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STATE OF MICHIGAN
DEPARTMENT OF AGRICULTURE
AND RURAL DEVELOPMENT

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Agreement No. 12-25-B-0930
USDA SPECIALTY CROP BLOCK GRANT-Farm Bill - 2009
FINAL REPORT
June 13, 2011

PROJECT SUMMARIES

The projects in this report include:

- Select Michigan: Great Lakes-Great Earth Directory
 - Select Michigan: Direct Marketing Opportunities for Specialty Crop Producers and Businesses –
 - 1) Specialty Crop Farmers Markets
 - 2) Select Michigan Specialty Crop Pavilion at Michigan Grocers Association Trade Show
 - 3) Guide to Marketing Food & Ag
 - 4) Marketing Guide Outreach
 - 5) Meet the Buyer Sponsorship
 - 6) Wine Grape Grower Education
 - 7) Select Michigan Specialty Crop Pavilion at Domestic Trade Shows
(Associated Food & Petroleum Dealers Show, Michigan Restaurant Association Show)
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- Food Safety Education for Michigan's Specialty Crop Producers
 - Innovative Fruit Plantings: Keeping Michigan Fruit Producers Competitive by Establishing Research Plots Designed for 21st Century Production Needs
 - Increasing Agri-Tourism: Partnership Initiative between the Michigan Farm Marketing Agri-Tourism Association and Michigan Apples
 - Enhancing the Competitiveness of Michigan-Grown Christmas Trees through Promotion and Education
 - Testing for Acrylamide and Asparagine in Potatoes
 - Sustainable Nutrient and Water Management for Container Tree Production
 - Bringing Regional and National Expertise to Michigan for Education Program that will Enhance the Competitiveness of Vegetable Growers
 - Serving Underserved with Specialty Crops
 - Tart Cherries and the Battle of the Super Fruit

- Feeding the Farm to School Program in Southeast Michigan with Local Fruits and Vegetables
- New Apple Varieties Optimized for Michigan's Nutraceutical Industry
- State-wide Weed Control Initiative for Michigan Nursery and Landscape Industries
- Improving Carrot Quality and Yield through Strip-Tillage and Enhanced Carrot Stand Establishment
- Enhancing the Competitiveness of the Michigan's Fresh and Processed Asparagus Industries through Increased Promotion and Updated Information
- Assessment of "Narrow Row Technology" for the Michigan Dry Bean Industry
- Implementation of the Michigan Grape Grower Sustainability Assessment Workbook to Enhance the Competitiveness of the Michigan Grape Industries
- Increasing Michigan Fruit Purchases by Restaurateurs
- Improving Petunia Production Efficiency through Cultivar Selection and Development of Molecular Tools
- Michigan Pavilions for Specialty Crops at Domestic and International Trade Shows
- Regional Agri-Tourism Marketing Project
- Food Safety and Michigan Fruit & Asparagus Producers
- Come to the Michigan Table: Developing Michigan's Wine and Food Experiences as Contributors to Agriculture and Tourism Economies

PROJECT TITLE

► Select Michigan; Great Lakes - Great Earth Directory

PROJECT SUMMARY

The grant was used to facilitate the creation of an on-line and 80,000 printed directory for consumers searching for sources of Michigan flowers, bedding plants, ornamentals, Christmas trees, sod, and other plant materials. The Michigan Floriculture Growers Council (MFGC), Michigan Sod Growers, Michigan Landscape and Nursery Association and the Michigan Christmas Tree Association collaborated to coordinate a listing of their Michigan growers in the directory.

The purpose of the grant was to market Michigan grown products listed in the directory including: flower and bedding plants, Christmas trees, sod, nursery and other similar Michigan specialty grown crops. The purpose was to promote awareness, create new business, and increase sales of the Michigan grown specialty crops. As Michigan is very diverse in its agriculture production, it is important to educate and make aware to the Michigan consumer the diversity and availability for their purchase.

PROJECT APPROACH

The directory, modeled similarly to the collaboration of the Michigan Farm Market & Agri-Tourism Association directory, will impact the membership of four specialty crop associations. There are approximately 1,200 listings in the directory, with the possibility of additional listings that are Michigan growers, but not a member of the collaborating associations. The impact of increased sales of specialty grown products, awareness of product availability will ultimately create a stronger specialty crop industry.

The Michigan Floriculture Growers Council headed up the collaboration that researched, compiled data, designed, and produced the directory. Julian Vail, LLC, was under contract to produce the directory.

The Directory was designed to help consumers locate Michigan grown flowers, bedding plants, sod, Christmas Trees, and other plant materials. This work was conducted with the assistance of a planning committee consisting of the MDA, Michigan Christmas Tree Association, Michigan Landscape and Nursery Association, and the Michigan Sod Growers Association. Creation of the directory will enable us to increase our industry exposure as well as, our competitiveness in the rapidly expanding *Buy Local* movement.

Timeline – March 20, 2010, through May 15, 2010

- Provided database of membership
- Secured bids on directory printing and provided details of completed directory and a total of 80,000
- Promoted participation in the directory to growers, partners, and sponsors, developed, designed, and distributed flyers and sign-up materials
- Designed and created the directory with input from all members, information of four associations/ads, and those indicating interest in participation
- Completed printing of the directory
- Uploaded with software for “live” directory and placed on each associations website and the Michigan Department of Agriculture
- Mailed directories to each grower listed, the 13 Michigan Visitors Centers, libraries, and appropriate events

GOALS AND OUTCOMES ACHIEVED

Increase in sales to those listed in the directory:

The Michigan Floriculture Growers Council and the Michigan Nursery and Landscape Association, well into their 2010 sales season, listed growers/facilities reporting a positive response to the directory. The Michigan Christmas Tree Association began their sales season in November. Communication from the general public for additional copies remained steady and interest was high for obtaining a copy of the directory. The directory listed small and large growers, members and non-members of the three associations. A report of all surveys would be compiled upon completion of the Michigan Christmas Tree sales season and delivered to each association for review.

Increase in Membership to the three partnering associations:

The three associations partnering in this directory distribution have received new member applicants due to the communication and development of the Great Lakes Great Earth Directory. Members and non-members were invited to have their listing printed in the directory to grow the industry and the organizations. Not only have growers felt a value of the directory to increase sales, education, and promotion of their industry – but the value of partnering with similar agriculture organizations. The opportunity alone for communication on the creation of the directory and positive impact to the industry, created an increase in membership. The three associations have monitored their membership roles and documented an increase in memberships.

Consumer Education and Promotion Feedback:

The surveys received are extremely positive as to the value of the directory in marketing their products to new customers. The MFGC is compiling the survey data and will be providing the information to the participating groups. The final feedback on surveys will arrive at the close of the growing season for complete calculations.

The grant was revised to only allow specialty crop vendors. The website only promotes specialty crops but will list (not promote or highlight) non- specialty crop companies. Any non-specialty crop work will be reported and tied to another activity code in the EWARS (pay) system not funded by this grant.

BENEFICIARIES

The groups participating in this project were direct beneficiaries. The interaction and relationships that occurred during the information gathering were beneficial to all groups. Another beneficiary is the consumer who now has a resource available to them to select and determine where to locate/purchase Christmas trees, landscape and nursery products, sod and floriculture.

LESSONS LEARNED

It was determined as this project progressed that the need for this publication and industry collaboration was very much needed.

CONTACT PERSON

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ADDITIONAL INFORMATION

The link to the brochure/report: <http://greatlakesgreatearth.intuitwebsites.com>
The directory is also created in a live web version and available through the association websites [and http://greatlakesgreatearth.intuitwebsites.com/favicon.ico](http://greatlakesgreatearth.intuitwebsites.com/favicon.ico). This link is also available to all libraries in Michigan for their reference resources.
<http://www.mifgc.org/favicon.ico> - Michigan Floriculture Growers Council

PROJECT TITLE

Select Michigan Direct Marketing Opportunities for Specialty Crop Producers and Businesses

- 1) Specialty Crop Farmers Markets
- 2) Select Michigan Specialty Crop Pavilion at Michigan Grocers Association Trade Show
- 3) Guide to Marketing Food & Ag
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ACTIVITY 1 -

Select Michigan Specialty Crop Farmers Markets

PROJECT SUMMARY

The Michigan Department of Agriculture provided a \$2,000.00 grant to assist with the transitioning the management of the July and September Farmers Markets at the Capitol events from the Michigan Department of Agriculture (MDA) to Michigan Food and Farming Systems (MIFFS) and Michigan Farmers Market Association (MIFMA). MDA agreed to provide staff assistance in the transition from the previous market manager and volunteers to assist with loading and unloading for vendors the days of the markets. It was the obligation of the new hosts to manage the market and seek additional funds to cover the costs of running the markets. It was also understood that MDA would continue to partner with MIFFS and MIFMA to hold Farmers Markets at the Capitol in future years.

The MDA specialty crop block grant sponsorship was to cover staffing costs in the amount of \$2,000, \$1,000 for each event, during the transition of MDA transferring the markets to MIFFS/MIFMA. The Michigan Department of Agriculture ensured that Specialty Crop Block Grant funds were solely used for the competitiveness of specialty crop growers and/or producers. During the application process, if you were a specialty crop producer, you were guaranteed a place at the markets. The specialty crop producers were given additional market spaces at the markets in order to bring more attention to those products at the market. There were non-specialty crop producers that submitted applications that were not accepted to participate in the markets.

MIFFS spent \$8,058 on staff time to execute two farmers markets at the capitol, of that total amount; \$2,000 was used from MDA's specialty crop block grant. That amount represented just less than 25% of the total time that it took to plan, execute, and evaluate both markets. That \$2,000 represented staff time it took to recruit specialty crop producers, coordination of specialty crop producer needs for the events, communication to producers, and the evaluation detail that was needed for reporting purposes of the grant.

The purpose of the markets was to highlight the importance of fresh fruits and vegetables that can be found at the two Specialty Crop Farmers Markets on the capitol lawn in addition to the other 250+ farmers markets across the state of Michigan.

PROJECT APPROACH

Maggie Smith, a part-time employee with MIFMA/MIFFS, coordinated the two markets. She worked with a team of MIFFS and MIFMA staff to manage the events. In addition, all six staff people were involved for various activities from fundraising to EBT management at the markets. This team effort in cooperation with MDA staff assistance resulted in two successful events. The Governor toured the July Market and the Food Bank Council held it Harvest Kick-Off events for its fall food and fundraising campaign. In addition, the Lieutenant Governor toured the September market with the Chair of the Commission of Agriculture, Todd Regis.

To defray costs, vendors were charged for booth space and use of electricity if needed. In addition, MIFFS sought sponsorships and successfully attracted non-traditional event sponsors such as Independent Bank, Lansing Community College, and the Lansing Convention and Visitors Bureau. We expect to grow sponsorship in the coming years as we gained new sponsors just by sharing the summary data from the July market resulted in new sponsors for the September market.

MDA staff was a great help to us as we 'learned the ropes' of managing the markets. They also assisted with getting the Governor's office to attend, as well as helping at the market and getting media coverage. It was a great team effort; we look forward to working together again in 2011.

GOALS AND OUTCOMES ACHIEVED

Through the expertise of MIFMA and in partnership with the Lansing City Market, bridge cards were accepted by vendors at each market. We did a soft launch of the availability of EBT at the July market and had Supplemental Nutrition Assistance Program (SNAP) sales of \$297.00. This figure is comparable to at typical sales day at the Lansing City Market. This service was more highly publicized for the September market, and SNAP sales more than doubled to \$678.00. If the September market had been on a better weather day, the sales would have been higher still. All vendors were required to report their sales in order to be eligible to participate in future markets at the Capitol. The figures provided by vendors are likely to be conservative as vendors do not count their receipts at the market and typically complete the vendor survey and turn it in at the market. Both markets this year exceeded the reported vendor sales of the July 2009 market (\$34,692.00) at the \$46,649.00 in July and \$35,662.00 in September. The average sales per vendor in July exceeded the July 2009 figure while the September average sales per vendor were less.

Through the customer counts methodology we estimate 5,886 adult customers at the July Farmers Market and 3,480 adult customers at the September Farmers Market. While shopper numbers were lower at the September market, it is interesting to note that September average sales per shopper were higher at \$19.03 versus \$17.75 for the average of a July market shopper.

Another interesting note was the reason shoppers came to the market. For both markets the number one reason for coming to the market was to support Michigan farmers and businesses and the second reason (31%) was to purchase food items.

An estimated 9,400 shoppers participated in both markets and 10,000 cars passed by the market each day.

New audiences were reached by working with Lansing Community College and the Lansing Convention and Visitors Bureau.

Between the two markets there were SNAP sales of \$975.00.

BENEFICIARIES

Benefits to specialty crop vendors at both markets (47 vendors in July and 58 in September) total sales of \$82,000 (conservatively).

LESSONS LEARNED

The two events occurred on Thursday, July 22, 2010, a nice sunny day till the market ended, and Thursday, September 16, 2010, a rainy, overcast day that saw record rainfall before the scheduled close of the market. Through use of volunteers to count attendees and a dot survey at each market, we estimate there were nearly 6,000 shoppers at the July market and about 3,500 at the September market. We attribute the smaller number of participants in September to the rainy, overcast weather. For all practical purposes, the market closed when the rain started coming down about 1:00 p.m. The blessing of the rainy, overcast day is that we received more radio coverage as the radio announcers felt sorry for folks at the Farmers Market at the Capitol.

CONTACT PERSON

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ADDITIONAL INFORMATION

[http://www.michigan.gov/documents/mda/MIFFS -
Farmers Markets Final Report and Surveys 351977 7.PDF](http://www.michigan.gov/documents/mda/MIFFS_-_Farmers_Markets_Final_Report_and_Surveys_351977_7.PDF) - Report
[Michigan Food & Farming Systems - MIFFS](#)

A public-private partnership was established, which enabled MDA staff to organize, promote, and conduct two special Select Michigan Farmer's Markets during the 2010 growing season. Both markets were on the state capitol lawn in Lansing on weekdays. The goal of this element was to work toward privatizing both markets, increase interest and awareness of the importance of Michigan specialty crops and Farmers Markets, assist specialty crop vendors in increasing sales, and provide consumers with access to local fruits and vegetables.

The markets at the state capitol expanded on the successful 2009 special Farmers Markets that were funded by the 2008 Specialty Crop Block grant. It was expected that these markets would have the potential to reach approximately 100 individual specialty crop producers/companies and approximately 100,000 consumers of fresh and/or processed Michigan specialty crops. The markets and their specialty crop message will also continue to reach decision makers. At the July 2009 market, Michigan Governor, Jennifer Granholm shopped the market with Select Michigan staff and communicated the Select Michigan and specialty crop messages. A media advisory released by MDA that morning assured the market of excellent press coverage with several TV stations and the local newspaper in attendance.

Each year, staff has increased the vendor requirements as a learning tool which enabled them to more easily transition to a local farmers market. For 2009, participating vendors were required to have proof of general liability insurance and have proof of any food or plant materials licenses. The 2010 markets required that vendors comply with all new food safety requirements for Farmers' Markets. No grant funds assisted any first-time vendor in paying for their food or plant material license. Any non-specialty crop companies that participated were required to pay a market fee to cover parking, electricity, security, and trash receptacles, etc.

This grant application was submitted prior to the second market of the season being conducted and data on the September 2009 market is not yet available. However, the growth and exposure potential of these markets is expected to continue, and it has proven to be an excellent way of communicating messages surrounding Michigan specialty crops.

In order to conduct two farmers markets on the capital lawn, the project needed to take in additional revenue beyond the \$2,000 from the MDA specialty crop block grant sponsorship for the event. The two market events took in just over \$12,100 of revenue, \$2,000 came from MDA. The other revenue came from vendor fees and other sponsorships from agriculture and other community based organizations. The \$2,000 from MDA helped cover the staffing transition while the additional revenue that came from fees and other sponsorships that was used for additional staff time, travel, parking fees, electricity, promotional material, informational mailings, office supplies and capitol staff and facility fees- all items that it takes to put on the markets and promote Michigan's specialty crops. None of the funds were used for non-specialty crop companies for food or plant material licenses or parking, electricity, security or trash receptacles.

ACTIVITY 2 -

Select Michigan Specialty Crop Pavilion at Michigan Grocers Association Trade Show
Michigan Marketplace, September 14, 2010

PROJECT SUMMARY

MDA sponsored a Michigan Marketplace at the Michigan Grocers Show on Mackinaw Island on September 14, 2010.

The Michigan Department of Agriculture ensured that Specialty Crop Block Grant funds were solely used for the competitiveness of specialty crop growers and/or producers by introducing attendees to more Michigan specialty crop companies, and by teaching them the benefits of using their products. Increasing the awareness of buying fresh and locally grown specialty crops sparked interest in the attendees, which in turn created traffic in the Michigan Marketplace.

PROJECT APPROACH

Thirteen Michigan specialty crop companies, which exceeded the original goal of ten, made significant contact with attendees, as well as other exhibitors. Many of the companies expect to see sales growths from this event in the total estimated sales of \$20,500. Three non-specialty crop companies were charged the full rate for booth space at the MGA Trade Show. Specialty crop companies paid \$200.00 for priority/discounted booth space, while non-specialty crop companies paid the full \$475.00.

The most important objective desired by all companies was to have product and company exposure along with buyer contacts.

GOALS AND OUTCOMES ACHIEVED

Staff recruited Michigan specialty crop companies for this trade show to give them an opportunity for new growth in the retail sector. Recruiting was done through e-mails and phone calls from MDA to an extensive Michigan company database as well as, recruiting through Michigan Grape & Wine E-newsletter (copy in "additional information"). Staff organized the marketplace to be filled with 16 participating companies. Invoices and forms were compiled to prove participation. Event details were given to all exhibitors. Finally, evaluations were handed out to all exhibitors on the day of the show. Evaluation answers were compiled into a word document through open-ended questions and charts.

Staff sent out various e-mails regarding the show as well as calling companies from the Michigan companies' database. Michigan Grape & Wine also allowed staff to place a paragraph in their monthly E-newsletter to help promote to Michigan wineries. Show invoices, event information, and forms were sent to all exhibitors. The forms and payments were collected and used to pay for booths.

The goal was to bring in at least 10 or more companies that created a balance of 70% specialty crop and with half of them realizing sales or making significant contacts at the show.

Our long term outcome measure for this project is to increase the amount of specialty crop products sold in retail stores. This event gave us the chance to get the importance of using local specialty crops into retail stores and how it will benefit those retailers that sell these products.

BENEFICIARIES

The companies in the Michigan booths benefited greatly from the show as they received a total of 113 solid leads.

- Zeeland Food Services
- Shoreline Fruit
- Grand Traverse Distillery
- Brownwood Acres Foods, Inc.
- Randy's Granola
- Sassy Products, LLC
- Detroit Spice Co.
- Mountain Country Coffee
- P & K Private Stock BBQ Sauce
- Bur Oaks Farm LLC
- Morano Gourmet Spaghetti Sauce
- Better Made
- Bearboy Gourmet
- Smitty's Sauces & Seasonings from Hell, MI
- Janie's Cookies & Pastries
- Great Lakes Potato Chip Co.

Attendees at the show also benefited from the Michigan Marketplace as they found great Michigan specialty crop companies to purchase products from for their stores or distribution. This allows them to increase Michigan made products on their shelves, which will in turn increase track flow into their establishments.

The Michigan Grocers Show allowed these Michigan companies to see how much people want to buy locally and how important it is to our economy. The desire and need for more Michigan grown and processed food is increasing. This event was a great opportunity for Michigan companies to meet with grocers and supermarkets to get their foot in the door of more retail outlets.

LESSONS LEARNED

The majority of participating companies felt they gained "excellent" (19%) or "very good" (25%) exposure for this objective at the show. For buyer contacts the participants felt they received "excellent" (25%) or "very good" (50%). It was also determined that there continues to be an interest for this type of event by specialty crop producers.

CONTACT PERSON

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ADDITIONAL INFORMATION

Michigan Restaurant Association (MRA) and Michigan Grocers Association (MGA) Fall Trade Shows

The Michigan Department of Agriculture is coordinating pavilions of Michigan food and beverage companies at these shows in September and October. There will be a focus on Culinary Tourism at the MRA Show, with Claudia Tyagi hosting a panel discussion each day. Click for more information on: [MGA Show](#) (September on Mackinac Island) or [MRA Show](#) (October in Novi). Note that wine is considered a "specialty crop" and wineries are eligible for the discounted booth space rates.

ACTIVITY 3 -

Guide to Marketing Food & Agriculture Products

PROJECT SUMMARY

“Growing Michigan’s Future – A Guide to Marketing Your Michigan Food and Agriculture Products” was developed as a resource for Michigan farmers, processors, and distributors to learn about opportunities for marketing their specialty crop products and to learn from other entrepreneurs in the food and agriculture industry through examples of their successes.

Learning the ins and outs of marketing can be daunting to those just starting in the food and agriculture business and those expanding beyond their traditional farming operations. This guide, which focuses on specialty crop food and agriculture marketing opportunities, is meant to serve as a one-stop resource, and covers, among other things, market selection, food safety regulations, Good Agricultural Practices/ Good Handling Practices (GAP/GHP), licensing requirements, pricing, market development and federal, state and local resources available. This guide helps connect producers and companies who want to capitalize on the opportunities to start or expand their specialty crop businesses with the resources and tools they need to be successful.

Additional funding for this project allowed for the printing of 400 copies of the guide. CD copies of the guide were also developed and distributed in efforts to expand its reach and use. The distribution plan for these copies included meetings with the Michigan Department of Agriculture’s advertising agency, MDA staff’s attendance to industry conferences and meetings, and notification to industry related media. The guide has also been made available for statewide distribution via the Michigan Department of Agriculture’s website.

PROJECT APPROACH

MDA’s advertising agency, LKF, in addition to MDA staff, was tapped to assist in the creation of a distribution plan for the marketing guide. LKF created a contact card, in order to gather information to whom the marketing guide was being distributed to. LKF created CD copies of the marketing guide to allow for easier and additional distribution.

