by the fungus *Phyllosticta vaccinii* was found in 2005 in association with plants that originated with the breeding programs at the UW Madison and Rutgers University. Early rot is a serious disease but one that is rare in Wisconsin. In 2006 plantings of 10 cultivars at 18 marshes were scouted for early rot in July and August. Two sites tested positive. At one site the plants were HyRed that had early rot in 2005. At the second site the infected plants were a new introduction from the Rutgers breeding program. The findings indicate that the fungus can over winter in Wisconsin and growers should be cautious as new propagation methods come into practice.

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. 2006-07 year: (1) Provide support for the commercial scale up of ‘HyRed’. (2) Further scale up and evaluation of the A-X15 selection. (3) Establishment and evaluation of second generation selections and new plantings of third generation progeny. (4) Continued field evaluation of tetraploid plots established previously and establishment of new large scale plots at new site.

Summary: (1) Commercial scale up of HyRed continued in 2006 both from mowed vines and transplants. Limited planting stock has required most growers to mow existing plantings to scale up. WARF developed a propagator’s license and issued at least one in 2006. That should allow more growers access to planting stock. (2) A-X15 is sibling of HyRed selected for large berry size. Plots were mowed in 2005 for planting a ¾ acre nurse bed. That will be used for further scale up in 2007. Plots should be suitable for fruiting evaluation in 2007.

(3) Second generation selections replanted in performance plots are still being established in 2006, initial evaluations are set to begin in 2007. A third generation cross between HyRed and a Grygleski selection were produced and planted. (4) Two tetraploid progeny were planted in 2003 in performance plots. Damage during harvest is one concern with the thicker stems. One selection showed better performance than the other in response to hand raking and vine damage. Fruit size continues to be larger than regular varieties. In 2006 the two progeny were planted in a 7,000 sq. ft. mini bed. Efforts will be made to improve pollination in this setting to provide a better test of performance when compared to conventional varieties. The planting also utilized gibberellic acid sprays to encourage runner formation. It provided increased stem elongation which did not lead to runner formation. This treatment did not appear to be effective in development of runner growth.

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, various Wisconsin cranberry growers.

Objectives: (1) To analyze irrigation water N inputs and their spatial pattern. (2) To determine if draining irrigation pipe after irrigation reduces excess vine growth. (3) To write up a standard protocol for ion exchange resin column tests for cranberry irrigation water N inputs, suitable for analytical labs working with growers

Summary: Ion exchange resin bags and columns were installed along irrigation systems on cooperator marshes. Analysis is ongoing but upright growth was significantly greater adjacent to joints and sprinkler heads than compared to other sites along irrigation pipe. Yields were not significantly different among sampling locations or between beds with different water sources. That may be due to other current season factors and will be studied over multiple seasons. Sources of water N were identified and highest in the spring collection period.

Canaries in Cranberries: weed population susceptibility to glyphosate

Principal Investigator: Jed Colquhoun, UW Madison

Objective: To manage the risk for potential herbicide resistance development by determining the susceptibility of common weed problems in cranberry marshes and surrounding areas to glyphosate.

Summary: Weed seeds were collected from about 20 cranberry marshes throughout the growing season. Seeds were collected from yellow loosestrife, goldenrod, barnyard grass and joeyweed in beds that had a history of glyphosate treatment and from surrounding areas that were not treated. The seeds were planted and then treated at various times with different rates of the herbicide. Data collection is underway with a targeted completion date of December 2007.

Determining the correct phosphorous rate for productive cranberries

Principal Investigators: Carolyn DeMoranville, UMass-Amherst Cranberry Research Station, Teryl R. Roper, UW 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

Extension Related to Cranberry Diseases and Disorders in Wisconsin

Project Coordinator: Patricia McManus, U W 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 2006. 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.

Compendium of Blueberry, Cranberry and Lingonberry Diseases

Project Coordinator: Frank Caruso, Rutgers University

Objectives: To revise and update the descriptions of diseases and other maladies that affect lowbush, highbush and rabbiteye blueberry, cranberry and lingonberry and to recommend management strategies for each disease. The discussion will include the casual agent, important information on the disease cycle and feature color photographs of the key symptoms as well as recommend control and prevention strategies.

Summary: Funding has been secured from a variety of groups. Approval was given in 2006 for the revisions by APS and review and work has begun. The first draft is due on September 30, 2007 with the targeted completion date October 31, 2008.

Manitowish Waters Cranberry Tours

Project Coordinator: Little Trout Lake Water Cooperative

Objective: To provide free educational tours of cranberry marshes in the Manitowish Waters area throughout the tourist season.

Summary: News releases announcing the season tours were sent across the area in May. 15 Friday tours were conducted with approximately 593 people participating. 800 people toured during the 2006 Cranberry Colorama.

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. The promotional activities included cooking demonstrations, the first annual Cranberry Blossom Tour day among others.

Future of Farming and Rural Life in Wisconsin

Project Coordinator: Wisconsin Academy of Sciences, Arts and Letters

Objectives: The mission of the project is to present target audiences with an engaging, fact based process that would stimulate thought, conversation and action on important issues in farming and rural life.

Summary: The first phase of the project involved six regional forums to educate diverse audiences and gather public input on the opportunities and constraints faced by rural communities specifically in relation to production agriculture, land use and conservation, the economic and social aspects of rural life, renewable energy and food systems. The second phase will include use of the public to develop policy recommendations to support efforts for vibrant rural communities.

Wisconsin Cranberry School - 2007

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 2007. The Wisconsin Cranberry School was held January 16-17 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 an emphasis on plant nutrition. Packets with relevant information were distributed to all attendees. Proceedings from the School are sent to all participants. The 2007 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”.

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 17,000 copies of the 2006 Fall Harvest brochure, printing of 14,900 copies of the new recipe brochure and 9,600 copies of the Cranberry Activity Books.

Wisconsin State Fair Promotion Program

Project Coordinator: Wisconsin State Cranberry Growers Association

Objectives: (1) To 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.

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 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.

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 initial effort was a news release on crop projections to peak media interest in the annual harvest. The second release focused on harvest getting underway across the state. WSCGA conducted a Media Day on the marsh in cooperation with the Wisconsin Chapter of the American Red Cross. The event offered reporters, photographers and videographers an opportunity to see harvest first hand and experience it from the air in a helicopter. Satellite feeds of harvest stories were picked up nationally. WSCGA worked with Mr. Food, a national syndicated program, to feature a segment on cranberries during Thanksgiving week. General harvest story pitches resulted in numerous local, state, regional and national stories. A story about a new piece of harvesting equipment invented by a grower was of great interest to media and resulted in a national story on the History Channel.

The fall communications efforts resulted in an estimated 13,000,000 impressions with an advertising value estimated at more than \$2,800,000.

New Display Boards

Project Coordinator: Wisconsin State Cranberry Growers Association

Objective: Create professional exhibits on cranberries to be used at State Fair, cranberry festivals and other venues.

Summary: The WSCGA Public Relations Committee interviewed vendors and selected Downing Display to create a new set of displays for the State Fair booth and other venues. Copy, graphics and design were reviewed and approved by the committee. The displays did debut at the 2006 State Fair, the Warrens and Eagle River Cranberry Festivals.

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 worked cooperatively with the USDA Cranberry Marketing Committee to retain a photographer and videographer who shot harvest photos and footage at the Media Day on the marsh. In addition a studio shoot was conducted in Milwaukee to feature products and models consuming them. The collection has been catalogued and assembled in an electronic format.

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 2006 projects totaling \$96,000 were funded by the WCB through the CI. The following are summaries of the reports of the projects funded by the partnership in 2006.

Cranberry Proanthocyanidins, cyclooxygenase-2 inhibition and inflammation

Principal Investigator: Jess D. Reed & Mark E. Cook, UW-Madison

Summary: COX-2 is induced in response to infection and tissue damage, leading to inflammation, and Celebrex and Vioxx, were introduced to promote its inhibition. However, these medications carry with them an increased risk of stroke and heart attack, and Vioxx has been withdrawn from the world market, and other products are under review. However, the present study indicates that cranberry may well inhibit COX-2 expression, but do so in a manner that does not carry the serious and negative side effects of the drugs. This study is ongoing.

Effects of cranberry juice constituents on the antibody response to influenza vaccine in the elderly: a randomized controlled study

Principal Investigator: Dr. Carlo Selmi, University of California-Davis

Summary: This study is designed to determine if daily consumption of cranberry can positively impact the positive effect of influenza vaccine in the older population. This is particularly important as our population ages, because it is recognized that vaccines are less effective as we age. The experimental design has been approved by the Internal Review Board at UC Davis. However, due to technical problems with cranberry juice and placebo delivery, the study was postponed by mutual agreement, to the Fall of 2007 for the next influenza season.

The molecular basis of the neuroprotective actions of cranberry

Principal Investigator: Dr. Helen Kim, University of Alabama-Birmingham

Summary: This is a very basic research study which attempts to assess how cranberry might work in the brain as an antioxidant, which could have an impact against Alzheimers Disease and other cognitive degenerations. The first part of the study was designed to develop methods to measure the effect of cranberry or any other material. This work has been completed, and the methodology is now available and is being published. The next steps of the study, now underway, are to administer cranberry to aged mice, determine which protein oxidations are affected using the new methods developed, and examine the mice brains to assess the effect of cranberry, and determine and report possible implications for human health.

Role of cranberries in the prevention of breast cancer

Principal Investigator: Dr. Rui Hai Liu, Cornell University

Summary: His results to date indicate that cranberry extracts significantly inhibit human breast cancer cell lines in model systems in a dose dependant manner. He has proposed a second study to the CI/WCB to continue this program in 2007.

Atherosclerosis Project, Cancer Projects

Principal Investigator: Dr. Catherine Neto, University of Massachusetts-Dartmouth

Summary: Cathy is currently working on two different project areas, atherosclerosis and cancer. In the atherosclerosis project, her co-investigator is currently conducting mice feeding trials using cranberry powder, and is seeing an effect at high and medium levels of cranberry, but not at lower levels. A determination of the level and prevention of damage to the blood vessels is now underway.

In the cancer area, cranberry materials were shown to reduce the formation of tumors in cell line studies, in a dose-dependant manner. These studies were highly significant and have been presented at a variety of scientific meetings in 2006, including the American Institute for Cancer Research, the American Society of Pharmacognosy, and the American Society for Cell Biology, and will be presented at the American Chemical Society meeting in March of 2007. She is also conducting research on prostate cancer, and has received partial matching grants from UMD to conduct this program.

Chemoprevention of prostate inflammation and preneoplasia by cranberry proanthocyanidins

Principal Investigator: Dr. Walter Hopkins, UW-Madison

Summary: In these studies with lab animals, there was a strong indication that cranberry PACs were effective in reducing both inflammation, and precancerous lesions in two of the three sections of the prostate gland, which is very encouraging. They are now planning to repeat these pilot studies with larger groups of mice to confirm these findings.