A list of industry related groups, organizations, events, and media was created in order to contact, in efforts to begin outreach for the distribution of the marketing guide.

Agricultural Schools

C. S. Mott Group for Sustainable Food Systems

Farm to School

Great Lakes Fruit, Vegetable and Farm Market Expo

Greenstone Farm Credit Services

Ingham County MSU Extension

Michigan Center for Sustainability

Michigan Christmas Tree Association

Michigan Department of Agriculture Facebook

Michigan Economic Development Center

Michigan Family Farms

Michigan Food & Farming Systems

Michigan State University Product Center

Muskegon Area Career Tech Center

Small Business Technology & Development Center

Industry trade shows and expos were attended, partner organizations were notified, and related media was contacted, all in efforts to promote the guide and increase the possible venues of distribution.

GOALS AND OUTCOMES ACHIEVED

The goal of this project was to create and distribute a marketing guide to Michigan producers, processors, distributors, local food groups, and those specialty crop producers interested in starting or expanding their local foods operations in Michigan and to help bring awareness to the diversity of Michigan's specialty crop industry.

To meet this goal, the guide was made available for statewide distribution as a PDF file and electronically via MDA's website and on partner organization websites. This goal has been achieved within the timeframe and budget outlined in the grant.

Four hundred copies of the guide were printed for distribution at industry conferences, to MDA staff who regularly work with Michigan food and agriculture businesses and to partner organizations.

The marketing guide has been marketed to the specialty crop industry by presenting the guide to many of the industry participants through education breakout sessions at the Great Lakes Fruit and Vegetable Expo, one of the nations largest industry shoes for the Specialty Crop industry. At the expo we offered a free copy of the guide on CD, with the completion of a contact card.

We also presented the guide at other industry in-state meetings and conferences, including: the Small Farms Conference, the Culinary Tourism Conference, the North West Orchard and Vineyard Show, the Family Farms Conference, the Northern Michigan Small Farm Conference and the Michigan Commission of Agriculture meeting.

We have notified our industry partners of the guide and the many ways it can be obtained, through the Web, a CD, and a printed hard copy.

Google analytics were applied to the guide's web page on November 8, 2010. (However, analytics were only tracked for a few weeks due to the migration to the new State of Michigan Internet content management system.) From November 8, 2010 to December 1, 2010 the marketing guide web page received 277 unique visitors and 452 page views, some of which were Google Search results. The marketing guide's web page ranking for specific search terms in Google were:

- ranked number one for Michigan Ag Marketing
- ranked number one for Michigan Food Marketing
- ranked number one for Michigan marketing guide (out of 8 million results)
- ranked number 18 for Michigan marketing (out of 30 million results)

The average time spent viewing the page was three minutes, which is a high average.

BENEFICIARIES

Michigan farmers, processors, distributors and food groups are the beneficiaries of this project as it has allowed for the creation of a marketing guide to help them learn about opportunities for marketing their specialty crop products and to learn from other entrepreneurs in the food and agriculture industry through examples of their successes.

MDA staff, MSU Product Center staff and others who serve as resources for people interested in starting or expanding a food and agriculture business in Michigan will also benefit from this one-stop guide when they seek to provide assistance to these businesses.

We have received many positive comments from producers/processors on the guide and how it is helpful to find all the information in one reference document.

To date, 248 of the 400 printed copies of the guide have been distributed, and 383 of the 500 CDs have been distributed.

LESSONS LEARNED

The vast interest of industry partners in the guide has taught us that this is a much needed tool for Michigan specialty crop producers and others who seek to start or expand their businesses in Michigan.

We have realized that periodic updates and revisions to the guide will be both necessary and beneficial as we continue to assist Michigan farmers, processors, distributors and food groups in their efforts to expand.

CONTACT PERSON

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ADDITIONAL INFORMATION

The guide and a PowerPoint presentation which was used to market the guide at various meetings and events can be found at [MDARD - MDARD Marketing Guide - Marketing Your Michigan Food and Agriculture Products](#); www.michigan.gov/mdamarketingguide.

MDA Press Release

MI Dept. of Agriculture Unveils New Guide for State's Budding Agri-entrepreneurs

Contact: [Heather Throne](#) 517-373-1085

October 25, 2010

Marketing guide is one-stop resource for agri-business expansion

October 27, 2010

LANSING, Mich. - The Michigan Department of Agriculture (MDA) today announced a new tool designed to assist those interested in starting or expanding a food and agriculture business in Michigan. "Growing Michigan's Future -- A Guide to Marketing Your Michigan Food and Agriculture Products" aims to serve as a one-stop resource guide to help expand and strengthen agri-businesses in the state.

"There are tremendous growth opportunities in Michigan's food and agriculture sector. The Guide is a comprehensive resource for producers, processors, distributors, local food groups and others interested in expanding and strengthening this economic sector," said MDA Director Don Koivisto. "It's meant to be a resource for all food-related businesses, regardless of size, production practices or the diversity of products."

In Michigan and across the nation, the landscape and culture of agriculture is changing. Customers are seeking not only diverse, farm-fresh foods but also a connection to the land on which it is grown. Small and medium-sized farms are on the rise; and growing food is not only happening in rural areas, but in gardens, greenhouses and farms in cities and suburbs.

"Michigan's food and agriculture production and processing markets, and associated businesses, are ripe for expansion. Increased consumer demand for locally grown and processed products, combined with a desire to reconnect with where food comes from as well as an increased focus on health and nutrition, provide opportunities for new and existing producers to succeed in the food and agriculture industry," said Koivisto. "And, with more than 200 commodities produced on a commercial basis in our state, Michigan's production resources give our farmers and processors the upper hand in local food production."

The guide, funded by U.S. Department of Agriculture Specialty Crop Block Grant funds, includes advice and resources for identifying marketing opportunities, selecting a market, creating a business plan and budget, and meeting regulatory requirements. The guide is available online at www.michigan.gov/mdamarketingguide.

For more information, contact MDA's Office of Agriculture Development at 517-241-2177.

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Food Digest Blurb

Marketing Guide Available for Michigan Food and Agriculture Businesses

A new tool designed to assist those interested in starting or expanding a food and agriculture business in Michigan is now available. "Growing Michigan's Future -- A Guide to Marketing Your Michigan Food and Agriculture Products" aims to serve as a one-stop resource guide to help expand and strengthen agri-businesses in the state.

The guide includes advice and resources for identifying marketing opportunities, selecting a market, creating a business plan and budget, and meeting regulatory requirements. The guide is available online at www.michigan.gov/mca/marketingguide.

Michigan Farmer Article

New guide available for budding entrepreneurs

THINKING of starting or expanding a food and agriculture business in Michigan? The Michigan Department of Agriculture is now offering a new one-stop resource guide to strengthen agribusiness in the state titled "Growing Michigan's Future — A Guide to Marketing Your Michigan Food and Agriculture Products."

"There are tremendous growth opportunities in Michigan's food and agriculture sector," says MDA Director Don Koivisto. "The Guide is a comprehensive resource for producers, processors, distributors, local food groups and others interested in expanding and strengthening this economic sector. It's meant to be a resource for all food-related businesses, regardless of size, production practices or the diversity of products."

Connection to land

In Michigan and across the U.S., the landscape and culture of agriculture is changing. Customers are seeking not only diverse, farm-fresh foods, but also a connection to the land on which it is grown.

Small and medium-sized farms are on the rise, and growing food is not only happening in rural areas, but in gardens, greenhouses and farms in cities and suburbs.

Michigan's food and agriculture production and processing markets,

Key Points

- Guide for producers, distributors, local food groups, processors and others.
- It has resources for marketing, creating business plan and meeting regulations.
- The guide is available online at www.michigan.gov/mdamarketingguide.

and associated businesses, are ripe for expansion. Increased consumer demand for locally grown and processed products, combined with a desire to reconnect with where food comes from, as well as an increased focus on health and nutrition, provide opportunities for new and existing producers to succeed in the food and agriculture industry," says Koivisto. "And with more than 200 commodities produced on a commercial basis in our state, Michigan's production resources give our farmers and processors the upper hand in local food production."

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For more information, contact MDA's Office of Agriculture Development at 517-241-2177.



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ACTIVITY 4 - Marketing Guide Outreach

PROJECT SUMMARY

Seminars, webinars and follow-up with individuals who have received a copy of the guide were among the anticipated activities. Financial support with SCBG dollars supported the costs of reproducing the Guide on CDs to be distributed at meetings, creating a Powerpoint presentation to present the Marketing Guide to stakeholders, and developing an outreach plan with MDA's creative agency. Educational activities using the Marketing Guide are critical to improving the competitiveness of Michigan's specialty crop producers.

While photos of cows and pancakes (maple syrup) were used in the guide, these photos purely illustrate the diversity of Michigan agriculture and demonstrate to the reader the interconnectivity of all related products. No outside funding was used to support the Guide.

PROJECT APPROACH

Additional funding for this project allowed for the printing of 400 copies of the guide. CD copies of the guide were also developed and distributed in efforts to expand its reach and use. The distribution plan for these copies included meetings with the Michigan Department of Agriculture's advertising agency, MDA staff's attendance to industry conferences and meetings, and notification to industry related media. The guide has also been made available for statewide distribution via the Michigan Department of Agriculture's website.

Outreach activities included seminars, webinars and follow-up with individuals who have received a copy of the guide. Financial support with SCBG dollars supported the costs of reproducing the Guide on CDs that are being distributed at meetings. A Powerpoint presentation has been completed and is being used to introduce the Marketing Guide to stakeholders. Educational activities using the Marketing Guide are critical to improving the competitiveness of Michigan's specialty crop producers.

GOALS AND OUTCOMES ACHIEVED

The guide was made available for statewide distribution as a PDF file and electronically via MDA's website and on partner organization websites. This goal has been achieved within the timeframe and budget outlined in the grant. Four hundred copies of the guide were printed for distribution at industry conferences, to MDA staff who regularly work with Michigan food and agriculture businesses and to partner organizations.

The marketing guide has been marketed to the specialty crop industry by presenting the guide to many of the industry participants through education breakout sessions at the Great Lakes Fruit and Vegetable Expo, one of the nations largest industry shows for the Specialty Crop industry. At the expo we offered a free copy of the guide on CD, with the completion of a contact card.

We also presented the guide at other industry in-state meetings and conferences, including: the Small Farms Conference, the Culinary Tourism Conference, the North West Orchard and Vineyard Show, the Family Farms Conference, the Northern Michigan Small Farm Conference and the Michigan Commission of Agriculture meeting.

We have notified our industry partners of the guide and the many ways it can be obtained, through the Web, a CD, and a printed hard copy. To date, over 250 of the 400 printed copies of the guide have been distributed, and nearly 400 of the 500 CDs have been distributed.

The Michigan Department of Agriculture & Rural Development will continue to assist in the education of over 500 growers and processors in developing markets for their products, using the Marketing Guide as a resource tool until all supplies are exhausted.

BENEFICIARIES

Distribution and promotion of the Guide to Marketing Food and Agriculture Products in Michigan enhanced the competitiveness of specialty crops in Michigan by providing resources to those specialty crop producers on marketing, development, licensing, food safety and other tools that they need to access in order to be successful.

LESSONS LEARNED

The Michigan Department of Agriculture & Rural Development will continue to assist in the education of over 500 growers and processors in developing markets for their products, using the Marketing Guide as a resource tool.

CONTACT PERSON

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Michigan Department of Agriculture & Rural Development
517-373-2469
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ADDITIONAL INFORMATION

[Marketing guidepresentationfinal](http://www.slideshare.net/andorferb/marketing-guidepresentationfinal); **<http://www.slideshare.net/andorferb/marketing-guidepresentationfinal>**

The guide can be found at **[MDARD - MDARD Marketing Guide - Marketing Your Michigan Food and Agriculture Products](http://michigan.gov/mda/0,1607,7-125-1570-244681--,00.html)**. <http://michigan.gov/mda/0,1607,7-125-1570-244681--,00.html>

ACTIVITY 5 -

2010 Meet the Buyers Sponsorship

PROJECT SUMMARY

The Meet the Buyers Event was held December 7, 2010, in Grand Rapids Michigan in conjunction with the Great Lakes Fruit, Vegetable and Farm Market Expo. MDA gave a sponsorship to Michigan Integrated Food & Farming Systems (MIFFS) to assist them in conducting this project. The reception works to connect Michigan specialty crop producers of fresh fruits and vegetables with Michigan produce buyers from supermarkets, restaurants, universities and various other institutions that are looking for more regional products.

PROJECT APPROACH

MIFFS put together project partners and a project team to help plan and implement the activity. MIFFS set a time line for how and when various aspects of the project would be conducted. Below is a chart outlining the scope of activities and how the project was approached.

Project Partners:

Michigan Department of Agriculture (MDA); Michigan State University Product Center-(MSU-PC)

Michigan Food and Farming Systems-(MIFFS); Michigan State University Extension-(MSUE);
Michigan Vegetable Council (MVC)

Project Team: Elaine Brown, MIFFS; Tom Kalchik, MSU-PC & MSUE; Scott Corrin-MIFFS; Emily Beutel-MIFFS; Dave Smith-MVC; Jamie Zmiko-Somers, MDA

SCOPE OF ACTIVITIES

Activity	Date
Organize a planning committee for the December 7, 2010 event. The following organizations have agreed to serve on the planning committee: Michigan Food and Farming Systems MSU Product Center Michigan Vegetable Council Meijer Stores Michigan Department of Agriculture	July 2010
Planning for the 2010 Meet the Buyers Event	July to December 2010
Save the Date email sent to buyers	September 2010
Amway facility booked for the event.	August 2010
Committee developed buyers and possible sponsor lists	September 2010
Mailing sent to buyers	October 2010
Phone calls made to follow up with buyers	October & November 2010
Mailing sent to potential sponsors	October 2010
Save the Date e-mailing sent to MDA Commodity Exec List	October 2010
Post card mailing sent to farmer list	November 12, 2010
E-mail blast sent from MIFFS 1. Farmer List in Value Chain Folder 2. MIFFS List serve 3. MIFMA List serve 4. Market Maker List- Tom K 5. Commodity Execs 6. MDA 7. Sponsors 8. Farm Bureau	November 23, 2010
Second E-mail blast sent from MIFFS	1 week before event
Phone calls made to farmers, if needed	Late November & Early December 2010
Email to Buyers with information on the event- sample on file	1 week before event
Printing of signs and programs for event	1 week before event
Printing of Name tags for Sponsors and Buyers	1 week before event
2010 Meet the Buyers Event	December 7, 2010

GOALS AND OUTCOMES ACHIEVED

Specialty crop producers in Michigan have a significant, but underutilized, opportunity to sell their products to consumers in the greater Midwest. Michigan has a large base of fruit and vegetable producers, though relatively few are tapping into the growing market for local produce.

This opportunity comes amid important changes within the Michigan produce industry. Competition from low-cost, foreign or out of region industrial-scale producers is cutting prices, sales and revenue for many mid-scale, independent farmers in Michigan who have traditionally sold their products as commodities to food manufacturers. Supermarkets, restaurants, universities, and other institutions looking for a more differentiated product mix represent a major opportunity for these producers.

MIFFS, MDA, MSU-PC, MVC, and MSUE came together in the summer of 2010 to plan the fourth Meet the Buyers event and build upon the success of the previous events. The Dot survey we did for the event is based on the methodology from *Tools for Rapid Market Assessment* approach that developed by Dr. Larry Lev, professor of agricultural economics at Oregon State University. MIFFS has used this evaluation tool in the past in evaluating farmers markets across the state. A Dot survey is a simple but effective data collection method in which a limited number of questions are posted on easels and the farmer attendees indicate their responses using colorful, stick-on labels (“dots”). The Dot survey approach significantly increases both the number of farmers surveyed and the percentage who agree to participate. Consequently, this approach provides more accurate assessments of consumer preference and behavior. This system is well liked by the users and therefore adds to the event atmosphere.

One of the barriers that farmers encountered was not being able to find contacts with these institutions to start discussions about selling products to them. In response to this unmet opportunity; MIFFS, FamilyFarmed.org, and the Association of Family Farms came together in 2007 to plan the first Meet the Buyers event. The sole purpose of this event was to connect specialty crop producers and buyers of regional food. This first event was made possible through a grant from Wallace Center at Winrock International and other Michigan partners.

MIFFS had three Michigan State University (MSU) students help conduct the Dot survey during the Meet the Buyers event and the results were the following:

1. What is your primary reason for attending this event?

n= 105 responses

- | | | |
|----|------------------------------|--|
| a) | Meet a new buyer(s) | 41 most frequent response @ 39% |
| b) | Meet with current buyer(s) | 36 = 34% of respondents |
| c) | Network with other producers | 24 = 23% of Respondents |
| d) | Make a deal with a buyer | 4 = 3.8 % |

2. How many buyers do you intend to meet today?

n=79

- | | | |
|----|---------------|--------------------------------|
| a. | None | 5 = 6.3% |
| b. | 1-2 | 30 = 38% |
| c. | 3-5 | 39 most responses @ 49% |
| d. | All 16 buyers | 4 = 5% |

3. After attending last year, what was the impact on your sales to these buyers?

n = 74 total responses

- | | | |
|----|--------------------------|--------------------------------------|
| a. | Did not attend last year | 50 = 68% first time attendees |
| b. | No increase | 4 = 5.4% |
| c. | 1-5% increase | 14 = 19% |
| d. | 6-10% increase | 6 = 8.1 % |
| e. | 11% plus increase | 2 = 2.7 % |

So (22) 30% of respondents saw an increase in sales which they attributed to attending this event.

4. My farm food safety plan is:

n = 68 total responses

- | | | |
|----|---|-----------------|
| a. | Not started | 7 = 10% |
| b. | A work in progress | 31 = 46% |
| c. | Certified this year by an auditor | 4 = 6% |
| d. | Certified annually for the past two or more years | 26 = 38% |

So (30) 44% of respondents have a certified food safety plan and (31) 46% are working on a food safety plan.

ATTENDANCE AND SUPPORT

The 2010 event drew more produce buyers this year, and those companies include: Superior Sales, Spartan Stores, Eastern Market Corporation, Sysco-Grand Rapids, Meijer, Mike Pirrone Produce,

Southeastern Michigan Local Food Hub, Miedema Produce Inc, Goodness Greeness, Cherry Capital Foods, Chicago Public Schools/FamilyFarmed.org, US Foodservice-Detroit, Walsma & Lyons and Whole Foods.

As part of this year's event, we had the MSU students conduct an attendance count based on Dr. Lev's methodology as described in the *Tools for Rapid Market Assessment*. The event is conducted during a two hour period and we had a student do a sample 15 minute count each hour. We then multiplied that count by four to get an estimated count for the hour.

Attendee Count:	first hour count 4:45- 5 p.m. 47 entered X 4 =	188
	*2nd hour count 5:45- 6 p.m. 15 X 4 =	60
	At a minimum	248 attendees

* Counter indicated that a rush had entered the room before he began the count period. Some people also entered through the lower level doors.

With Buyers (39), sponsors (6) and staff (9) a min. of 304 participants

The Meet the Buyers reception was sponsored by MIFFS, MDA, MSU-PC, MSUE, Great Lakes Fruit, Vegetable and Farm Market Expo , USDA-Rural Development, C.S. Mott Chair of Sustainable Agriculture at Michigan State University, Greenstone Farm Credit Services, Michigan Apple Committee, Originz, Michigan Blueberry Growers Association, Superior Sales, Meijer, Miedema Produce, Goodness Greeness, Eastern Market Corporation, US Foodservice-Detroit, Walsma & Lyons, Sysco-Grand Rapids, and Whole Foods.

BENEFICIARIES

According to attendee counts, approximately 248 Michigan specialty crop producers attended the event.

Farmer Testimonials:

Patrick McGuire

Royal Farms, Ellsworth, MI - Sweet Cherries, Cherries, Apples, and Peaches (20 acres). *"Our farm has attended this event all four times. This event has introduced us to buyers that for instanced have purchase our entire apple crop. If it was not for this event, I would have had to find these buyers the old fashion way. Lots of phone calls and hope someone would return our call."*

Ted Wanless

Great Lakes Produce, Niles, MI - Sweet Corn, Pumpkins, Sweet Potatoes, Peas, Green Beans and Apples *"This event allows us good access to local buyers without having to travel to various locations. It is a positive to us and works within our budget to make some great contacts. If not for this event we would have to go out to beat the bushes, travel, and making cold call phone calls. This is a positive event for us."*

Doug VanDyk

VanDyk Farms, Imlay City, MI – Lettuce *"This is the first year that we have attended this event and we are hoping to make some contacts for our farm. If it was not for this event, we are not sure how many of these companies would give us time to talk about our products. With this reception, it allows us the access and time to talk to buyers in one location."*

Buyer Testimonials:

Adam Mitchell - Whole Foods *"The Meet the Buyers event is very important to us. The fact that it is running alongside the Expo, makes it all the more attended and valuable. We continue to meet new growers there, as well as strengthen our relationships with existing growers. This year, our booth was so busy that we barely had time to exchange business cards and dialogue briefly with plans for follow up calls and discussions; so we could attend to all of the growers stopping by our booth. We have made many contacts that have proven fruitful for us, at the event. The produce that we purchase from farmers we have met through the event is sold not only in our Michigan stores but some of it also supplies our*

other 28 stores in our Midwest region. We appreciate the work that you and your team put into it. Looking forward to next year.”

Scott Calandra - Meijer Stores “It is a nice event because we are able to reach out and interact with growers that might not have the time or know how to contact us. This event allowed us (Meijer) to put us out on display, and we are here to reach out and meet local growers. We get to meet growers and see what products are out there that may help us fulfill our needs. It is also nice to meet the growers that currently sell to us and put a face with a name.”

Susan Fancy - Southeast Michigan Local Food Hub “We are a new company that is emphasizing in Michigan local foods. We have a lot of institutional buyers/customers and I need farmers to help meet those needs. This event helped save me time finding farmers; otherwise I would be on the internet, list serves, and online databases looking and calling farmers.”

LESSONS LEARNED

Overall, this program was successful at providing new market opportunities, information, and access to produce buyers to Michigan’s specialty crop producers.

Evaluation efforts and this report document the Meet the Buyer reception success and opportunities for Michigan specialty crop producers. If funding is available, this event should continue so that Michigan’s specialty crop producers continue to have access to opportunities to make their operation more profitable. Recommendations for future events include:

- Earlier communication with buyers from institutions.
- Continue printing of the event program that includes the commodities that the institutions are looking for to make growers aware of their needs.
- Increase the number of aggregators for small producers to sell their produce to. The small producers may not be able to supply big box stores or wholesalers, but could provide product to these operations.
- Continue increasing the number of farmers attending the event through different marketing methods.
- Encourage specialty crop commodity committees’ staff attend the event and build relationships with the buyers.
- Invite institutional buyers (i.e. MSU, Grand Valley State University) to be buyers at the event.

CONTACT PERSON

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Ph: (517) 432-0712
miffs@msu.edu

ADDITIONAL INFORMATION

MIFFS report and survey information [http://www.michigan.gov/documents/mda/MIFFS - Farmers Markets Final Report and Surveys 351977 7.PDF](http://www.michigan.gov/documents/mda/MIFFS_-_Farmers_Markets_Final_Report_and_Surveys_351977_7.PDF).

Meet the Buyers Reception webpage [Michigan Food & Farming Systems - MIFFS: 2010 Meet the Buyers Reception on December 7](#)

ACTIVITY 6 -

Wine Grape Grower Education

PROJECT SUMMARY

The Michigan Grape and Wine Industry Council utilized Specialty Crop Block Grant funds to enhance four grower meetings to increase their effectiveness in communicating critical information to growers. This information is important in maintaining the competitiveness of the

Michigan wine grape industry as new technologies and science provide better tools for vineyard management.

1. NE- 1020 Meetings - Traverse City - Supported educational event for out of state speakers and travel support (hotel) for growers who needed to travel a distance to attend

2. Great Lakes Expo – Grand Rapids, MI – Dennis Rak – Double A Vineyards

3. Northwest Orchard and Vineyard Show – Acme – Supported out of state speaker – Kevin Ker

4. Grape School – Supported out of state speaker – Alan Landis

PROJECT APPROACH

Activity 1) NE-1020 Meetings – November 2010

A group of 30 Eastern U.S. viticulture researchers attended a meeting in November in Traverse City. It was a rare opportunity to have such a group travel to Michigan (at their own cost). Michigan State University seized this opportunity to offer a one day workshop to members of the wine grape industry of Michigan, at the conclusion of the meetings. (program attached)

Funds provided by SCBG were used to: Host one dinner event for the NE-1020 attendees - 35 people

Sponsor hotel expenses for five Council members and key leaders from the SW wine grape growing region, so that the industry workshop included discussion of growing practices from the main growing regions of the state.

GOALS AND OUTCOMES ACHIEVED

Michigan raised awareness of the quality of its wine industry to important academic figures working in viticulture research from across the U.S.

Wine grape growers from Southwest Michigan had the opportunity during the industry workshop to discuss the latest trends in the field of viticulture. The attendance to the event was limited to 100 people and the event was “sold out” a week prior to the meeting. By offering hotel accommodation to five people from other regions of the state, they made their decision to attend early enough to become pre-registered for the meeting.

Activity 2) Great Lakes Expo – Guest Speaker Honorarium – December 2010

At the annual Grape Industries Luncheon, a presentation on the “Clean Plant Network” occurred to educate 50 wine and juice grape growers on the importance of purchasing the highest quality nursery stock possible. Diseases latent in grapevines are a common problem in the industry that do not become apparent until years after the vines are planted.

Funds provided by SCBG were used to provide an honorarium to a speaker (Dennis Rak, Double A Vineyards, NY) to educate attendees about the Clean Plant Network, a USDA funded initiative to improve the health of new grapevine plantings.

Outcomes:

Michigan’s wine and juice grape growers gained increased awareness about the importance of carefully choosing a supplier of grape vine planting material. Selecting quality material will reduce grower costs and increase the quality and profitability of grape production.

Activity 3) Northwest Orchard and Vineyard Show – Guest Speaker - January 2011

The Horticulture Societies of NW Lower Michigan organized a regional orchard and vineyard show in January each year to provide education to growers in the area. Funds provided by SCBG were used to provide a sponsorship fee to the Horticultural Society to cover an honorarium for an out of state speaker.

Outcomes:

The presentations by the speakers educated the growers on ways to become more cost-competitive and quality-focused in their viticulture practices.

Activity 4) MSU Grape School - February 2011

Michigan State University planned a Grape School in February 2011 to educate grape growers about the latest technology in sprayer use.

Funds provided by SCBG were used to provide a sponsorship fee to Michigan State University to cover travel expenses for an out of state speaker who is a regional expert on sprayer technology.

Outcomes:

Michigan grape growers obtained needed educational programming on new sprayer technologies. The presentations by the speakers will helped growers be more cost-competitive and quality-focused in their viticulture practices.

This educational event provided Michigan's grape growers with vital information about the latest practices in viticulture.

BENEFICIARIES

The project benefits grape growers by providing educational opportunities that will enhance their competitiveness in the global wine industry.

LESSONS LEARNED

The project team has learned that Michigan wine grape growers are eager to obtain knowledge from the country's leading academic viticulturists.

CONTACT PERSON

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Michigan Grape and Wine Industry Council
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ADDITIONAL INFORMATION

Northwest Vineyard Show - <http://agbioresearch.msu.edu/nwmihort/fruitnws0111.pdf>

Great Lakes Fruit & Vegetable Expo Grape Summary -
<http://www.glexpo.com/summaries/2010summaries/Grape.pdf>

ACTIVITY 7 -

Select Michigan Specialty Crop Pavilion at Domestic Trade Shows (Associated Food & Petroleum Dealers Show, Michigan Restaurant Association Show)

PROJECT SUMMARY

MDA sponsored a Michigan Pavilion at the Associated Food & Petroleum Dealers (AFPD) Show in Novi on April 27 & 28, 2010. Staff recruited Michigan specialty crop companies for this trade show to give them an opportunity for new growth. Recruiting was done through e-mails from MDA to an extensive Michigan company database. Staff organized the pavilion to be filled with 10 participating companies. Invoices and forms were compiled to prove participation. Event details were given to all exhibitors. Finally, evaluations were e-mailed to all exhibitors after the show ended. Evaluation answers were compiled by survey monkey and placed into a word document through open-ended questions and charts.

The Michigan Department of Agriculture ensured that Specialty Crop Block Grant funds were solely used for the competitiveness of specialty crop growers and/or producers by offering them priority/discounted booth space for the show. Specialty crop participants were charged \$600.00 for a full booth space, while non-specialty crop participants paid the full booth space of \$900.00.

MDA sponsored a Michigan Pavilion at the Michigan Restaurant (MRA) Show in Novi on October 19 & 20, 2010. Staff recruited Michigan specialty crop companies for this trade show to give them an opportunity for new growth. Recruiting was done through e-mails and phone calls from MDA to an extensive Michigan company database as well as recruiting through Michigan Grape & Wine Newsletter. Staff organized the pavilion to be filled with 11 participating companies. Invoices and forms were compiled to prove participation. Event details were given to all exhibitors. Finally, evaluations were handed out to all exhibitors on the last day of the show. Evaluation answers were compiled into a word document through open-ended questions and charts.

Within the Michigan Pavilion was a Michigan Food & Wine Pairing booth hosted by Michigan Department of Agriculture and Michigan Grape & Wine Industry Council. A professional chef was hired to prepare meals made with Michigan Specialty crops and products from the participating companies in the Michigan Pavilion. Attendees were invited to attend the hourly meals to learn more about Michigan Specialty crops and Michigan wine. The pairing helped increase traffic to the Michigan Pavilion.

PROJECT APPROACH

AFPD Show - An e-mail and application was sent to encourage Michigan specialty companies to sign up for the Michigan Pavilion at the Associated Food & Petroleum Dealers Show. This e-mail was sent out to all companies in the database. Show invoices, event information, and forms were sent to all exhibitors. The forms and payments were collected and used to order electricity and tables needed by the exhibitors.

MRA Show - Staff sent out various e-mails regarding the show as well as calling companies from the Michigan companies' database. Michigan Grape & Wine also allowed staff to place a paragraph in their monthly newsletter to help promote to Michigan wineries. Show invoices, event information, and forms were sent to all exhibitors. The forms and payments were collected and used to pay for booths, order electricity and tables needed by the exhibitors.

GOALS AND OUTCOMES ACHIEVED

AFPD Show - The goal was to bring in at least seven or more companies that created a balance of 70% specialty crop and with half of them realizing sales or making significant contacts at the show.

The Michigan booths included 10 companies, eight of which were specialty crop companies (80%). All 10 companies made significant contacts with attendees as well as other exhibitors. Four of the companies were able to sell at the show and the sales totaled \$20,000. The majority (70%) of companies expect to see sales growths from this event in the total estimated sales of \$200,200.

This event introduced show attendees to more Michigan specialty crop companies, and taught them the benefits of using Michigan products. Increasing the awareness of buying locally grown and processed specialty crops sparked interest in the show attendees, which in turn created a highly trafficked Michigan Pavilion.

MRA Show - The goal was to bring in at least five or more companies that created a balance of above 60% specialty crop and with half of them realizing sales or making significant contacts at the show.

The Michigan booths included 11 companies, seven of which were specialty crop companies (64%). All 11 companies made significant contacts with attendees as well as other exhibitors and brokers at the show. The majority of the companies (73%) expect to see sales growths from this event in within the next six to 12 months.

This event introduced attendees to more Michigan specialty crop companies, and taught them the benefits of using their products on their menus. Increasing the awareness of buying fresh and locally grown specialty crops sparked interest in the attendees, which in turn created a highly trafficked Michigan Pavilion.

BENEFICIARIES

The companies in the Michigan booths benefited greatly from the show as they received a total of 167 solid leads. Some of the companies in the Michigan booths connected with other exhibitors at the show and found themselves distributors and packaging companies that will help their company grow.

The most important objectives desired by all companies were to have product/company exposure, and buyer contacts. The majority of participating companies felt they gained 50% of "excellent" exposure and 20% for "very good" exposure at the show. For buyer contacts, companies felt 30 % was "excellent and 10% was "very good" for the quality of contacts.

Attendees at the show also benefited from the Michigan Pavilion as they found great Michigan specialty crop companies to purchase their specialty and convenience stores. This allows them to sell the best Michigan products, which will in turn increase track flow into their establishments.

MRA Show - The companies in the Michigan booths benefited from the show as they received a total of 113 solid leads. Some of the companies in the Michigan booths connected with other exhibitors at the show and spoke with brokers to help expand their company reach and promote more growth.

Zeeland Food Services
 Big Moe's BBQ Sauce
 Grand Traverse Distillery
 McClure's Pickles
 Valentine Vodka
 Elena's

Sweetfire Salsa
 Microcide, Inc.
 Honee Bear Canning
 Patunia LargeBottom
 Randy's Granola/Simply Suzanne

The most important objective desired by all companies was to have product and company exposure. The majority of participating companies felt they gained "very good" (45%) or "excellent" (36%) exposure for this objective at the show, which is a combined total of 81% meeting their main objective. Attendees at the show also benefited from the Michigan Pavilion as they found great Michigan specialty crop companies to purchase their menu items from. This allows them to have the freshest Michigan grown or processed food for their menu, which will in turn increase track flow into their establishments as consumers are very interested in the eat local trend.

LESSONS LEARNED

AFPD Show - The Associated Food & Petroleum Dealers Show allowed these Michigan companies to see how much people want to buy locally, and how important it is to our economy. The desire and need for more Michigan grown and processed food is increasing. The event was a great opportunity for Michigan companies to expose themselves to a retail market.

MRA Show - The Michigan Restaurant Show allowed these Michigan companies to see how much people want to buy locally, and how important it is to our economy. The desire and need for more Michigan grown and processed food on menus is increasing. Consumers desire more locally grown and process products to enhance their dish. Restaurants have noticed this trend and are trying to look for the best products to feature on their menu. This event was a great outlet to allow food service companies to find Michigan specialty crop companies for all their menu needs.

CONTACT PERSON

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 Promotional Agent
 Michigan Department of Agriculture
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janszj@michigan.gov

ADDITIONAL INFORMATION

MRA Show Seminars - [Michigan Restaurant Show - 2010;](http://mravideos.com/2010tradeshows/seminarschedule.html)
<http://mravideos.com/2010tradeshows/seminarschedule.html>

Press Release
 For Immediate Release
 May 17, 2010

Contact: Jennifer Holton, 517-241-2485
 or holtonj@michigan.gov

Michigan Pavilion at Associated Food & Petroleum Dealers Show

Novi, MI – The Michigan Department of Agriculture (MDA) held a Michigan Pavilion at the Associated Food & Petroleum Dealers (AFPD) Show on April 27 & 28 at Rock Financial Showplace. The Michigan Pavilion hosted ten local Michigan companies. These companies were able to meet with a wide variety of retailers, distributors, party stores, specialty stores, and bars/restaurants from the AFPD membership.

From participating in the show exhibitors made over 160 contacts and leads, while expecting an increase in combined total sales of \$200,200. The overall rating from exhibitors at this show was very good. About half of the companies felt that this show meet their objectives of buyer contacts, and product/company exposure.

Products from Traverse City to Laingsburg to Detroit were exhibited in the Michigan Pavilion including everything from Michigan cherries, honey, maple syrup, pickled products, and cherry vodka. MDA used funds from a USDA grant to help subsidize costs for this trade show, one of several underway for this year.

For information on the upcoming trade shows and events please contact Erin Groeb at 517-373-2469 or groebe@michigan.gov.

The Michigan Pavilion featured food and beverage exhibitors, including:

Marfood USA	Heeren Brothers Produce
Shoreline Fruit	Dough & Spice
Safie Specialty Foods	Farm Boy Flap Jacks
For Goodness Sake	MaMa C's Sweet & Sassy Sauce
Grand Traverse Distillery	The Blueberry Store

PROJECT TITLE

Food Safety Education for Michigan's Specialty Crop Producers

PROJECT SUMMARY

The objectives of the project are to:

1. Enhance the competitiveness of specialty crop producers by providing important and timely food safety education.
2. Assist farmers in expanding into new and existing specialty crop markets by providing them with information on the latest food safety research and trends so that they can make appropriate adjustments to their operation.
3. Provide introductory and advanced information and resources to specialty crop producers to support them in completing and implementing a Good Agricultural Practices and/or Good Handling Practices plan.

PROJECT APPROACH

In recent years, Michigan's fruit and vegetable producers have witnessed both an increased demand for their produce and a strong desire for increased food safety measures. The increased demand is largely due to growing consumer interest in purchasing food that is locally grown and interest from Michigan retailers and wholesalers working to source more local fruits and vegetables in order to reduce their transportation cost from shipping those products and to meet consumer demand for local food.

In the past year, Michigan Food and Farming Systems (MIFFS) has built on its partnerships with agencies and agriculture groups across Michigan to help farmers respond to the increased desire for food safety measures by teaching them to implement food safety plans on their farms and prepare for the food safety audits their buyers may require. Training materials were developed and six training sessions were conducted to aid in the educational process.

MIFFS worked closely with the following partners to conduct these training sessions: Michigan State University Product Center (MSU PC), Michigan State University Extension (MSUE), the Southwest Michigan Research and Extension Center (SWMREC), Detroit Eastern Market Corporation, the Michigan Farmers Market Association (MIFMA), and Michigan Department of Agriculture (MDA).

This report outlines the six training sessions that MIFFS conducted, shares the evaluation materials gathered at each and concludes by analyzing these evaluation materials to identify trends that will help shape future training sessions. Each training session included an overview of good agricultural practices (GAP) that outlined the importance of mitigating food safety risks on the farm and communicating a commitment to food safety to buyers and consumers via GAP certification. Each training session also highlighted different perspectives' related to food safety including growers, buyers and/or auditors. Finally, each session included an evaluation component that will be used to improve future sessions and identify further training needs.

The seven training sessions included a break-out session at the 2009 Great Lakes Fruit, Vegetable & Farm Market Expo, the 2010 Michigan Family Farms Conference, the Northern Michigan Small Farm Conference, and the 2010 Great Lakes Fruit, Vegetable & Farm Market Expo, as well as three day-long workshops held in Hart, Benton Harbor, and Detroit Michigan. Combined, these workshops reached 404 growers and over 18 educators. While demographics differed slightly at each session, the majority of growers reached were small producers who had little to no experience with GAP. Of the 120 growers who reported farm size, 45% farmed less than 25 acres and 62% farmed less than 100 acres. Of the 131 growers who attended MIFFS day-long GAP workshops, only 12 (9%) were GAP certified. A large number of beginning farmers were also reached with these training sessions. When asked, 35% of growers said they had less than 10 year of farming/gardening experience.

An analysis of evaluation materials shows that there is a need for continued GAP/GHP educational efforts. Evaluations call for more detailed workshops that help farmers write farm food safety plans and prepare for audits and for workshops that allow adequate time for specific questions and facilitated networking. Feedback shows that farmers appreciate hearing from individuals with first hand GAP experience, including growers and auditors, that they need help finding resources on the web, and that they need tools and resources that are scale appropriate. As educational efforts continue, it is also important to remain broadly focused on the areas that are common to all food safety standards (not to focus on one standard over another) and to emphasize that GAP audits are currently only industry driven and not federally mandated.

GOALS AND OUTCOMES ACHIEVED

This project will have several goals and outcomes.

1. Approximately 350 specialty crop producers will receive introductory or advanced training on farm food safety planning, Good Agricultural Practices, Good Handling Practices, and farm auditing. This training will enable them to more cost effectively develop food safety plans to meet audit requirements.
2. The work initiated with MDA and others in 2008 to bring information and training to specialty crop producers about food safety and auditing requirements will be leveraged and strengthened
3. Over 5000 specialty crop producers will have easy access to training materials on two websites for reference or to develop and/or refine their food safety plans.
4. Advanced food safety training materials will be developed and refined for future training sessions in 2011 and 2012 based on evaluation and feedback from farmers and farm audits.
5. Partnership across commodity groups, state agencies, MSU experts and farmers will be strengthened.

6. The long term viability of the specialty crop producers in Michigan will be enhanced to maintain and grow the \$1.3 billion generated annually. Since the start of the grant agreement, MIFFS along with the help of its partners, have conducted the following workshops:

December 10, 2009 at the Great Lakes Fruit, Vegetable, and Farm Market Expo in Grand Rapids, MI.

Session Title: Tricks of the Trade for Farmers Markets: Sharing What Works (Introductory Session) **Presenters:** Dru Montri, Michigan Farmers Market Association, Manager; **Attendees:** 70.

Januray 16, 2010 at the Michigan Family Farms Conference in Battle Creek, MI.

Session Title: Putting Together a Food Safety Plan for Your Farm (Introductory Session); **Presenters:** Phil Tocco, Michigan State University Extension; **Attendees:** 60.

January 30, 2010 at the Northern Michigan Small Farms Conference in Grayling, MI.

Session Title: Legislation, Laws, Regulations and What They May Mean to Your Farm - GAP Part 1 (Introductory Session); **Presenters:** Elaine Brown, Michigan Food and Farming Systems and Coleen Bess, Michigan Department of Agriculture; **Attendees:** 37.

February 2, 2010 at The Starting Block in Hart, MI.

Session Title: Advancing Good Agricultural & Good Handling Practices for Produce **Presenters:** Phil Tocco, Michigan State University Extension; Coleen Bess, Michigan Department of Agriculture; Juan Muinez, Primus Labs; Denis Jennish, Sysco-Grand Rapids; Steve Wright, Spartan Stores; Todd and Sara Greiner, Todd Greiner Farms; **Attendees:** 50.

February 9, 2010 at the Southwest Michigan Research and Education Center in Benton Harbor, MI.

Session Title: Advancing Good Agricultural & Good Handling Practices for Produce; **Presenters:** Phil Tocco, Michigan State University Extension; Coleen Bess, Michigan Department of Agriculture; Juan Muinez, Primus Labs; Jason Byrd, LH Piggott & Girls Farm, and Rodney Winkel, Winkel Farms; **Attendees:** 71.

February 16, 2010 at the Detroit Eastern Market in Detroit, MI.

Session Title: Advancing Good Agricultural & Good Handling Practices for Produce **Presenters:** Phil Tocco, Michigan State University Extension; Coleen Bess, Michigan Department of Agriculture; Beth VanDyk, VanDyk Farms; Diane DuRussel, DuRussel Potato Farms; and Denise Worton, Michigan Department of Corrections. **Attendees:** 51.

December 7, 2010 at the Great Lakes Fruit, Vegetable, and Farm Market Expo in Grand Rapids, MI

Session Title: Grower Experiences and Lessons Learned with Farm Food Safety Plans and GAP audits. **Presenters:** Elaine Brown, Michigan Food and Farming Systems, Bob McCully, Michigan Department of Agriculture, Beth VanDyk, VanDyk Farms in Imlay City, MI; Rodney Winkel, farmer from Watervliet, MI, Jason Byrd, farmer from Benton Harbor, MI. **Attendees:** 128.

The curriculum that was used for each of the sessions was developed using the USDA- Good Agricultural and Handling Practices (GAP or GHP) standards. The reason for using this standard is that it would be used as a baseline for any audit that a farmer might be required to do depending on what their customer required. Roughly 80% of all GAP audits are very similar and by using the USDA standards as a guideline, a farmer would only have to do minor

changes to their farm plan to meet a different GAP standard. The materials used in the sessions are entitled:

- Good Agricultural Practices- PowerPoint by Phil Tocco
- USDA Audit
- How to Comply With a Food Safety Audit by Primus
- Primus Food Safety Audit
- Good Agricultural Practices (GAP) and Good Handling Practices (GHP) Internet Resources
- Food Safety Auditors- By Tom Kalchik, MSU Product Center
- Checklist of Potential On-Farm Food Safety Risk- by MSUE
- Creating a Field Map with Google Maps-by MSUE
- Food Safety for Fruits and Vegetables- by Ohio State University Extension
- Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables- US Dept. of Health and Human Services
- Global Gap
- SQF 1000 code
- Wholesale Success manual-by Family Farmed.org
- Sample Audit developed by MSUE and Michigan Agriculture Commodity Marketing Association-Apple Division. (Not Attached)

MIFFS also created a web page on the MIFFS website that is dedicated to the material and videos that were taken during the three advance sessions. That material can be located at www.miffs.org/gapghp.asp. During the advanced sessions, we did ask a non-USDA GAP auditing firm to make a presentation to discuss their program and to give farmers and understanding that there were not many differences from the USDA audit. We also brought in retail/wholesale produce buyers to give their perspective of why they are asking for audits, giving farmers insight to their concerns, and a dialog with the growers of their concerns with the audits.

MIFFS Specialty Crop Block Grant - Proposed Work Plan

Tasks	Responsibility	Completed by
Meeting of MIFFS staff and grant partners to review project plans, responsibilities, and confirm dates for the seven meetings.	Elaine Brown Scott Corrin	Completed
Contact potential advisory team members and set the date for the advisory team meeting.	Elaine Brown	Completed
Work with the MI Family Farms Conference and Northern MI Small Farms Conference to plan an introductory session.	Scott Corrin	Completed
Conduct Advisory team strategic planning meeting.	Elaine Brown	Completed
Secure locations and dates for three advanced sessions.	Elaine Brown Scott Corrin	Completed
Create a promotional flyer that can be distributed at the Great Lakes Fruit, Vegetable, and Farm Market Expo (GL Expo), Michigan Family Farms	Emily Beutel	Completed
Conference, and the Northern Michigan Small Farms Conference, and selected MSUE County offices to promote the advanced training sessions. Make training material available on MIFFS and MIFMA web pages & publicity.	Emily Beutel	Completed

Develop curriculums for three introductory sessions, three advance sessions, and one enhanced session.	Elaine Brown MSU PC	Completed
Work with the Michigan Farmers Market Association (MIFMA) to incorporate the introductory curriculum into their session at the GL Expo.	Elaine Brown MSU PC MIFMA	Completed
Conduct introductory session at the GL Expo	Elaine Brown MSU PC MIFMA	Completed
Conduct introductory session at the Michigan Family Farms Conference	Elaine Brown Scott Corrin MSU PC	Completed
Conduct introductory session at the Northern Michigan Small Farms Conference	Elaine Brown Scott Corrin MSU PC	Completed
Conduct three advanced sessions at the following locations • Detroit Eastern Market • Northern Michigan or Southwest Michigan • The Starting Block, Hart	Elaine Brown Scott Corrin MSU PC MIFMA	Completed
Present an enhanced training session at the GL Expo based on a season of audits and lessons learned from farmers and the first six training sessions.	Elaine Brown MSU PC MIFMA	Completed
Process project invoices and financial Reporting	Scott Corrin	Completed
Prepare grant reports	Elaine Brown Scott Corrin	Completed

Final Financial Report

Category	Budget	Interim Report Request	Final Report Request	Totals
Salaries and Fringes for three people	\$22,656.00	\$13,676.48	\$8979.52	\$22,656.00
Travel	\$2000.00	\$ 1,220.28	\$779.72	\$2000.00
Materials and Supplies	\$12,000.00	\$ 7,237.04	\$4762.96	\$12,000.00
Contracts	\$13,817.00	\$ 8,150.00	\$5667.00	\$13,817.00
Totals	\$50,473.00	\$30,283.80	\$20189.20	\$50,473.00

BENEFICIARIES

Approximately 460 attendees, which exceeded the goal of 350, participated in the introductory or advanced training on farm food safety planning, Good Agricultural Practices, Good Handling Practices, and farm auditing. The specialty crop attendees received training to enable them to more cost effectively develop food safety plans to meet audit requirements.

Over 5000 specialty crop producers will now have easy access to training materials on two websites for reference or to develop and/or refine their food safety plans.

LESSONS LEARNED

Per the evaluations, one of the most popular segments in the advanced classes, were the farmers that we brought in that currently have an USDA audit and shared their experiences going through the planning and audit process. These farmers shared their ideas on how to put the plan together, lessons learned, suggestions on how to put a plan together, and how it is a very important part of their business.

CONTACT PERSON

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ADDITIONAL INFORMATION

Included in the final report is the **GAP/GHP Trainings Evaluation Report for 2010 - http://www.michigan.gov/documents/mda/MIFFS_791N0200076_Final_Report_2010-12-20_342192_7.pdf**. This report includes the evaluations from each session along with observations and recommendations for future trainings.

PROJECT TITLE

Innovative Fruit Plantings: Keeping Michigan Fruit Producers Competitive by Establishing Research Plots Designed for 21st Century Production Needs

PROJECT SUMMARY

Bordered by the Great Lakes, Michigan's climate uniquely positions the state as the lead producer of perennial fruit crops in the Midwest, U.S.A. with an annual farm level value of \$314 million. The competitiveness of Michigan fruit production is largely dependent on growers' abilities to adapt to changes driven by technological innovation, regulatory policies and demands of local, national and global markets. It is research on experiment station farms that has allowed growers to adopt innovation without risk to commercial enterprises. To maintain this competitive edge, research plots need to reflect modern horticultural systems and agricultural technology. This project team established high density and other innovative research plantings of apple, cherry, grape, blueberry and peach at four MAES fruit experiment stations, providing optimal arenas for a multidisciplinary team of scientists to develop and deliver the ever evolving management tactics, strategies and tools that will keep MI fruit producers profitable. This project provided a unique collaborative opportunity for leveraging funds from federal and state governments, the IR-4 Program, the Michigan State Horticultural Society, targeted fruit industries and MAES to address a glaring need to update research plantings to reflect the current and future needs of Michigan's fruit producers.

PROJECT APPROACH

The project team proposed a 4-year work plan and budget to upgrade fruit plantings at Michigan Agricultural Experiment Stations and the MSU campus, but requested funding for the first year only, through this proposal. The team was notified on September 2, 2009 of its successful application for funding from the MDOA. The Michigan State University Contract and Grant Administration received project funds from the MDOA on January 15, 2010. Project team

members participated in planning meetings on September 30, 2009 and February 8, 2010. At these meetings adjustments were made to the 2009-2010 work plan to address two concerns, 1) higher than expected labor costs resulting from MSU budget cutbacks at the Clarksville Research Station (33% operating budget reduction), and 2) unavailability of some desired nursery stock for year 1 plantings. The revisions to the project work plan and budget are attached as appendices 1 (work plan) and 2 (budget). Changes to the year 1 work plan include:

- 1) Removal of plans for planting a 2ac vertical axe apple plot at Trevor Nichols Research Complex for disease and insect pest management trials from year 1; with plans to accomplish this planting in year 2.
- 2) Addition of a 1ac high-density sweet cherry planting at Clarksville Horticultural Experiment Station.
- 3) Increase size of the Southwest Michigan Research and Extension Center grape planting from 2 to 6 acres
- 4) Removal of 1ac organic wine grape planting at Clarksville Horticultural Experiment Station, with plans to accomplish this planting in year 2 or 3.
- 5) Include purchase of plants for 2ac blueberry planting at Trevor Nichols Research Complex in year 1.
- 6) Decrease number of peach trees to be planted at the Southwest Michigan Research and Extension Center from 600/ac to 300 trees per acre.

In addition to matching dollars previously committed to this project, a \$75,000 MSU Project GREEN grant was obtained in March 2010 to advance the development of Solid-Set Canopy Delivery spray system technologies for high density fruit tree orchards, such as those being established under the MDA Specialty Block grant at the MSU fruit research stations. Further leveraging of a three-year research grant for \$171,000 was obtained from the Ceres Trust to utilize the new research infrastructure being developed at the MSU Horticulture Teaching and Research Center (below).

GOALS AND OUTCOMES ACHIEVED

- In the *Goals and Outcomes Achieved* section, please share your preliminary research results. What have you found so far? Alternatively, you can simply report on the Expected Measurable Outcomes listed in your approved state plan. Specifically, please report on the following:
 - Annual measures of the number of new reduced-risk pesticides registered following the pesticide screening, the GLP field residue trial conducted on the proposed plantings (IR-4).
 - There have two new registered uses of reduced-risk pesticides for fruit crops since this project began, and the initiation of GLP field residue trials for eight new fruit pesticides resulting from the 2010 IR-4 Food Use Workshop's prioritization process. These plantings will support continued participation with the USDA IR-4 Project.
 - The data from pesticide performance trials will directly inform recommendations in MSU's Fruit Management Guide (E-154), which provides recommendations to fruit growers on pesticide selections and optimal use patterns for Integrated Pest Management. Please include referenced data.
 - Most plantings are still too young to be used for performance trials, but trial data are annually published in Arthropod Management Tests (<http://www.entsoc.org/Pubs/Periodicals/AMT>), and Fungicide & Nematicide Tests (<http://www.plantmanagementnetwork.org/pub/trial/fntests/>). The results of these trials are

the basis of the recommendations made in the Michigan Fruit Management Guide (E0154) (<http://web2.msue.msu.edu/bulletins2/product/2011-fruit-management-guide-1028.cfm>).

- Upon vineyard establishment, commercial Michigan juice grape growers will be surveyed annually to determine the number of farms and acreage utilizing vineyard design and/or vineyard mechanization strategies developed at SWMREC. Please include results of survey.
- Not yet completed.
- Measures of improved yield and quality in established apple, cherry, grape, blueberry and peach plots. Please include sample data.
- Plantings are still too young for yield measurements.
- Measures of improved yield and quality in blueberry protected with bird netting. Please include sample data.
- Plantings are still too young for yield measurements.
- Measures of improved yield and quality in high tunnel cherry and raspberry production. Please include sample data.
- Plantings are still too young for yield measurements.
- Measures of improved water application efficiency and precision from research plots fitted with modern irrigation systems. Please include sample data.
- There are no data available yet, but for several of the new plantings two lines of RAM tubing with emitters were installed every 24" and these lines connected to the main irrigation controller. Irrigation and fertigation trials will be conducted, and these planting will also serve as future demonstration plots for pruning and training systems.
- Evaluations on use of mobile platform and other mechanized equipment for labor efficiency of management practices (robotics, computer vision technology). Please include sample data.
- The money is set aside for purchase of a platform in Yr 3 for the Tall Spindle apple planting at CHES. Therefore, we do not have data because we have not purchased a platform yet.
- Evaluations of organic wine grape production strategies and tools, including variety comparisons for disease resistance, comparisons of two trellis system heights for effects on cold and disease management and pest management with organic compounds. Please include sample data.
- Planting are still too young for production strategy evaluations.

This project expanded and enhanced fruit plantings at Michigan Agricultural Experiment Stations (MAES) and the Horticulture Teaching and Research Center (HTRC) on the MSU campus. Modern high efficiency orchard and vineyard plantings and infrastructural technologies are necessary for research targeting implementation of new management strategies to keep the MI cherry, apple, grape, blueberry and peach industries profitable and competitive in markets from regional to international. Such research is critical for optimization of land and labor use as well as to advance more efficient harvest technologies and to obtain consistently profitable crop yields. Several new horticultural plantings at MAES research stations are critical to keep up

with testing needs for new rootstocks, varieties, technologies (production and harvest) and pest management strategies and tools. High tunnel fruit production is expanding across Europe, and preliminary MSU high tunnel fruit research at the SW MI Research and Extension Center (SWMREC) and the Clarkesville Horticultural Experiment Station (CHES) has confirmed a strong potential for MI conditions, with results that include higher fruit quality, more consistent yields, and less pesticide use for production of premium fresh market sweet cherries.

1. Expansion and enhancement of quality apple, grape, cherry, blueberry and peach plantings at MAES research stations
2. Determine the effectiveness of new management practices in these modern plantings

Trevor Nichols Research Complex (TNRC)

Balaton cherry orchard: The site preparation, planting and maintenance of a 2 acre Balaton cherry orchard for screening insecticides through the IR-4 Program was successfully completed in 2010.

Blueberry plot: Overhead irrigation was successfully installed and soil preparation and contouring of raised beds completed in the 2ac TNRC blueberry plot in 2010. Blueberry plants were planted in Fall 2010.

Apple orchard: Site preparation including tree removal, deep tilling, soil testing, and planting of rye cover crop was completed in 2010 for the 2ac vertical axe apple orchard to be established at the TNRC in 2011. Plans are set for planting trees in May of 2011.

Southwest Michigan Research and Extension Center (SWMREC)

Concord Grape Vineyard: This project is being conducted for the purpose of creating new production technology for the Concord juice grape. A 5-acre site at the MSU Southwest Michigan Research and Extension Center (SWMREC) was prepared for planting. Existing vegetation on the site was eliminated and Glyphosate-resistant soybeans were planted. Multiple applications of glyphosate were used to eradicate emerging perennials and annual weed populations. Soybean stubble was eliminated from the site in late fall.

Four thousand vines on five rootstocks were propagated. Concord scion wood was collected, treated to prevent storage molds, bundled and stored. Grafted vines of several rootstocks were propagated under contract with a commercial nursery. Own-rooted Concord vines were propagated at SWMREC.

Construction was begun on a prototype mechanical shoot positioner to be used in this project. The positioning heads were fabricated and construction of the framework for supporting and manipulating those heads is in progress. Completion of this unit is scheduled for initial field trials in June 2011.

Peach: The purpose of this project is to establish and train a peach orchard at the SWMREC for research and demonstration of mechanical blossom thinner equipment and techniques. The orchard will use four training systems, planted in two years, using six commercial peach and nectarine varieties. The two planting dates will make it easier to show tree training techniques during field day demonstrations.

The peach orchard site at SWMREC was chisel plowed and disked in preparation for planting in spring 2010 and 2011. Three peach varieties (PF28-007, PF Lucky 13, and Allstar) were established in 2010 in four training systems, palmette, spindle, Y, and open center, at tree and row spacing of 12' x 18', 5' x 18', 5' x 18' and 10' x 18', respectively. Two additional peach

rows, each with 25 trees, were established adjacent to this planting at 12' x 18' spacing for conducting additional palmette training and thinning trials. Initial tree training was done in spring 2010. Routine fertilizer, weed, insect and disease management, appropriate for a 1st year orchards, was conducted. A trickle irrigation system was installed and used as needed.

A second planting is planned for 2011 using the peach varieties PF24C and Messina, and the nectarine PF11. The trees have been ordered for early spring planting. This planting will have the same four training systems and tree spacing that were used in the 2010 planting. Initial bids have been secured from N.V. Bartlett, the North American distributor for the PT250 string thinner. Access to a tractor capable of operating the PT250 has been arranged. An educational session on mechanical string thinners will be part of a March 8th, 2011 spring peach meeting at the SW Research and Extension Center. Representatives from N.V Bartlett will attend and provide instruction on use of the PT250.

Blueberries: A bird exclusion structure was partly constructed over 0.5 acres of blueberries at the SWMREC. Posts were purchased and installed. Netting was purchased. Wire and the remaining posts will be in place for the 2011 harvest season. This site has extreme bird pressure due to the small size and proximity to woods.

Clarksville Horticultural Experiment Station (CHES)

High Density Tall Spindle Apple Orchard: Three acres of orchard was established in spring of 2010 with the focus on apples planted on dwarfing rootstocks and spaced 3 ft by 11 ft. The Tall Spindle protocol was implemented in training these trees in this initial year and a mound of soil was constructed on exposed rootstock shanks to avoid Dogwood Borer infestation. Trickle irrigation and a 4-wire trellis system were installed in the site by the end of the summer. The focus for the 2011 growing season will be on training in compliance with Tall Spindle protocols. The goal will be to develop trees that can accommodate mechanical and mechanical assist harvesting equipment, which will have multi-functional application, such as spraying and other routine tree maintenance work during the growing season.

Additionally, the plot will be used in a USDA Specialty Crops Research Initiative (SCRI) proposed research study "Development and Optimization of Solid-Set Canopy Delivery Systems for Resource-Efficient, Ecologically Sustainable Apple and Cherry Production. Trees were ordered from two nurseries, delivered in May and established in May and June at the Clarksville site. A total of 3300 trees (1100 trees of each of three varieties) were planted: Honeycrisp and "Rubinstar" Jonagold on Bud.9 dwarfing rootstock and "Crimson" Gala on M.9 NAKB 337.

Sweet Cherry: A one-acre site was deer-fenced and prepared (rows and irrigation system installed) at the CHES for a new NC140 regional research project on high density sweet cherry training systems, one of twelve cooperating sites in North America (19 in the US, 2 in Canada, 1 in Mexico). The one-acre site was planted to 14 rows of high-density Benton sweet cherries on three different dwarfing rootstocks (Gi5, Gi6, and Gi12) in spring 2010. Trellis posts and high tensile nylon wires were installed in summer 2010. Four state-of-the-art experimental cherry training systems are being developed: the Tall Spindle Axe (TSA), Kym Green Bush (KGB), Upright Fruiting Offshoots (UFO), and Super Slender Axe (SSA). There is a graduate student and a regional cooperative research project associated with this trial. Two smaller research trials were planted at the north-south ends of the plot: 1) three rows of Rainier sweet cherry trees trained to the UFO system, with the training system variables under study including trunk angle and height of training to the first trellis wire; and 2) two rows of Montmorency tart cherry trees trained to the UFO system, with the training system variables under study including trunk

angle. A two-year grant for ~\$13,000 was obtained from the International Fruit Tree Association to help establish this trial site (and the others across North America).

Northwest Michigan Horticultural Research Station (NWMHRS)

Irrigation/Fertigation Installations into an Experimental High Density Tart Cherry System: In spring of 2010, a high-density tart cherry orchard was planted at the Northwest Michigan Horticultural Research Station (NWMHRS) to investigate production efficiency, fruit quality, and harvest technologies for mechanically harvested tart cherries. High-density systems use dwarfing rootstocks for smaller, more compact trees. Dwarfing rootstocks have significantly smaller root systems, and therefore must receive supplemental water and nutrients to maximize potential.

Irrigation System Installation: Immediately after planting the high-density tart cherries, an irrigation system of a double line of RAM tubing was installed. Emitters are 24" apart and emit 0.42 gallons per hour. The system is automated, using two moisture sensors in the plot, and irrigation needs were based on rainfall and monthly recommendations. The method of watering was completed in two different ways due to an upgrade in the fertigation process. Prior to automation of the fertigation system, we watered the plot for one hour/day: water 15 min, inject fertilizer for 30 min., water for 15 min. After automation, we watered for 2.5 hours/day: water 60 min., inject fertilizer 60 min., and water 30 min. Table for Daily Water Use – see report in "additional information".

Fertigation System Installation: In late April before planting, fertilizer and lime were applied to the plot. Fertilizer (19-10-26) was applied at 400lb/acre (76lb actual N) and lime at 1 ton/acre. Once the irrigation system was installed, a 28-8-18 water-soluble fertilizer was injected 57 times from 26 May until 11 August. Each day, 1.4lb of total fertilizer was injected, which equates to 37.2lb of actual N/acre. Total N for the whole plot was 113.2lb/acre. The amounts of water and fertilizer applied were based on requirements of similar crops, such as sweet cherries. As this trial moves forward, water and nutrient can be adjusted to meet different seasonal demands, orchard maturity, and tree health, fruit size, and overall orchard vigor.

In addition to the irrigation/fertigation installation, MDA funds were spent on examining irrigation systems on high-density orchards in the region.

Entomology Planting – MSU Campus

Six Hundred and fifty, Crimson Crisp, on bud nine rootstock were planted at the Michigan State University Entomology farm located 0.5 miles west of the intersection of Collins and Dunkle Roads in November 2010. The planting was established in a 3-ac plot on a 5-foot by 14-foot tree x row spacing. Winter Banana was used as the pollinator and interspaced evenly throughout the orchard. The trees were 5/8" caliper and planted using a Jack Brown tree planter with unions 4 inches above the soil line. Trees were secured to 12.5 gauge galvanized wire on 6 inch treated posts. The entire orchard is enclosed by 8-foot high woven wire deer fencing, with an additional 1.5 feet of high tensile wire above the woven wire extending the protection to 10'. Soil mounding will be established in the spring to protect unions from dogwood borer infestation for the first 3-4 years of establishment, after which the soil will be removed to discourage scion rooting. White plastic spiral tree guards were installed around trunks to protect from rodent damage and winter injury. Trees were trained to a vertical axis by securing lower limbs below horizontal using UV resistant rubber tree training bands. No additional heading or pruning was necessary as trees arrived greatly feathered.

We anticipate that leaf and shoot grow will commence normally during 2011 and resident insect pests will be established naturally. Insect pests including mites, codling moth, oriental fruit

moth, and leafrollers will immigrate from nearby horticulture and plant pathology research orchards and can be supplemented by live releases from infested fruits and shoots obtained at other research sites. A moderate pathogen management program will be used to protect trees. Crimson Crisp has strong resistance to apple scab and is only moderately susceptible to fire blight. If deemed necessary, irrigation can be obtained by well risers located adjacent to the orchard on the entomology farm. Trees will also receive summer and fall training and pruning as necessary.

Horticulture Teaching and Research Center – MSU Campus

Raspberries and Cherries: A one acre high tunnel range at the Horticulture Teaching and research Center was constructed in 2009 and early 2010. Three bays were planted to raspberries in 2010 and treatments were started to compare organic nutrient management approaches, trellis designs and varieties. The first berries were harvested in the fall of 2010. These were marketed through the MSU Student Organic Farm. Drainage tile was installed in five of the bays to correct for land slope effects on surface water flow patterns and to reduce the future potential for cherry fruit cracking from excess soil water during rain events. Three bays will be planted to mixed stands of sweet cherries and raspberries in 2011, along with an organic apple nursery tree production experiment. These mixed tunnels, which were maintained in cover crops during 2010, will be used to study organic pest control objectives. The remaining three bays will be planted to sweet cherries in 2011. These bays were planted to various organic cover crop treatments in 2010 to test effects on tree establishment. Construction of automatic doors on the tunnel ends was begun during fall 2010 and will be completed by May 2011.

BENEFICIARIES

Areas of research to benefit from these new plantings includes: labor performance, machine assist technology, pest management, plant growth regulator research, vegetative & crop load control, precision planting, nutrition, machine adaptations, soil & water management, chemigation, frost susceptibility and control, harvest technology and canopy management.

LESSONS LEARNED

Michigan is the leading producer of fruit in the Midwest, with apples, blueberries, cherries, grapes and peaches grown on approximately 104,700 acres (3,400 farms), contributing a farm level value of \$313.8 million to Michigan's annual economy (MI Agricultural Statistics 2007-2008). Additionally, a viable fruit industry is also a major component of the high value tourism industry that draws people to visit or reside in Michigan. For example, the grape industry has a \$789.3M impact on the state of MI through its contributions to tourism, restaurants and labor ([http://www.michiganwines.com/docs/Industry/micheconimpact_execsum .pdf](http://www.michiganwines.com/docs/Industry/micheconimpact_execsum.pdf)). High property costs due to development pressure is a main driver of farmland conversion in MI. Coincidentally, prime fruit growing areas in MI are on the same highly sought and highly valued property near Lake Michigan. Thus, the continued presence of a fruit industry in MI is in direct competition with development interests. Michigan's fruit belt is ranked as some of the most development-threatened, high quality farmland in the U.S. (Sorensen *et al.* 1997).

Fruit industries are at risk from declining profitability, significant production challenges related to invasive pest species, global competition, restrictive regulations and the public's concern over pesticides and the environment. The trends in agriculture show a clear shift towards higher valued crops and management systems. Production costs are largely fixed on a per acre basis, and the ability to increase yield/acre can reduce production costs, significantly increasing profitability and stability of these industries. Concurrent development of rapidly evolving insect, disease and weed management programs and labor and fuel saving technologies in research

plots designed for 21st century production needs will further enable MI's fruit industries to remain competitive and viable contributors to Michigan's economy in the face of numerous challenges.

Additionally, the national IR-4 program serves as the primary avenue that new reduced-risk pesticides can be registered for specialty crops. The TNRC and HTRC are two of the few Good Laboratory Practices (GLP) compliant facilities in the state of Michigan capable of conducting the field residue trials needed for IR-4/EPA registration. It is also increasingly important to provide significant evidence of product performance before initiating IR-4 field residue trials. MSU's IR4 program on average helps retain 10 new reduced-risk pesticide registrations per year for MI fruit crops. The research and technology that will be delivered through the conduct of this project will put this industry on a profitable foundation and provide experimental data in support of new product registrations through the USDA IR-4 project.

CONTACT PERSON

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ADDITIONAL INFORMATION

[http://www.michigan.gov/documents/mda/MSU -
Innovative Fruit Plantings 791N0200077 353586 7.pdf](http://www.michigan.gov/documents/mda/MSU_-_Innovative_Fruit_Plantings_791N0200077_353586_7.pdf)

PROJECT TITLE

Increasing Agri-Tourism: Partnership Initiative between the Michigan Farm Marketing Agri-Tourism Association and Michigan Apples

PROJECT SUMMARY

This project allowed the Michigan Farm Market and Agri-Tourism Association (MIFMAT) to join the Michigan Apple Committee (MAC) to obtain a targeted distribution of the *Michigan Farm Market & Agricultural Tourism* directory. MAC has been developing a Check into Michigan Apples hotel apple program for the last three years.

The plan called for targeting hotel properties with more than 100 rooms located in all parts of Michigan. Joining forces, MI-FMAT and MAC and the state's hospitality industry could touch more potential agri-tourists coming to our state and help boost traffic to over 200 apple growing families who sell direct to the public.

PROJECT APPROACH

The overall goal of this grant was to create an autumn partnership with the Michigan Apple Committee (MAC) and Michigan Farm Marketing Agri-Tourism Association (MI-FMAT) to boost agri-tourism visibility for farm markets – most of which sell apples in fall – while increasing Michigan apple sales to hotel properties. The plan was to 1) create a unique tourist experience by prompting guests to visit a local farm market through a targeted distribution of Michigan Farm Market & Agricultural Tourism directories and billboard placements; 2) encourage hotel/motel properties that serve breakfast, cater or have restaurants to source local Michigan apples.

The four-year-old program had a record number of participants this year: 410 hotel properties. This represents a 37.5 percent increase over previous years. Boost in participation is due largely to newly-negotiated partnership roles with leading food service suppliers Sysco-Grand Rapids, US Foodservice and Van Eerden Produce. These companies are distributing the

apple/market directory packets to properties with over 20 rooms and a food service operation. Both US Foodservice and Van Eerden are new to the program. Commitment by all three foodservice organizations is unprecedented for Michigan associations and commodity groups, and was based on a successful track record. Meetings between Sysco and MAC in Fall 2010 were very positive, indicating the program will be even stronger in Fall 2011.

MI-FMAT distributed an additional 6,000 directories through this program directly to the tourists at hotel/motel properties in the state, above previous numbers. Typically, distribution of MI-FMAT directories has been at Michigan Welcome Centers, Farm Bureau insurance offices, Michigan Department of Agriculture, Michigan State University Extension offices and legislative offices, with a total annual distribution of 80,000. MI-FMAT also provided each business 25 copies for their own use to promote their farm market/farmers' market.



Billboards purchased for the program this year were located along US 31 from Traverse City to South Haven. A total of 11 billboards were purchased with the grant for display September 6th through October 3rd, 2010. The billboards listed two websites and promoted four different fall crops at on-farm markets.

New this year: MAC exhibited at the Pure Michigan Governor's Conference on Mackinac Island in an effort to boost hotel participation in the program. A postcard was mailed prior to the conference to remind hotel/motel properties to stop by the booth and sign up for the program. Email recruitment in cooperation with the Michigan Lodging & Tourism Association was also done, resulting in the 410 hotel properties which will be the permanent client base for future programs.



Also new this year was the addition of the table tents displays featuring the billboard art, placed on the front desk of each of the hotel properties. This reinforced the consumers' billboard impressions, encouraging them to visit farm markets and sample the delicious produce and other foods.

While billboards, and especially directories and table tents are micro-targeted to travelers already in lodging properties, the basket of apples delivered at the beginning of the promotion encourages the property to source local Michigan-grown apples for healthy snacking, or in breakfast programs and restaurant business. Switching to a program where deliveries are made by the food service salesperson ensures someone will be there to take the re-order for Michigan Apples. Food service companies cited here have increased their offerings of Michigan apple product codes from about seven five years ago to about three dozen in Fall/Winter 2010! The goals have been clearly met for this program and we consider the past year's program a success.

GOALS AND OUTCOMES ACHIEVED

A boost to agri-tourism visibility and awareness by fall-color and other tourists, and increasing actual visits to farm market were two major outcomes. We surveyed farm market properties that

currently have a listing in the directory to determine whether they saw more traffic in their farm market because of the directory. We also measured the number of lodging properties and the amount of directories distributed in the program.

- ✓ In November 2010 a survey was sent to all farm markets (200) using the Michigan Apple Committee's mailing list. We received 40 responses (20 percent). This information is very important to both of our groups for future planning of this and other programs. However, whether visitors mentioned they saw something on a billboard to any employee that we surveyed at the farm market is a stretch.

Here are the results of the survey:

- Do you believe the Check In program in general has had a positive impact on your farm market business?
 - Strongly Agree – 12 percent (3)
 - Agree – 28 percent (7)
 - Somewhat Agree – 44 percent (11)
 - Somewhat Disagree – 4 percent (1)
 - Disagree – 8 percent (2)
 - Strongly Disagree – 4 percent (1)
- Did you experience an increase in traffic to your farm market in the years you were listed in the directory as part of the Check In program?
 - Strongly Agree – 9 percent (2)
 - Agree – 17 percent (4)
 - Somewhat Agree – 57 percent (13)
 - Somewhat Disagree – 9 percent (2)
 - Disagree – 4 percent (1)
 - Strongly Disagree – 4 percent (1)
- Do you believe this year's billboards helped increase traffic to your farm market?
 - Strongly Agree – 0 percent
 - Agree – 5 percent (1)
 - Somewhat Agree – 57 percent (12)
 - Somewhat Disagree – 14 percent (3)
 - Disagree – 14 percent (3)
 - Strong Disagree – 10 percent (2)

The survey also further asked about the farm marketers' businesses for future use in developing programs for this niche market. The modern consumer is no longer looking for information in printed materials. With cell phones, netbooks, tablets and MP3 players all internet accessible, it is time for this group to join the social media and app world.

- How are your customers learning about your farm market? Circle all that apply.
 - ✓ Farm Market Directory – 19 percent (16)
 - ✓ Advertising – 17 percent (14)
 - ✓ Internet – 26 percent (22)
 - ✓ Word of Mouth – 29 percent (24)
 - ✓ Other – 6 percent (5)
 - ✓ GPS – 1 percent (1)
 - ✓ Phone App – 2 percent (2)
 - ✓ 410 hotel properties participated in the program this year. While MI-FMAT didn't meet the goal of 600 hotel properties; this is a 37.5 percent increase in hotel property participation over previous years and is our largest participation to date.
 - ✓ Six thousand directories were purchased in part by the Michigan Apple Committee and distributed to the hotel properties.

- ✓ The program did help increase Michigan apple sales to Michigan hotel properties. Specifically, 2010 brought an estimated 10 percent increase in Michigan apples sold through foodservice channels.
- ✓ Three foodservice companies made deliveries this year. They were: Sysco – 168 deliveries; US Foodservice – 31 deliveries; and Van Eerden – 3 deliveries. This was the first time that US Foodservice and Van Eerden participated in this program.
- ✓ Sysco-Grand Rapids reported that they experienced an increase in sales and repeat orders with this program. They were unwilling to provide confidential sales numbers, but reported their Michigan apple sales had doubled (100 percent) from 2009 to 2010. This is doubly impressive due to the fact that 2009 was one of the largest crops ever for Michigan, and 2010 was one of the smallest.
- ✓ Sysco-Grand Rapids has already met with MAC staff to discuss the program for next year and see how they can improve deliveries. This is a great commitment from Sysco and shows that the program is increasing sales for their company.
- ✓ This program did elicit continued support and/or working relationship with the organizations that are already endorsing this effort.

Endorsements for the program this year were:

- Michigan Association of Festivals & Events
- Michigan Culinary Tourism Alliance – **New!**
- Michigan Department of Agriculture
- Michigan Farm Market and Agri-Tourism Association
- Michigan Lodging & Tourism Association – **New!**
- SW Michigan Tourist Council – **New!**
- Travel Michigan/Michigan Economic Development Corporation
- UP Tourism Association – **New!**
- West Michigan Tourism Association

Increase in the overall visibility of Michigan-grown apples and direct sales of Michigan apples at farm markets.

- ✓ While no direct sales to hotel properties from farm marketers were reported, 83 percent of those surveyed did report that they agreed (from somewhat to strongly) that the program did increase traffic to their farm markets.
- ✓ MI-FMAT membership has risen 3 percent from 2009 to 2010. Michigan Apple Committee paying for memberships in this directory for farm marketers in “good standing” is a huge boost to membership.

In order to deliver on the outcomes presented in the grant, we needed to develop a work plan. Entirety of this program occurred in 2010. Below is the timeline of the work accomplished during the grant period.

January 2010

- Assist with orchard recruitment for 2010 Farm Market & Ag Tourism Directory.

March 2010

- Work began on the hotel property list and contact with foodservice organizations.

April 2010

- A letter was delivered to hotel properties inviting them to join the program.
- Postcard mailing to all previous participants of this program asking them to stop by the booth at the Pure Michigan Conference. Email blast by Michigan Lodging & Tourism Association.

May 2010

- Exhibited at the Pure Michigan Conference to boost registration to the program with hotel properties.
- Coordinator contacted hotel properties again.

July 2010

- Table tents and billboards were designed and made ready for printing and placement for September 2010.
- August 2010
- Supplies for the program were purchased
- September 2010
- Personal delivery of apples and directories to the hotel properties by the coordinator and food service organizations.
- October 2010
- Follow-up survey to participating hotel properties and farm markets.
- December 2010
- Final report of program to Expo growers and in *The Apple Press* (MAC newsletter)

BENEFICIARIES

The 900 Michigan apple growing families in the state benefited from this marketing campaign, from the commercial growers supplying the foodservice companies to the small farm market selling direct to tourists or hotels.

Michigan farm markets are the face of the apple industry. The increase in sales garnered from this marketing project benefited apple growers, their families, employees and suppliers. It would also encourage healthy snacking by hotel guests.

Helping travelers and tourists find farm markets close to their hotel or travel route, could have increased visits and sales at farm markets –especially smaller markets with no billboard or mass media presence-during the key marketing period. However, the farm markets surveyed did not necessarily hear back whether the billboards increased traffic to their business from consumers. This specific targeting of people who are already traveling in the area, but may be unaware of agri-tourism potential represented cost effective niche marketing for MI-FMAT.

LESSONS LEARNED

While most farm marketers that responded stated they believe the program had a positive impact on their business, they were not convinced of the benefits from the billboards placed in West Michigan. This is not to say that the billboards were not a valuable component in driving traffic to these farm market businesses.

In the future, the groups plan to continue the program in a new way. Having all deliveries made by the foodservice companies in the future seems to be the way for this program to succeed. While billboards, and especially directories and table tents are micro-targeted to travelers already in lodging properties, the basket of apples delivered at the beginning of the promotion encourages the property to source local Michigan-grown apples for healthy snacking, or in breakfast programs and restaurant business. Switching to a program where deliveries are made by the food service salesperson ensures someone will be there to take the re-order for Michigan Apples.

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ADDITIONAL INFORMATION

http://www.michigan.gov/documents/mda/MIFMAT_Increasing_Agri-Tourism_Partnership_MI_Apples_Final_353579_7.pdf

PROJECT TITLE

Enhancing the Competitiveness of Michigan-Grown Christmas Trees through Promotion and Education.

PROJECT SUMMARY

The purpose of this project was to provide market opportunities for Michigan's Christmas tree growers. Over the last few decades, we have seen a steady decline in the number of Christmas trees harvested in our state. There are many factors that impact the declining harvest; increased competition from other growing regions, the aging population of Christmas tree growers and increased competition from sales of artificial Christmas trees.

The activities undertaken focused on two main objectives: Increasing market share of Michigan grown Christmas trees sold through retail lots, garden centers and other outlets throughout the Midwest and South, and increasing understanding that farm-grown Christmas trees are the best environmental choice and thus removing a significant consumer barrier to purchasing natural Christmas trees.

PROJECT APPROACH*Increase Market Share of Michigan-Grown Christmas Trees*

Michigan has long been a leader in natural Christmas tree production in the US and currently ranks third among Christmas tree producing states behind Oregon and North Carolina. Michigan is known for its diversity of tree varieties produced – more than any other growing region featuring at least a dozen species available on the wholesale market. With our close proximity to major growing areas, Michigan is in an enviable position for Christmas tree production and distribution. However, overproduction of Christmas trees in the other large growing regions has forced those regions to aggressively market their trees. Some states or regions have large marketing budgets and promotional campaigns with which individual Michigan growers find it difficult to compete.

In order to drive customers to Michigan's wholesale growers, we developed an attractive, four-color, oversized postcard that featured eye-catching photos of Michigan-grown Christmas trees. The postcard emphasized the quality of Christmas trees grown in Michigan as well as our wide selection of tree varieties and close proximity for shipping to many major markets. The association's website was prominently featured on the card and instructed interested buyers to visit the site. Once on the website, prospects could easily view wholesale Christmas tree growers, the species that they offer and complete contact information for each member grower. This postcard was sent to approximately 5,500 retail greenhouse/garden centers in key Midwestern and southern states. A companion four-color, half-page print advertisement was also produced and appeared in two industry journals and the annual MCTA Buyers Guide.

To further enhance the marketing efforts of Michigan grown Christmas trees, funds were used to redesign the Michigan SNOWFRESH logo, banners and marketing materials in an effort to increase the value of this brand to our members and consumers alike. The Michigan SNOWFRESH brand was instituted in the 1980's to help address an overproduction of Scotch Pine in Michigan, but now includes all Christmas tree varieties. Only the highest quality trees

qualify for the voluntary program and growers are required to follow certain procedures when harvesting and shipping Michigan SNOWFRESH trees. In addition to the new logo and marketing materials, funds were used to in the development of a website for Michigan SNOWFRESH and to feature a new Michigan SNOWFRESH advertisement in the annual MCTA Buyers Guide.

Educate Michigan Youth on the Environmental Benefits of Farm-Grown Christmas Trees

Based on results of surveys executed by Harris Interactive for the National Christmas Tree Association, the primary reasons that consumers don't select natural Christmas trees are inconvenience and messiness. However, in recent years, another reason has been cited. A majority of consumers feel that artificial Christmas trees are better for the environment than natural trees. In a survey conducted in 2008, 55% of respondents believed that artificial trees were better for the environment where only 33% believed that real trees were better.

This is a source of great concern and frustration for real Christmas tree growers. Individuals from outside the Christmas tree industry and environmental organizations have publicly stated that natural trees are better for the environment than petroleum-based, artificial trees. Unfortunately, consumers are not getting the message. In fact, our youth are bombarded with the "don't cut down a tree" message. Although this lesson is intended to protect rain forests and old-growth forests, it has been damaging to forestry, and now, to the Christmas tree industry.

In an effort to reach students with the message the real Christmas trees are sustainable, completely biodegradable and an environmentally friendly choice, we developed an environmental teaching kit. This kit was designed at a 3rd – 4th grade level and the committee that helped to design the kit included two Michigan elementary school teachers. Each kit included an educational DVD that was produced by the Minnesota Christmas Tree Association as well as complimentary worksheets, experiments and projects. The kit covered a variety of disciplines including math, science and English language arts. State of Michigan educational benchmarks met by the lessons were identified for the convenience of the teachers using the kit. 500 copies of the kit were made available to elementary schools throughout the state.

Additionally, we contracted with two educators to speak to students in 3rd and 4th grade classrooms around the state and provide a simple science and environmental lesson. Elementary principals and teachers were notified of the availability of the guest speaker and the topic. These presentations accommodated one to two classrooms at a time and as often as possible, we attempted to offer multiple presentations per building or community to reduce travel. The educators used the Minnesota Christmas Tree Association produced DVD as well as hand-outs and other interactive materials to present the environmental lesson. Teachers were asked to complete an evaluation following the presentation.

GOALS AND OUTCOMES ACHIEVED

As outlined in our plan of work, we anticipated increased awareness of Michigan's wholesale Christmas tree growers and their ability to service new customers in the Midwest and southern states. The emphasis of our marketing and advertising campaign was the availability of wholesale Christmas trees in Michigan and the MCTA website ([Find Christmas Trees | Michigan Christmas Tree Association](http://www.mcta.org); <http://www.mcta.org/>) as the place to find growers who could supply those trees.

Our direct mail postcard campaign was aimed at retail greenhouses and garden centers in Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Michigan, Missouri, Ohio, Oklahoma and

Texas. Our mailing list of approximately 5,100 was purchased from InfoUSA.com and augmented with some prospect addresses in the association's database. A total of 5,500 postcards were distributed. The postcards were designed by Millbrook Printing and produced and mailed by UPrinting.com.

Our advertising campaign included half page four color display ads that appeared in Garden Center Magazine (July, August) and Today's Garden Center (June, August) as well as the annual MCTA Buyer's Guide. The ads were quite similar to the postcard designs, directing viewers to the MCTA website. These publications also offered a package advertising price that included ad placements in their respective e-mail newsletters. Today's Garden Center reported that we received 108 "click throughs" from their on-line newsletter to the MCTA website. Further, using Google Analytics, we were able to determine that the wholesale search on our website received 487 views during June, July and August, 2010.

We surveyed wholesale growers who appear on the wholesale portion of the MCTA website to determine if they received new customer inquiries or additional sales in 2010. Survey results show that 93% of respondents received new customer inquiries in 2010 and 93% also indicated securing new customers in 2010. 86% of respondents reported that customers or prospects mentioned finding them on the MCTA website. 86 % of respondents also indicated that they believed that they received additional prospects through the MCTA website. 36% of those surveyed reported an increase in sales in 2010 and 85% of respondents indicated that repeating a similar marketing program in the future would be valuable.

The Michigan SNOWFRESH committee worked with designers at Millbrook Printing to develop a revised logo for the Michigan SNOWFRESH brand. The new logo provides a fresh design, while incorporating components of the old logo to insure brand continuity. This new logo was featured on a new, larger tree tag and new point of sale banners. The website, www.michigansnowfresh.com, was designed and is maintained by Digital Farming. The website provides another opportunity for participating Michigan Christmas tree growers to promote their available inventory. All Michigan SNOWFRESH participants received new banners to share with their retail customers and sample press releases as well as other printable designs are now available for Michigan SNOWFRESH retailers on the website. All new materials now feature the Michigan SNOWFRESH website address.

Educating Michigan school children about the environmental benefits of farm-grown Christmas trees was another goal of this project. Using a mailing list purchased from Michigan Education Directory, a colorful mailer was sent to more than 2,500 public and private elementary school principals in May encouraging them to register for the free educational kit at the MCTA website. We also reached hundreds of elementary science teachers through an e-blast with the Michigan Science Teachers Association. We were disappointed with the initial response, but were able to distribute a majority of the 500 kits and have a plan to distribute the balance of the kits in 2011. Based on voluntary survey results of teachers who received the kit, 98% said that they used the student worksheets that were provided in the kit and 98% also indicated that they would use the dvd and kit in future years.

We also were able to reach students with the classroom presentations with our educators. Our educators visited 27 schools, from Redford to Traverse City, making more than 50 presentations. These classroom presentations reached approximately 2,300 students. Our educators reported that the third and fourth grade levels were the right choice for this program as most schools are teaching sections on the environment in these grades. Typically, the information that our educators presented to the third graders was new, where most fourth

graders had some familiarity with the topic and such terms as “biodegradable” and “photosynthesis.” Our educators typically started their presentation by asking the students the following question; “Which is better for the environment, a real Christmas tree or an artificial Christmas tree?” Our educators indicated that student responses to this question were always mixed, however at the end of the program when asked this question again, virtually 100% of the students understood that the real Christmas tree was better for the environment than the artificial tree. All students received a “Certified Tree Expert” sticker that they could wear home to encourage discussion with their parents.

BENEFICIARIES

Christmas tree growers benefited by seeing increased customer inquiries, increase in sales, and additional prospects.

LESSONS LEARNED

This series of projects certainly provided important information for our industry and definitely created a strong foundation on which we can build. Our growers were pleased with the activity on the association website and leads for wholesale tree sales. We are already working on a plan with our web master to maximize the wholesale section of the website to encourage more traffic, similar to the traffic we see for the consumer Christmas tree season. This project demonstrated the value of the website to our wholesale members.

We are making plans to further promote the Michigan SNOWFRESH brand with our members and encourage more to use the brand now that we have the website established as well as fresh marketing materials. The committee is already working on a plan to make the Michigan SNOWFRESH program more meaningful for choose & cut growers.

The educational segments of the project presented significantly more challenges than we would have foreseen. The greatest challenge that we met in this process was the concern on the part of educators to use any curriculum that included “Christmas” in the title even though it was in the context of an agricultural commodity that is produced in our state. We made great efforts to stress that the lesson taught in this project was an environmental lesson however the use of the word “Christmas” presented a challenge for some educators. One educator commented that she was concerned that the presentation would become a commercial for our product. This definitely reduced the number of students that we could reach.

However, the responses by the teachers and students who participated made it clear that the materials were valuable and hit the mark with this age group. Further, the survey responses from educators who used the kit and dvd were very positive with 98% saying that they planned to use the kit again with another classroom of students. This was our plan in having the kit available in the library for multiple classrooms to use and by making all of the worksheets available to be downloaded from our website.

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ADDITIONAL INFORMATION

http://www.michigan.gov/documents/mda/MI_Christmas_Assoc-Enhancing_the_Competitiveness_348412_7.PDF

[Why join the Michigan Christmas Tree Association?](#)

http://www.mcta.org/index.php?option=com_content&view=article&id=12&Itemid=90

[Michigan Snowfresh Christmas Trees](http://www.michigansnowfresh.com/) <http://www.michigansnowfresh.com/>

PROJECT TITLE

Testing for Acrylamide and Asparagine on Potatoes

PROJECT SUMMARY

Identify raw product with sugar and amino acid profiles that allow anticipated acrylamide limits to be met. All current US potato varieties used for Chip manufacturing exceed 275 ppb of acrylamide, which is a threshold that has been identified by California courts.

The project is composed of three elements – the collection and shipping of potato samples to be tested, the testing itself, and the analysis of results. Samples out of storage were tested for acrylamide. In one portion of the project, the potatoes were tested after harvest for asparagine.

PROJECT APPROACH

The grant has two studies. The large study, referred to as the processor study, was conducted to examine the relationship of many variables upon acrylamide formation in processed potato chips. We looked at variables such as potato line, processor, processing method, tuber glucose level, tuber sucrose level, chip defects, tuber dry-matter content, processing temperature and processing time (dwell time). The second study, referred to as the variety study, was conducted to look in more detail at the effect of variety and also storage time on acrylamide formation using only a single processor (Techmark).

GOALS AND OUTCOMES ACHIEVED

The first experiment was to determine acrylamide levels of uniform samples subjected to various chip-processing methods. The cooperating chip processors were the laboratory of Dr. David Douches, MSU potato breeder in the Department of Crop and Soil Sciences; Techmark, Inc., a Lansing, MI technology company; and three commercial chip manufacturers, Utz Quality Foods, Inc., Hanover, PA; Herr Foods, Inc., Nottingham, PA; and Lance Manufacturing, LLC, Charlotte, NC. Four varieties were processed from four separate dates out of storage for 80 data points replicated three times for a total of 240 analyses. These chips were then forwarded to the University of Wisconsin-Madison's laboratory for acrylamide testing.

The second experiment was to determine acrylamide levels from 12 different varieties of potatoes sampled from 12 storage dates at the Michigan Potato Industry Commission's Cargill Demonstration Storage for 144 data points replicated three times for a total of 432 analyses. These chips were shipped to Madison for acrylamide testing.

Out-of-Storage Potatoes for Acrylamide

The potatoes used for the processor trials were samples pulled from the bins at the Cargill Demonstration Storage owned by the Michigan Potato Industry Commission and also from a commercial bin at Sackett Farm. The storage environment was chosen to represent

commercial storage conditions. In this way, the data generated could be related to commercial activities conducted by the potato industry.

Analysis for Asparagine

The amino acid asparagine content of potato tubers was measured for the four lines. Asparagine interacts with the glucose reducing sugar to create the byproduct acrylamide. Asparagine is measured by an extraction process followed by measurement on an HPLC lab machine. The company Covance will provide standardized procedures to conduct the measurement. Two sets of tuber samples of the four varieties were in the processor study. The larger cost of asparagine testing was to be for the variety study. The poor quality of the tuber samples for the study was noted. The reason for the poor quality was the unusually cold and wet 2009 growing season. It was determined that the size of the planned variety study would be reduced significantly since the full data to be collected would be compromised. As a result, a smaller subset of the study was conducted.

The potatoes for the study were stored at the MPIC Demonstration Storage adjacent to the Montcalm Research Farm and also at the storage bins of Sackett Farm. Each sampling period a team of people traveled from campus to conduct the sampling.

Data Analysis/Final Inspection/Supervision

A large part of the labor associated with this project took place at Michigan State University. The personnel involved in the tuber sampling were from MSU. This sampling occurred from October through May on two-week intervals. Trips for tuber sampling ranged from two to six personnel depending on the sampling work. MSU was one of the designated chip-processing sites. During the processor study, chips were fried every two weeks. Procedures were followed to obtain chip moisture readings for the MSU and Techmark chip samples.

All chip samples from the processors and Techmark were sent to MSU for handling and sample processing. Tubers for asparagine testing were packaged and shipped from MSU as well as the crushed chip samples for acrylamide testing. Prior to sample chip crushing, the samples were organized and sorted to facilitate the sampling process and insure proper identity. To prepare the samples for acrylamide testing, the samples were ground using personal electric grinders, and the ground chips were transferred to disposable 15ml sealed containers that were labeled with proper identification. Samples were shipped to the University of Wisconsin-Madison Food Lab for acrylamide analysis. Data was sent by email to MSU upon completion of the sample set. Three separate sets of samples were submitted. The acrylamide data was combined with the sample data that was collected at chip processing time. A large spreadsheet of data was created that was used for the data analysis. The data analysis was performed, and data summary and figures have been created in PowerPoint. Dr. Dave Douches served as the MSU project manager and supervised the technical staff and provided guidance on the data analysis. The data collected in the grant has allowed us to examine the importance of variety, processor, processing type, tuber glucose concentration, storage period, tuber asparagine concentration, chip defects, processing temperature, processing (dwell) time, and chip moisture content on acrylamide formation in finished potato chips. This data has helped us focus and design a follow-up study for 2011.

BENEFICIARIES

This study has provided data that has helped us design a current study to confirm some observations from the past study and look more precisely at some other observations. We plan to share this data with the potato industry and the participating processors so they can learn

from this study too. Secondly, the data will help us apply for USDA/SCRI funds and direct our studies in that proposal.

LESSONS LEARNED

A number of important relationships emerged from this research. First is that varieties differ in their overall acrylamide levels in processed chips. Secondly, the processors have an influence on the acrylamide levels in the processed chips. Third, the types of processing (continuous, kettle and test batch) differ in their acrylamide levels in the processed chips. Interestingly, the kettle fry process led to the processed chips with the lowest levels of acrylamide. This was contrary to our expectations prior to the study. Additional points that we learned are that varieties differ in potato chip acrylamide levels despite having similar glucose levels. Oil temperature, dwell time and process type all interest to affect moisture content and acrylamide content in the chips. Lastly, low levels of acrylamide have the potential to be achieved in kettle chips if the right variety is used. It will be more difficult with continuous chip processing at this present time.

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ADDITIONAL INFORMATION

http://www.michigan.gov/documents/mda/MI_Potato_MGMT_Board_Testing_for_Acrylamide_347949_7.PDF

PROJECT TITLE

Sustainable Nutrient and Water Management for Container Tree Production

PROJECT SUMMARY

Landscape tree nurseries in Michigan are faced with several challenges. These include adapting to a shift in the industry from traditional field production to container production, optimizing nutrition and water management to maximize growth, and meeting rising consumer demands for sustainably- or organically-produced landscape materials. For the past four years we have conducted research trials on improving nutrient and water management of landscape conifers and shade trees in Pot-in-Pot container production. (Klooster et al., 2010; Taylor et al., 2009). The overall goals of the current phase of our Pot-in-Pot production research are to expand the capabilities of the system and evaluate components of production systems for container-grown conifers and shade trees that will enable growers to market plants as certified Organic or certified Naturally-grown.

PROJECT APPROACH

Our project partner is: Dr. Bert Cregg, Michigan State University, Department of Horticulture and Department of Forestry, East Lansing, MI 48824-1325, Telephone (517) 355-5191 ext. 1335, Email: cregg@msu.edu

The specific objectives of this project are to:

1. Increase the research capacity of the MSU Pot-in-Pot research nursery by adding an automated drainage measuring system; making it a state-of-art facility for water and nutrient management research on container-grown landscape trees.

2. Compare the growth and quality of landscape shade trees and conifers grown with conventional fertilizers and organic-approved fertilizers.
3. Develop whole-crop water and nutrient budgets for shade tree and conifer crops grown with conventional and organic-certified fertilizers.

The results of the project will provide baseline information on the potential to produce container-grown trees under organic management as well as comparative data on the potential environmental impacts of conventional and organic production. Moreover, enhancements to the MSU Pot-in-pot nursery facility will provide the infrastructure for continued investigations on sustainability of container tree production.

GOALS AND OUTCOMES ACHIEVED

In the *Goals and Outcomes Achieved* section, please report on the following Expected Measurable Outcome from the approved state plan:

- o Research results will be disseminated to the industry in trade publications such as the Michigan Landscape and American Nurseryman. We will also prepare peer-reviewed articles for HortScience, Journal of Environmental Quality, and other outlets as appropriate. Research results will also form the basis of presentations at nursery grower meetings (e.g., MNLA Great Lakes Trade EXPO).

Below is list of presentations to grower and scientific audiences based on the project. Although the grant was funded for only 15 months, we are continuing a second year of data collection since most scientific journals will not publish field studies based on a single year of data. I still anticipate that we will publish at least one paper on nutrient leaching of organic vs. conventional fertilizer in J. of Environmental Quality and a paper on tree growth responses in Hort Science or comparable journal. I am also preparing an article for an upcoming issue of the Michigan Landscape.

Cregg, B.M. 2010. Pot-in-Pot production for living Christmas trees. National Christmas Tree Association. Winston-Salem, NC. Aug. 12, 2010.

Cregg, B.M. 2010. Container production for conifers. Michigan Christmas tree Association Summer meeting. Paw Paw, MI, July 24, 2010.

Cregg, B.M. 2010. Nutrient management of conifers in container production. Michigan Seedling Grower's Association, August 10, 2010. Lake City, MI.

Cregg, B.M. 2011. Water and nutrient management of conifers in Pot-in-Pot production. Michigan Christmas Tree Association winter meeting. March 5, 2011. Midland, MI.

Cregg, B.M. 2011. Sustainable water and nutrient management for container nursery production. Michigan Nursery and Landscape Association and Michigan Turf Foundation Great Lakes Trade Expo. January 10, 2011, Grand Rapids, MI.

Cregg, B.M. 2011. Sustainable nutrient management of container-grown living Christmas trees. Abstract accepted for 10th International Christmas Tree Research and Extension Conference. August 21, 2011, Eichgraben, Austria.

Cregg, B.M., R.T. Fernandez, D. Ellison, and P. Nzokou. 2011. Growth, foliar nutrition,

photosynthesis, and nutrient leaching of container-grown landscape trees produced with conventional and organic fertilizer. Abstract accepted for: American Society for Horticultural Science Annual Meeting. September 27, 2011, Waikoloa, Hawaii.

Objective 1. Installation of automated leachate measurement system. In the spring of 2010 we installed a new two-year nursery trial at the MSU Pot-in-Pot research nursery at the Michigan State University Horticulture Teaching and Research Center to compare growth, physiology, and nutrient leaching of common nursery trees under conventional and organic fertilization. The 25-gallon container section and the seven gallon container section of the nursery were retro-fit with a leachate collection system under the containers. The leachate collection system was designed to collect leachate from eight containers from each of eight rows in each production area. Container leachate from each row was collected and total run-off was measured by a series of tipping bucket rain gauges and an automated data logger (Zhu et al. 2005). The system was completed in early July 2010. Trees in each section of the nursery were irrigated daily at 09:00 via spray stakes (Netafim, Inc) operated by an automated timer. Irrigation and rainfall in excess of daily plant water use leached through the containers and collected by tipping buckets and recorded by the datalogger. After an initial assessment and troubleshooting period, irrigation rates were adjusted for each container section in early August in order to achieve a target leaching fraction of 10-20% of irrigation applied. Subsequent to this adjustment, major peaks in leaching through the system were associated with rainfall events. The system operated essentially trouble-free following installation until irrigation ceased at the end of October. The only minor difficulty encountered was one plugged drain-line in one plot of the 25 gallon containers, which was easily remedied. Photos and figures can be found in the report in "additional information".

Objective 2. Comparison of growth and quality of container-grown trees grown under conventional and organic nutrition management. Following installation of the leachate collection system, we planted 200 35 mm caliper London planetree (*Plantanus x acerifolia* 'Bloodgood') liners in 25 gallon containers and 100 conifers (50 Colorado blue spruce (*Picea pungens*) and 50 Fraser fir (*Abies fraseri*) in seven gallon containers. All trees were planted in a standard container substrate of 80% pine bark and 20% peat moss (v:v) (Renewed Earth, Inc. Kalamazoo, MI). Four rows of trees in each nursery section were assign at random to receive either a conventional controlled release fertilizer (Osmocote Plus 15-9-12, 5-6 month release, Scotts, Inc., Marysville, OH) or an OMRI-certified organic fertilizer (NatureSafe 10-2-8 and NatureSafe 5-6-6, Griffin Industries, Cold Spring, KY). The organic fertilizers were blended to provide approximately the same ratio of N-P-K as the conventional source. Fertilizers were applied at a rate of 30 grams N per container for trees in the 25 gallon containers and 12 grams of N per container for trees in the seven gallon containers.

Application of the organic fertilizer was split into two applications, once in early July and once in mid-August. We measured height and trunk caliper at the start of the study and at the end of the growing season. Foliar samples were collected for nutrient analysis in September (planetrees) and November (conifers). Net photosynthetic gas exchange of the conifers was measured on three dates (Aug. 8, Aug. 31 and Oct. 7) using a portable photosynthesis system (LI-6400, Li-cor, Inc.) equipped with a 0.25-liter cylindrical conifer chamber. Gas exchange measurements were collected on all conifers in the study between 10:00 and 16:00 on clear days (photosynthetically active radiation (PAR) >1500 mol m⁻² s⁻¹). Gas exchange of leaves of 'Bloodgood' planetrees was measured on Aug.2 and Sept. 3 using a portable photosynthesis system (LI-6400), equipped with a 6 cm² broad-leaved chamber with a red-blue LED light

source set to 1500 mol m⁻²s⁻¹ of PAR. All measurements were collected between 10:00 and 16:00.

Results from the first year of the trial indicate that fertilizer source (conventional versus organic) affected ($p < 0.05$) stem caliper growth of conifers but not planetrees. Conifers fertilized with conventional controlled-release fertilizer grew an average of 25% larger in caliper than trees fertilized with the same amount of nitrogen in the organic form. Planetrees grew an average of 4.8 mm in caliper with conventional fertilizer and grew an average of 4.5 mm with the organic product. Foliar nutrient levels in planetree leaves did not differ ($p > 0.05$) between conventional and organic fertilizer treatments for most elements. Conventional fertilization increased ($p < 0.05$) foliar manganese compared to trees receiving the organic fertilizer. Foliar manganese levels of trees from both treatments were above sufficiency standards. Fertilizer source, date, and species affected net photosynthesis of conifers. Across the season, conventional fertilization increase net photosynthesis of conifers relative to the organic fertilizer. Fertilizer source did not affect net photosynthesis of 'Bloodgood' planetrees. However, water use efficiency (ratio of net photosynthesis to stomatal conductance) was higher for trees fertilized with conventional fertilizer due to reduced stomatal conductance relative to trees fertilized with organic fertilizer. Tables can be found in the report in "additional information".

Objective 3. Develop whole-crop water and nutrient budgets for shade tree and conifer crops grown with conventional and organic-certified fertilizers. Nutrient and water budgets are being developed from whole-tree biomass samples collected at the end of the 2010 growing season, leachate run-off data, and irrigation and fertilization records. We are also awaiting results of residual analysis by Scotts, Inc. of fertilizer prills collected at the end of the 2010 growing season. Periodic subsamples of leachate collected from the container leachate system indicated that nitrate levels were consistently higher for conifer trees in seven gallon containers fertilized with conventional fertilizer than for trees receiving the organic fertilizer. Nitrate concentration of leachate from the 25-gallon containers did not show a consistent difference between conventional and organic fertilizer, and overall concentrations were comparable between the two treatments.

BENEFICIARIES

Between 2001 and 2005 the number of USDA Certified organic nurseries and greenhouses increased by over 15-fold. A desire to be environmentally conscious is a substantial market driver influencing purchase organic products. Standard container nursery production systems are resource-intensive and rely heavily on inorganic fertilizers, herbicide-based weed control, and use of inorganic pesticides. In order to Qualify as USDA Certified Organically grown, producers must follow USDA Organic Certification guidelines. (USDA) These require that no inorganic pesticides or fertilizers be applied to production areas for three years and that all fertilizers and pesticides used in the production system are approved by the Organic Materials Resource Institute (OMRI). Meeting crop needs without the use of inorganic fertilizers will be one of the largest challenges for organic nursery producers. (Chong, 2005; Chong et al., 2008; Manas et al. 2009) The results of this study will provide Michigan growers with initial guidelines for organic nutrient additions that will result in acceptable crop growth.

LESSONS LEARNED

Through the first year of the study, growth and foliar nutrition of 'Bloodgood' planetrees was similar with either conventional or organic fertilization. This suggests that growers may use either fertilizer source. Caliper growth of conifers was greater with conventional controlled release fertilizer rather than with organic fertilization. In the conifer portion of the study, conventional fertilization resulted in greater fertility (higher nitrate levels), which resulted in

higher rates of photosynthesis and growth. We are currently processing biomass samples and fertilizer prills in order to complete water and nutrient budgets.

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ADDITIONAL INFORMATION

[http://www.michigan.gov/documents/mda/MI_Nursery_Landscape - Sustainable Nutrient 791N0200084_353576_7.pdf](http://www.michigan.gov/documents/mda/MI_Nursery_Landscape_-_Sustainable_Nutrient_791N0200084_353576_7.pdf)

PROJECT TITLE

Bringing Regional and National Expertise to Michigan for Education Programs that will Enhance the Competitiveness of Vegetable Growers

PROJECT SUMMARY

The purpose of this grant is to bring regional and national expertise to Michigan for educational programs that enhance the competitiveness of vegetable growers. As planned, the venue used for these programs was the Great Lakes Fruit, Vegetable and Farm Market Expo, which was held in Grand Rapids, Michigan on December 8-10, 2009. The Expo offered three days of sessions that provided information for improving vegetable production and marketing practices.

PROJECT APPROACH

A number of researchers from Michigan State University presented information at the 2009 Expo. In addition, the following out-of-state speakers were used to make the presentations listed below (in parentheses after each session listing are the attendance and presentation evaluation results which show the percentage of respondents that found the presentation very helpful/somewhat helpful/not helpful):

Dr. George Abawi, Department of Plant Pathology, Cornell University

- Carrot Session (47/83%/17%/0%): "Biology, On-farm Assessment, and Management of Root-knot Nematodes on Carrots"
- Fresh Edible Legumes Session (97/78%/22%/0%): "Root Diseases of Beans and Peas and the Impact of Soil Health Management Practices"
- Organic Vegetable Production Session (53/58%/37%/5%): "The Cornell Soil Health Assessment Protocol and the Connection Between Soil Health and Root Health"

James Adkins, University of Delaware Research and Education Center, Georgetown, DE

- Pickling Cucumber Session (63/50%/36%/14%): "Efficiency and Economic Returns with Current Pickle Harvesters"

Dr. Mark Bennett, Department of Horticulture and Crop Science, Ohio State University

- Tomato, Pepper, Eggplant Session (170/48%/50%/2%): "Tools for Integrated Crop Management of Peppers"
- Transplant Production Session (184/52%/38%/10%): "Vegetable Transplant Tactics for Improved Crop Establishment"

Dr. David Francis, Ohio Agricultural Research and Development Center, Wooster, OH

- Tomato, Pepper, Eggplant Session (160/43%/51%/6%): “Overview of the SolCAP and Great Lakes Vegetable Working Group Tomato Heirloom Projects”
- Transplant Session (153/40%/35%/25%): “Grafting of Tomatoes for High Tunnel and Open Field Production”

Dr. Amanda Gevens, Department of Plant Pathology, University of Wisconsin

- Potato Session (65/50%/40%/10%): “Late Blight in 2009: A National Outbreak with Local Consequences”

Dr. Lewis Jett, West Virginia University Extension, Morgantown, WV

- High Tunnels and Low Tunnels Session 150/no evaluation results): “Future Trends for High Tunnels in the U.S.”

Ed LaClair, NSF-Davis Fresh Technologies, Lake Placid, FL

- GAP Audits Session (130/no evaluation results): “NSF/Davis Fresh Audits”
- Vine Crops Session (NA/18%/70%/12%): “The Future of GAP in Cucurbits”

Klass Martens, Lakeview Organic Grain, Penn Yan, NY

- Fresh Edible Legumes Session (97/25%/75%/0%): “Edamame: Varieties and Production Practices”
- Organic Opportunities and Markets Session (30/76%/24%/0%): “Is Organic Farming Stepping Back in Time or Is it the Key to the Future?”
- Organic Vegetable Production Session (60/83%/17%/0%): “Organic Weed and Soil Management: Insights from a New York Vegetable and Grain Farmer”

Dr. Brian Nault, Department of Entomology, Cornell University

- Onion Session (NA/92%/8%/0%): “Onion Thrips Control in New York”

Dr. Stephen Reiners, Department of Horticultural Sciences, Cornell University

- Fresh Edible Legumes Session (97/36%/55%/9%): “How We Grow Snap Beans in New York”
- Organic Vegetable Production Session (63/72%/28%/0%): “Sweet Potatoes: The Next Big Crop for Up North”

Dr. Mark VanGessel, Department of Plant Science, University of Delaware

- Fresh Edible Legumes Session (97/60%/10%/30%): “Getting the Most Out of Our Bean Herbicides”
- Pickling Cucumber Session (73/48%/48%/4%): “Tank Mixes, Higher Rates, and Crop Rotation to Improve Weed Control in Continuous Pickle Production”
- Sweet Corn Session (175/72%/28%/0%): “Strategies for Weed Control”
- Vine Crops Session (NA/81%/13%/6%): “Weed Management in Cucurbits: Update”

Dr. Celeste Welty, Department of Entomology, Ohio State University

- Vine Crops Session (NA/44%/53%/3%): “Efficacy and Cost Comparisons of Using Insecticide Seed Treatment on Cucurbits”

GOALS AND OUTCOMES ACHIEVED

In addition to the session evaluations, a general survey of Expo attendees was conducted. The answers to questions about speakers from outside Michigan are reported on pages 12-14 of the survey report. Here’s a summary of the results:

- 44% of respondents were influenced in their decision to attend the Expo by the large diversity of expert speakers from around the country.

- 86% of respondents attended at least one presentation by a speaker from outside Michigan.
- 96% of respondents intended to incorporate information gained from out-of-state speaker presentations into production and/or marketing practices.
- 99% of respondents thought the Expo should continue to invite experts from around the country to make presentations at the Expo.

Some out-of-state attendees responded to the session evaluations and the general Expo survey, but the large majority of responses were by attendees from Michigan.

BENEFICIARIES

Fruit and vegetable growers, processors benefited by the exposure and education provided from the Great Lakes Fruit, Vegetable and Farm Market Expo session.

LESSONS LEARNED

It is clear from the survey results that attendees found value in the presentations which should help them be more competitive in growing and marketing their vegetable crops.

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ADDITIONAL INFORMATION

A copy of the survey results can be found on the MDARD website at http://www.michigan.gov/documents/mdard/MI_Vegetable_Council_-_Regional_Natl_Expertise_with_Survey_354777_7.pdf

Great Lakes EXPO

PROJECT TITLE

Serving the Underserved with Specialty Crops

PROJECT SUMMARY

Our overall goal is to introduce Michigan Specialty crops to the central Detroit community. With respect to that, we have developed four objectives.

PROJECT APPROACH

We spent the fall surveying Highland Park, the area west of Linwood and north of Chicago Blvd., and the area east of Woodward. We also reached into an area of Southwest Detroit, but have determined that the area is too far away at present. The question there is also whether access is really "severe". Southwest Detroit seems to have access in a variety of areas. We interviewed 202 heads of households and another random 180 people regarding their choices in eating. The survey listed every fruit and vegetable that we knew as a Michigan Specialty crop, and asked people to check the box of produce they would eat if given the opportunity. After discovering very early on that we omitted sweet potatoes from the list, there were very few surprises. Men preferred to eat fruit instead of vegetables. Women would eat and serve both, and children preferred fruit also.

This past summer we expanded to the near Northeast community of Detroit (7 Mile and Conant area), a largely Chaldean community and a smaller area west of Wayne State University. We received requests to visit these two communities in June and have been servicing them ever since. Apples, peaches and pears are their mainstays thus far in terms of Michigan produce; however, they too like bananas. In total in these two communities we interviewed 56 and 31 people respectively.

To date, we are servicing Highland Park, an area west of Linwood, the 7 Mile and Conant community, and a small pocket near Wayne State University. Therefore, we have met the objective of researching at least three additional communities and interviewing at least 250 community members. The research has resulted in service of produce delivery to these communities.

Research the need for fresh produce in at least 3 surrounding communities from where we presently serve.

--do a geographic scan of where access to produce is most severe

--interview at least 250 members in each community regarding what produce they would like to eat.

GOALS AND OUTCOMES ACHIEVED

Market and promote the impending expansion of the produce truck route to include a greater radius of the central and west Detroit communities based upon the research so that at least each new community is being provided access at least twice a week.

After surveying the community (and finding no surprises) we then began to market the delivery of produce into these underserved communities. This was very simply done with a flyer announcing the dates and times that our produce truck would be in the area. Each community area was served on Tuesday, Wednesday, or Thursday and then revisited again on Friday. Flyer distribution continued for several weeks even after the routes were established so that people would understand that we were there for them instead of doing a delivery for a store in the area or just passing through. Every time the produce truck stopped to make a sale, the assistant to the driver would jump out and flyer the homes where the truck stopped. This continued for about four weeks. We have seen our services warmly received everywhere but in particular the area west of Linwood and around Dexter Avenue in particular. This seems to be the most isolated area of the three communities we canvassed.

As a result of our research, we not only service the 7 Mile and Conant area with produce through delivery from the Peaches and Greens truck, but we have also put produce in three strategic Corner stores in that area. Sales are good, modest, but steady.

Access is being provided at least two times a week for each community area.

Expand the produce truck route to these three communities.

The key here is consistency and doing what you said you were going to do in the flyer will lead to success. In other words, if the flyer says the truck will be in the neighborhood on Wednesdays from 12-2 p.m, don't show up on Thursdays instead. During the non winter months we even expanded our produce truck routes to include an early afternoon shift and a late afternoon/early evening shift. This allowed us to tap into the working class family coming home from work—a little more expendable income, but still in a food dessert.

Introduce new and exciting options for fresh produce by providing samples of Michigan grown specialty crops; at least one new item of produce a week.

Our approach here was again quite simple—offer different specialty crops as samples. All of the samples we offered were fruit as the mobile truck was not equipped to clean or cook vegetables. When Michigan crops came in September and October, this became very fun because the purchase prices were so low. Apples were particularly wonderful tasting this past growing season. We were able to pick some apples from a local farmer and pass them out in the neighborhoods. I have personally never tasted an apple fresh off the tree, and I was amazed how incredible it tasted. It demonstrated the advantage of locally grown produce in terms of freshness and quality. If everything tasted that fresh, we would have no problem getting people to eat fresh Michigan grown produce.

This Michigan harvest season (2010) we focused on vegetables and made salsa and have had it available for samples with chips. Tomatoes, peppers, and onions-simple stuff in abundance during this time. Again, samples of this nature are pretty much bound to the store as they do not travel well.

In the produce store we took the introduction of new crops even a step further by doing cooking demonstrations. Each week we introduce a new fruit or vegetable and show how it can be used in a recipe. This was as simple as demonstrating how to make a fruit smoothie and providing samples to baking a blueberry pie, to squash soup. We primarily targeted pre-teens and teens as our chefs and samplers to which they showed us they were up to the task.

BENEFICIARIES

Specialty crop fruit and vegetable producers benefited by increasing awareness and having more deliveries of their products to underserved communities. Community members also benefited by sampling and purchasing specialty crops.

LESSONS LEARNED

We found great consistency in popularity with the following Michigan Specialty crops: peaches, strawberries, cherries, watermelon and grapes. This, of course, lines up with our sales on the mobile truck and the produce store, Peaches & Greens.

CONTACT PERSON

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ADDITIONAL INFORMATION

[Central Detroit Christian \(CDC\)](http://www.centraldetroitchristian.org);

http://www.centraldetroitchristian.org/Peaches_and_Greens_Truck2.htm

http://www.michigan.gov/documents/mda/Central_Detroit_Christian_FINAL_343193_7.pdf

PROJECT TITLE

Tart Cherries and the Battle of the Super Fruits

PROJECT SUMMARY

By using digital tools and advocates to communicate tart cherries' points of differentiation (pain relief, unique compounds and taste) to an online audience of media, consumers, influencers and industry decisions makers, The Cherry Marketing Institute kept cherries competitive by increasing their awareness as a Super Fruit among consumers and potential B2B customers.

PROJECT APPROACH

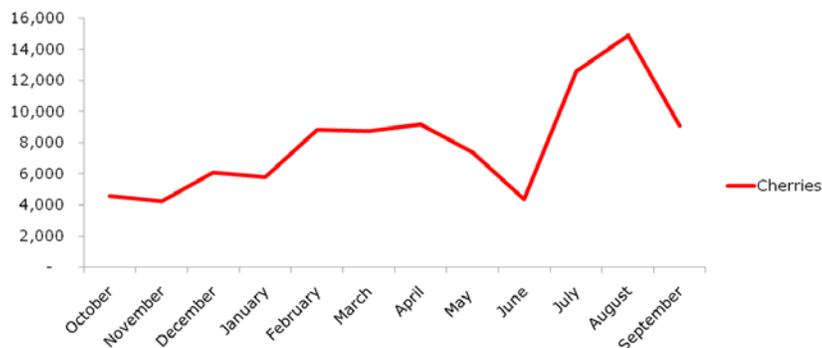
The Project Approach section clearly lays out each of the program tactics executed to achieve the objective. As included in the Project Summary, these tactics (leveraging digital tools and advocates) were employed to help communicate cherries' unique advantages that aligned with our overall PR program to help keep cherries competitive. For example, the bold line items below indicate the approach (eg: Engaged Runners/Created Advocates in Niche Social Networks), and the supporting information in the bullets is how we activated against that approach to support the objective.

Tactical Elements of the Project Included:

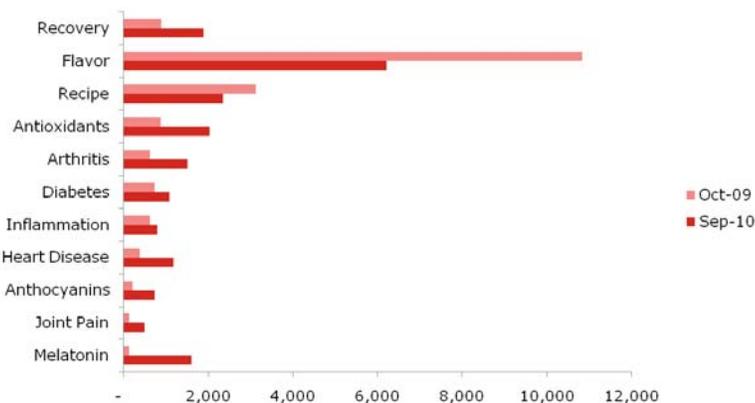
- **APPROACH: Engaged Runners/Creating Advocates on Niche Social Networks**
 - *Train to Manage Pain* article deployed to 923K+ subscribers of the MapMyRun, MapMyRide and MapMyWalk newsletters
 - Additional engagement on niche social networks (e.g. Athlinks, DailyMile)
- **APPROACH: Educated Michigan Cherry Processors and Growers on Social Media Best Practices Hosted a Heart Health Powered by Red Twitter Party and Live Stream (February 2010)**
 - #RedRecovery Twitter parties (Feb. 16-17)
 - Generated 100+ new followers; 2,300+ total tweets that reached 325K people
 - LIVE cooking demo with celebrity dietitian Keri Glassman (Feb. 17)
 - Hosted at ChooseCherries.com
- **APPROACH: Participated in 12 Local Marathons with Powered by Red Advocates**
- **APPROACH: Sponsored one of the Advocates' Runs, resulting in 71 tweets**
- **APPROACH: Took 8 Key Food, Health and Travel Bloggers and Media To a CMI Farm-to-Fork Immersion Event (July 2010)**
 - **140 social media posts** over the 3-day event
 - **2 local** media stories
 - **612K in total** media impressions
- **APPROACH: Hosted a Travel-Themed Twitter Party (August 2010)**
 - **493** users sent **4,760** tweets tagged with #RedRecovery and/or #TNI
 - Total of **12 million impressions**, corresponding to **712,000** unique impressions
 - Gained **30 new Twitter followers** immediately prior to/during the #TNI event

GOALS AND OUTCOMES ACHIEVED

- Created Branded Presence in Key Social Media Communities
- Increased Cherries' health-related conversations in social media by 1,220% since program started.



- Tart Cherries are ranked #4 in overall health-related superfruit conversations—an upward move since the start of the program.
- While Cherries' health-related conversations overall did not reach a #3 spot, there is a noticeable increase in health-related conversations with targeted outreach (i.e. heart health in February)
- Shifted Conversations From Flavor/Recipes to Benefits of Tart Cherries



- We're growing! Since 2009, we seen a 380% increase in Twitter followers, 234% increase in Facebook likes and 9,238% increase in YouTube views.
- We're seeing online conversations impacting offline purchase behavior

BENEFICIARIES

Michigan Tart Cherry growers.

LESSONS LEARNED

A key lesson learned that is that by building a team of digital advocates it helped us to better engage a larger population in the social media space and effectively influence buyer behavior in the marketplace. Users in the digital world have been very responsive to the health messaging of tart cherries when championed by trusted voices (influencers) and supported with credible research.

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ADDITIONAL INFORMATION

[http://www.michigan.gov/documents/mda/Cherry Marketing Institute FINAL 343189 7.pdf](http://www.michigan.gov/documents/mda/Cherry_Marketing_Institute_FINAL_343189_7.pdf)

PROJECT TITLE

Feed the Farm to School Program in SE Michigan with Local Fruits and Vegetables

PROJECT SUMMARY

Because Southeast Michigan farmers cannot compete with the subsidized commodity prices that schools pay for meat and dairy products, the FSEP Farm to School program focused on assisting schools with purchasing fresh fruits and vegetables from area farmers for the school meals program. Through its experience over the past two years facilitating Farm to School programs in Southeast Michigan, FSEP has determined there are not enough farmers in the region growing fruits and vegetables to be able to meet the increased demand from schools. Funding from the USDA Specialty Crop Block Grant Program allowed the Food System Economic Partnership (FSEP) to create and expand opportunities for specialty crop farmers in Southeast Michigan by increasing production and meeting demand for local fruits and vegetables from schools.

PROJECT APPROACH

Schools most often receive processed and pre-cut cut food, and many school kitchens lack adequate food-preparation facilities. This means that farm-fresh food must be delivered in a form that is usable to schools with minimal processing. Workshops and business counseling were conducted to teach local farmers best practices in how to deliver fresh produce along with appropriate delivery methods that meet institutional food safety requirements. Another goal of the program was to educate students about the importance of the region's fruits and vegetables by making the connection about where their food comes from and thereby increasing consumption. Classroom visits by local farmers and outreach in the cafeteria were conducted to teach students about the nutritional benefits associated with the region's fruit and vegetable crops.

GOALS AND OUTCOMES ACHIEVED

Goals were achieved by conducting workshops for specialty crop farmers to increase awareness within the farming community of the opportunities to sell local, fresh produce directly to schools or through food distributors selling to the schools. The workshops focused on teaching participants about food safety requirements, proper packing and grading, how to bid to schools, and how to adapt what they are currently growing to serve the school market.

Objective: Increase purchases of fruits and vegetables from farms in Southeast Michigan by schools participating in the FSEP Farm to School program.

Task: Identify interested farmers by conducting outreach at farmers' markets, farm organizations, and special events to inform the farming community about opportunities to sell fresh produce to schools. Issue press releases about Farm to School opportunities and workshops. (Oct 2009 – Nov 2009) *Farm to School Program Director and Business Development Specialist*

Task: Conduct workshops for farmers to facilitate the purchase of fresh, local fruits and vegetables by school districts in Southeast Michigan. (Oct 2009 – March 2010). *Farm to School Director and Business Development Specialist*

Task: Identify interested schools in Farm to School expansion and identify partnering organizations to determine level of assistance needed and level of institutional knowledge about Farm to School. (Oct 2009 – Dec 2009). *Farm to School Program Director*

Task: Identify policy and practice barriers through organizing meetings with partner schools and interested local farms. Identify policy and practice changes to enable the purchase and distribution of fresh, local fruits and vegetables to schools. (Jan – April 2010). *Farm to School Program Director and Business Development Specialist*

Task: Identify workable distribution methods based on needs of schools, farms, and intermediaries. (Jan – April 2010). *Farm to School Program Director and Business Development Specialist*

Task: Work with existing schools to identify imported fruits and vegetables that can be replaced by produce purchased from local farmers and work with schools to promote increased purchases of local produce. (Oct 2009 – April 2010). *Farm to School Program Director*

Task: Facilitate supply, distribution, and delivery of fresh, local farm foods into participating schools. (May – June 2010 & Sept – Dec 2010). *Farm to School Program Director and Business Development Specialist*

OUTCOMES

Press releases about the Specialty Crop Block grant were issued to local media outlets including markets in Detroit, Washtenaw and Jackson counties. Coverage was obtained in the *Jackson Citizen Patriot*, and Detroit's Fox News. Various interviews were conducted to raise awareness of the program.

Due to efforts of Rehmann and interest from the Detroit Public Schools (DPS) Food Service Directors, a pilot Farm to School program in Detroit was launched during fall 2009 increasing opportunities for specialty crop producers to sell directly to DPS. This major expansion for the Farm to School program involved 18 schools with a three-year plan to implement the Farm to School program district-wide. DPS desires to purchase fresh produce from urban farmers in Detroit as much as possible.

Throughout the grant period, Rehmann provided information via the FSEP Farm to School email listserve to Food Service Directors in the region about produce availability from the Lesser Farm in Dexter, Grazing Fields Egg Co-op, D-Town Farms, Grown in Detroit Co-op, Curtis Farms in Napoleon, Todosciuk Farms in Howell, Fusilier Family Farms in Manchester, the Michigan Celery Co-op and the Michigan Bean Trading Company, a dried bean Co-operative in Pigeon.

Outreach was conducted by Rehmann at the 2009 Statewide School Superintendents conference in Traverse City and networked with school administrators to share information about Farm to School and the benefits of connecting schools with local farmers who produce

specialty crops. More than 600 superintendents attended the conference and many were interested in learning more about Farm to School. Both Rehmann and FSEP Business Development Specialist, Jane Bush presented information about opportunities for fruit and vegetable producers at the Bioneers conference from October 17-18, 2009. Outreach with specialty crop producers was conducted at the MSU Product Center's "Making It In Michigan" conference on November 13, 2009 and at the Great Lakes Fruit and Vegetable Expo from December 8-10, 2009. On December 9 at the GLFV Expo, Rehmann presented information about opportunities for specialty crop producers to sell to institutions as part of a break-out session which included approximately 50 attendees.

During the spring of 2010, Rehmann worked with Saline Public Schools, Dexter Community Schools, Whitmore Lake Public Schools in planning the implementation of Farm to School programs thus expanding the program even further throughout Southeast Michigan. Outreach to specialty crop farmers was conducted by Bush at the Michigan Family Farms conference in Battle Creek on January 16, 2010, the Michigan Good Food Summit in Lansing on February 25, 2010, the Michigan Organic Food and Farming Alliance on March 6-7, 2010, and the FSEP annual conference on June 24, 2010. As building relationships between farmers and buyers is such a crucial component of a local foods program, Bush and Rehmann conducted a series of networking sessions to bring interested parties together. Networking events were held in Jackson, Adrian and Ann Arbor several times throughout the year. FSEP also led a community discussion "Putting the Michigan Good Food Charter to Work" to build support and increase awareness of the local food movement and benefits to specialty crop producers in Southeast Michigan. Outreach was also conducted at the GLFV Expo through the FSEP booth from December 7-9, 2010.

WASHTENAW COUNTY

During the fall of 2009, Bush conducted one-on-one business counseling sessions at the Chelsea Public Library to 10 participants to provide assistance to food and farm businesses including specialty crop producers to allow for the expansion of existing businesses. During 2010, Bush has been facilitating relationships with specialty crop producers including Alward Farm, No Bad Days Farm, Paradise Farm, Snick's Farm and Allegiance Hospital. Bush has also facilitated the expansion of the University of Michigan's (U-M) local food purchasing program as the University plans to increase local produce purchases campus wide and in all dining facilities. Local food purchases at U-M have increased dramatically over the past two years due to the efforts of Bush and the specialty crop producers she has been working with that are selling to U-M.

Ann Arbor Public Schools

Rehmann searched for Michigan produce available at the terminal market (celery, parsnips, bell peppers, radishes, turnips, potatoes, winter squash, apples, apple cider) and encouraged the Food Service Director to request Michigan specialty crops from his vendor, even if farmer identity was not available. May 2010, was the first time local produce was used in the Farm to School program during the spring and demonstrated a commitment by the food service department to source Michigan grown produce when available. The 2010/2011 school year was marked with growth as well, as the program shifted from serving one local food item a week to serving fresh fruits and vegetables three times a week in September and October. Michigan grown winter squash, apples, sweet potatoes and white potatoes continued to be purchased and used in the school meals program through December 2010.

Saline Public Schools

In the early part of 2010, Rehmann met with Julie Harsh, Food Service Director of Saline Public Schools. The Farm to School program was formally launched in May with asparagus, rhubarb and other local items. During the summer of 2010, Rehmann facilitated the development of a bid request sheet representing seven school districts, including Saline, that requested 43 different types of fruits and vegetables for use in the school districts farm to school program.

Ypsilanti Public Schools

Meetings were held in early fall 2010, with the launch of the program beginning in November 2010. Rehmann advised sourcing specialty crops that required no prep due to the school's tight labor budget and decided that apples and potatoes would be easy to work with this winter. November was apple month, and apple facts were announced in each school over the intercom every day. Rehmann provided the school district with apple posters from the Michigan Apple Commission and created Farm to School information boards for display during parent teacher conferences held in November.

WAYNE COUNTY

Detroit Public Schools

Rehmann assisted in locating additional produce, as the number of students purchasing school lunch at the 18 pilot schools had increased from an estimated 3,500 to more than 5,700. DPS held their first local food day on September 17 and it was a huge success! Students at Robeson Academy asked for local food every day.

Outreach to specialty crop producers was conducted by Rehmann and Bush at the Wayne State Farmers' Market and at the Greening of Detroit – "Grown in Detroit" Collaborative. On November 19, 2009 Rehmann attended the DPS Local food day at Farwell Middle School. Students were served acorn squash from Todosciuk Farm in Howell.

The food service staff purchased up to 10 different varieties of Michigan apples from local growers during March. One of the challenges for DPS is that they wish to have produce processed into certain serving sizes and there are no food processors in the region that can supply the schools. The FSEP Farm to School program was in high gear during the spring with Asparagus Month in May. Rehmann helped DPS purchase asparagus from Joe Luellen and Associates.

During fall 2010, Bush and Rehmann continued to provide technical assistance to DPS in sourcing produce from specialty crop producers in Southeast Michigan. The DPS Farm to School program has expanded from 18 schools to 45 schools and is reaching students in all grades, K-12. Rehmann serves as a key member of the Schools Work Group for the Detroit Food and Fitness Collaborative.

Detroit Charter Schools: Nsorma Institute, Aiesha Shule, WEB Dubois, Timbuktu

Produce was incorporated into the school lunch program during the fall of 2009 and has continued to grow. Touch of Class Catering and D-Town Farms have developed a strong relationship that is allowing for expansion of the farm to school program in these schools.

Detroit Charter School: University Prep Academy and University Prep Science and Math (UPrep)

During the winter of 2009 and spring of 2010, Rehmann attended monthly meetings with UPrep Healthy Schools Collaborative and began to plan local food days for the school cafeterias. The food service operators featured sweet potatoes grown by a collaborative of farmers in Detroit in December.

During January, Rehmann assisted the school in sourcing the local food items for February and March -- apple slices from Peterson Farms from west Michigan, which were available through the commodity foods program for \$2.50/case (100 pk/case). Because Edibles Rex serves more than just UPrep, they purchased 55 cases of apple slices per week to be served over 8 weeks. The UPrep Farm to School program has grown from featuring a local food once a month during the 2009/2010 school year, to featuring local food twice a month as part of the school meals program, in addition to two tasting days during the month during which unique foods are featured such as rutabaga and brussel sprouts. The addition of tasting days during the month allows the food service to expose students to seasonally appropriate fruits and vegetables and increase their palate.

JACKSON COUNTY

Through various networking events hosted by FSEP, the food service directors of Concord Community School's, Jackson Public Schools, and Northwest Community Schools began working with Fusilier Family Farms of Manchester for the 2009/2010 school year. Through FSEP's facilitation of a networking event in December 2009, Fusilier Family Farms began working with DuRussel Farms, also of Manchester, and were able to begin providing the three school districts with potatoes. In turn, DuRussel Farms began distributing Fusilier Farm's apples to Michigan Department of Corrections, Region III facilities. FSEP has aided in the development of strong relationships between the food service directors, farmers and created an efficient ordering and delivery system, that has allowed the Farm to School program at all three school districts to expand dramatically for the 2010/2011 school year.

During fall 2009, Rehmann met with Napoleon Public Schools Food Service Director, Andrea Haskell and discussed the type of support she would need from FSEP for the 2009/2010 school year. Haskell asked that FSEP continue to facilitate relationships with specialty crop producers by providing information on who is interested in selling to the schools and what produce is available, and to assist the school district in marketing the program. Haskell has been purchasing produce from Curtis Farms in Napoleon and has been serving as much local produce as possible.

Bush presented information about the opportunities for specialty crop producers through season extension production and direct marketing on January 20 at the Jackson Agriculture Council meeting. Bush also conducted a workshop at the Jackson Public Library on February 6 with 30 participants in attendance. The workshop was focused on increasing the financial viability for specialty crop farmers through the CSA business model, direct marketing, season extension techniques, and on-farm sales.

MONROE COUNTY

On December 7, 2009 Bush conducted one-on-one business counseling sessions to six participants to provide assistance to food and farm businesses including specialty crop producers to allow for the growth of existing businesses and launch of new ventures. Since August 2010, Bush has been providing business counseling services to the McLaughlin Farm, a 20-acre diverse farm operation.

During July 2010, Rehmann met with Dundee School's Food Service director, Zachary Cohen, about the Farm to School and the technical support FSEP is able to provide. During their July 2010 meeting, Cohen shared that he is seeking to purchase from specialty crop producers in Dundee, Tecumseh and Clinton. However, he does not understand the procurement procedure for their company, so FSEP can connect them with the farmers who are best suited to meet

their needs. Sysco Detroit is his current supplier, so FSEP suggested that Cohen ask Sysco Detroit about product that is locally grown. Rehmann is working to address these barriers with the goal of starting a program in this district in 2011.

LENAWEE

Over the course of the past year, Bush has been providing business counseling to John Craig, a farmer in Adrian who is interested in selling to Saline schools. This farmer has a full-time job, and is farming part-time. He is also interested in selling to restaurants and Bush has been assisting in making this connection. Bush assisted with local sourcing efforts for the “Art-a-Licious/Food-a-Licious” annual event in Adrian in September.

OTHER

During October 2009, Bush assisted Alward Creek Farms located in the Dewitt/St. John’s area with development of a marketing plan for their transition potatoes in order to expand the operation. She also provided expertise in grading, packaging, distribution and customer service. Through Bush’s assistance, connections have been made to the University of Michigan, Eastern Michigan University, and Zingerman’s Delicatessen. Bush also assisted the specialty crop business, Todosciuk Farm in Howell in connecting them to Detroit Public Schools as part of the Farm to School program.

During April 2010, Rehmann presented information about the Farm to School program to a joint meeting of Washtenaw/Livingston food service directors in Hartland. Food Service Directors and cooks from Dexter, Howell, Fowlerville, Whitmore Lake, Saline and Hartland were in attendance. Farmers Gwen Kato (Fowlerville) and Joe Luellen were in attendance, along with Eric Hahn of Locavore Food Distributors. Rehmann discussed how to start a Farm to School program and resources/tools available to help with promotion of the program.

During the annual FSEP conference held on June 24, 2010 at the Jackson Career Center, Bush and Rehmann conducted sessions for farmers focused on how to sell to institutions and expand operations including how to form co-operatives, marketing Farm to School programs, and integrating Farm to School into the school. Other sessions geared to specialty crop producers featured food safety on the farm, and a panel discussion on successful CSA operations. Rehmann and Bush also sourced the food for the conference from specialty crop producers in Southeast Michigan including the Chestnut Growers cooperative, Grown in Detroit, Apple Schram Orchards, Fusilier Family Farms, Garden to Go CSA, Snick’s Farm, No Bad Days Farm, Pregizter Farm, Grazing Field Co-operative and Michigan Bean Trading Company.

Objective: Increase access to healthy local foods by children in participating schools thereby increasing the likelihood of healthy weight in children.

Task: Create and provide localized resource materials for description and promotion of Farm to School Program to participating schools. (Oct 2009 – Dec 2010). *Farm to School Program Director*

Task: Assemble and provide educational resources for nutrition education, related classroom curriculum, school gardens, farm field trips, and other related educational efforts to enhance effect of project. (Oct 2009 – Dec 2010). *Farm to School Program Director*

WASHTENAW COUNTY SCHOOLS

Ann Arbor Public Schools

During the 2009/2010 school year there were 57 classrooms averaging 25 students each requesting visits. (Numbers for the 2010/2011 school year are not yet available.) Deb Lentz and staff from Tantre Farm in Chelsea conduct classroom visits, along with Alex Young, owner of Cornman Farms in Dexter and Managing Partner of Zingerman's Roadhouse in Ann Arbor. Lentz has teacher certification and both she and Young have demonstrated their ability to connect the students with the nutritional value of the fresh produce and where the food came from in order to increase consumption.

A local food rescue operation, Food Gatherer's has served as the conduit for fresh produce distribution at the preschools on Thursdays, utilizing locally grown produce donated by specialty crop producers selling at the Wednesday Ann Arbor Farmers' Market.

The Farm to School program has expanded beyond Farm Fresh Fridays and is now marketed as Farm Fresh Features as the Food Service Director has worked to purchase more specialty crops to serve to students. During the fall of 2010, local produce was served multiple times per week.

During the June 2010 meeting, the Farm to School Collaborative discussed the Farm Fresh Features for the upcoming school year and ways to prepare in advance for local food days and also discussed the need for increased communication to the broader community about the Farm to School program and brainstormed ideas of places around town to display the farm fresh feature posters.

Saline Public Schools

In February, Rehmann met with Julie Harsh, Food Service Director to continue working on building the Farm to School program with the launch occurring in May 2010. Saline is actively working to secure funding for several hoop-houses which will produce salad greens for the school meals program and provide Agri-science students with business opportunities and provide the students with the necessary skills to grow specialty crops.

DETROIT PUBLIC SCHOOLS

Rehmann utilized student volunteers from Wayne State to create posters highlighting the Farm to School program which were displayed in the school cafeterias. During mid-October 2009, Rehmann conducted meetings with DPS Food Service staff and finalized details for the local food day held on October 14. Rehmann created and distributed produce posters on zucchini, summer squash, tomatoes, peppers, watermelon for schools to display on local food days.

JACKSON COUNTY SCHOOLS

Concord Community Schools conducted a local food cooking demo with Chef Brian Renz of Taher Management Company. At the demo, Rehmann shared information about the Farm to School program with Chef Renz and why/how the program works. Chef Renz travels to schools around the country doing cooking demos and would like to encourage the food service directors he meets to purchase more local food. He was very excited about the quality and freshness of the ingredients Concord, Jackson and Northwest are purchasing from our local farmers.

Concord Food Service Director Alan Breneman noted that much progress was made during the fall of 2010 in implementing Farm to School in Concord, Jackson, Northwest, and the YMCA Camp Storer. FSEP facilitated getting buy-in from Washtenaw County farmer, Kathy Fusilier. Fusilier has been delivering fresh produce to Jackson area schools since the fall of 2009. She

has now planned what to grow for Jackson area schools and supplied them with specialty crops during the spring and fall 2010 which allowed her to increase sales to the schools.

During November 2009, Rehmann provided the Napoleon Food Service Director with farmer contact information for local apple purchases and marketing materials to post throughout the schools and cafeterias about apples. During December, Rehmann created and distributed produce posters on winter squash for schools to display on local food days.

STATE/NATIONAL

FSEP was approached by the Community Food Security Coalition (CFSC) and the National Farm to School Network to serve as the local host for the National Farm to Cafeteria conference that was held in Detroit during May 17-19, 2010. Rehmann served as the planning coordinator for the conference which drew over 700 attendees from across the country and even beyond our nation's borders including Brazil, Canada and the Netherlands. This was the highest attended National Farm to Cafeteria conference in CFSC's history. Bush and Rehmann worked closely with specialty crop producers across Michigan to source the food for the conference and highlight the local food efforts across the region including purchases from Giving Tree Farms, Peterson Farms, Purity Foods, Uncle John's Cider Mill, Dawn Foods, Michigan Apple Committee, Locavore Food Distributors, Ypsilanti People's Food Co-op, Alward Creek Farms, Bur Oaks Farm, Avalon International Bakery, Zenner Farms, Ann Arbor Tortilla Company, Michigan Bean Trading Company, Mike Pirrone Produce, American Sweet Bean Company and Zingerman's Deli..

Along with many volunteers, Bush and Rehmann planned and coordinated field trips to schools and institutions including Tappan Middle School in Ann Arbor, the University of Michigan, Earthworks Urban Farm, the Student Organic Farm at MSU, Eastern Market Produce Distribution Companies and DuRussel Farms, to showcase the specialty crop production and sourcing that has grown throughout the region and how each of this programs works to purchase food from Michigan farmers.

Rehmann attended the Healthy Kids, Healthy Michigan Coalition meeting in Lansing in November 2010 and learned about the various committees and goals for 2011. Several aspects of the Coalition's work align with the goals of Farm to School including working to increase access to fresh and healthy food access through PA 231 and working to increase community and school gardens in underserved areas. The Farm to School program also aligns with the Education Policy Action Team which has been working with the Michigan Board of Education on adopting new nutrition standards and encouraging the inclusion of whole foods in school vending machines. This provides an excellent opportunity for specialty crop producers. The Coalition is also encouraging faculty role modeling so that teachers will eliminate food as a reward in the classroom and are supporting the shift to healthier options in concession stands, at conferences, school open houses, events ,etc. As these changes continue to take place, the opportunity for specialty crop producers to serve these markets will grow.

Objective: Increase production of fruits and vegetables in Southeast Michigan to be able to supply schools with fresh produce during the school year.

Task: Conduct classes with beginning farmers about successful fruit and vegetable production. (Oct 2009 – Dec 2010). *Business Development Specialist*

Task: Conduct season extension classes for fruit and vegetable production with new and existing farmers. (Oct 2009 – Dec 2010). *Business Development Specialist*

Objective: Measure outcomes and success of Farm to School program and increased production and consumption

Task: Construct evaluation tools for gathering of input data. (*Oct 2009 – Dec 2009*).
Farm to School Program Director

Task: Gather and track school purchasing data of local fruits and vegetables to measure increased purchases and consumption of fruits and vegetables. (*Oct 2009 – Dec 2010*).
Farm to School Program Director

Task: Interview and survey all participating parties. (*June 2010 – Dec 2010*). *Farm to School Program Director*

JACKSON COUNTY

On February 23, 2010 Rehmann and Bush conducted a Meet & Greet event for farmers and food service professionals at the Jackson Coffee Company. Approximately 20 people participated and shared ideas about how to tap into local markets and expand opportunities for specialty crop producers. The farmers in the meeting began discussing ways they could work together and since the meeting, began working to establish a four seasons growers co-operative to meet the demand for year round locally produced food. Food Service Director, Brant Russell of Jackson Public Schools attended and was representing Jackson Public Schools, Northwest, Concord and the YMCA Store Camp and stated that if more local produce was available, they would purchase it. The Conference Coordinator for Spring Arbor University (SAU) was also in attendance and expressed an interest in exploring ways SAU could incorporate local food and support sustainability as a way to set the university apart from others in the area. Since this meeting, Rehmann and Bush have hosted regular networking events in Jackson to increase opportunities for specialty crop producers and connecting them with food purchasers.

During October 2010, Rehmann and Bush planned and coordinated “Jackson Community and Local Food Conversation” event held in October 19, in partnership with the Jackson Community Action Agency as part of a community food profile commissioned by the agency. Approximately 20 people attended the event which served as a networking opportunity to share information about FSEP services including the Farm to School program and business planning support for specialty crop producers.

LENAWEE COUNTY

During March 2010, Rehmann and Bush developed and promoted “*Growing for Local Markets*” workshop which was presented in Adrian. The workshop was designed for farmers interested in entering the local food market and presented information about the demand from area institutional buyers, cold crop storage, hoophouse production, food safety, and marketing.

WASHTENAW COUNTY

Bush was instrumental in planning the Small Holder Farm and Career Day held at Washtenaw Community College on April 19, 2010. The event was planned as a method to assist specialty crop producers with identifying interns and employees for the upcoming season and as a way for WCC students to connect with local farmers and community supported agriculture programs (CSAs) to learn about jobs in agriculture. The program was a success as many businesses hired employees they networked with at the job fair. Due to the event’s success, it will be held again in February 2011. Additional time will added to the day’s events to allow farmers and food service professionals the opportunity to network, with the goal of increasing the purchase of specialty crops by schools, restaurants, catering companies, universities and hospitals during the 2011 growing season.

ALL SCHOOLS IN FARM TO SCHOOL PROGRAM

May 2010 was Asparagus Month! Rehmann assisted school food service directors in Concord, Jackson, Northwest, Napoleon, Dexter, Saline, Detroit and University Prep connect with farmers (through Joe Luellen and Associates) for asparagus day in schools. Ann Arbor Public Schools also served asparagus, which was sourced from their broadline distributor. Nearly all of the schools served asparagus during the week of the National Farm to Cafeteria Conference. Rehmann assisted in marketing the asparagus to increase consumption, by providing the schools with information posters on asparagus for display in the school cafeterias, as well as, wrote press releases and a newsletter for distribution across each district. Food Service Directors noticed an increase in consumption and many students noted it was the first time they had ever been served asparagus in school!

BENEFICIARIES

Producers of the specialty crops listed in the chart below are beneficiaries of this project. The following information represents purchases of specialty crops for three school districts as reported to FSEP during the 2009/2010 and 2010/2011 school years. The charts below demonstrate the impact the Farm to School program can have on the purchase of fresh fruits and vegetables from specialty crop producers.

Concord Community Schools, Northwest Community Schools, Jackson Public Schools and YMCA Camp Storer in Jackson County

Local Food Purchases
(Concord, Northwest, Jackson school districts and YMCA Camp Storer)
Fall 2009 v. Fall 2010

Item	2009 quantity	2010 quantity
Apples	246 cases	271 cases
Broccoli		21 cases
Cabbage		6 cases
Carrots	1/2 case	
Cauliflower		1 cases
Cucumber	5 cases	10 cases
Eggplant		3 cases
Onions		8 cases
Peas		1 cases
Peppers	10 cases	17 cases
Potatoes - Red	1 case	25 cases
Potatoes - White		45 cases
Sweet Corn	2 cases	2 cases
Sweet Potatoes		2 cases
Tomatoes	44 cases	40 cases
Tomatoes - grape		17 cases
Watermelon		68 cases
Winter Squash		8 cases

During the 2010/2011 school year, the Farm to School programs in Jackson, Northwest and Concord have featured the produce described above including: seven varieties of apples (Paula Red, Ginger Gold, Gala, Macintosh, Jonamac, Golden Delicious, and Fuji), two different varieties of winter squash (Blue Hubbard and Acorn) and green and red peppers and cabbage.

LESSONS LEARNED

Evaluation of the Farm to School program was conducted by collecting anecdotal information from the food service directors, specialty crop producers, and other stakeholders. One concern that was expressed was that the capacity of FSEP staff to provide technical assistance is limited due to resources and a large service area. Detroit Public Schools requires more hands-on assistance on a daily basis due to challenges faced by the school district. However, FSEP staff is unable to provide daily assistance due to limited staff. Seasonality continues to be a concern for school food service directors as they desire to purchase specialty crops throughout the school year, but producers are unable to provide an adequate supply of produce during the cold, dark winter months of January and February. This presents an opportunity for crops produced in hoop houses and those that utilize cold storage techniques as there is a market for locally grown produce year round. Processing is also a gap for specialty crop producers as

some school districts desire to have produce processed prior to arrival at the school as they do not have the labor budget to process whole produce.

FSEP received state-wide and national exposure due to the National Farm to Cafeteria conference. Conference evaluations were positive especially the pre-conference field trips that Rehmann organized which highlighted the Farm to School program, urban farming efforts and distribution systems for locally grown food. The field trips were so popular, an additional bus needed to be added for the Farm to School field trip, raising the number of field trip participants to approximately 270 people. FSEP conducted two sessions at the National Farm to Cafeteria conference which one session focused on FSEP as a regional model for food system change and the second focused on marketing Farm to School programs. The evaluations of these sessions showed they were effective in increasing knowledge about Farm to School programs and which tools work for promoting the program.

Conference evaluations from the FSEP annual conference showed that the “Marketing Local Foods in Schools”, “Integrating Farm to School in Your School”, and “Gaining Ground for Local Foods through Cooperatives” workshops were well received and participants gained useful knowledge from these sessions.

In August, with assistance from the MSU Product Center, Bush conducted a survey to specialty crop producers to learn about interest and capacity in season extension and specialty crop production in preparation for working with producers in forming a cooperative. The survey clearly showed an interest and willingness of specialty crop producers in meeting market demand by forming a cooperative specifically focused on season extension crops. Since then, Bush has been instrumental in advising the cooperative members in all aspects of the process of forming this venture and purchase agreements have been made with Allegiance Health with the potential to serve schools in Southeast Michigan.

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ADDITIONAL INFORMATION

http://www.michigan.gov/documents/mda/Food_System_Econ_Partnership_-_Feeding_the_Farm_348410_7.PDF

[RSS; http://www.fsepmichigan.org/](http://www.fsepmichigan.org/)

PROJECT TITLE

New Apple Varieties Optimized for Michigan’s Nutraceutical Industry

PROJECT SUMMARY

This project addressed the potential to exploit Michigan apple production infrastructure for production of apples as *nutraceuticals* (nutrition/pharmaceuticals) and *functional foods*. Nutraceuticals are defined as processed foods or food extracts that have a medicinal effect on human health. Functional foods are defined as normal components of the human diet that have health-beneficial effects. As the apple is already the ultimate functional food, it has high

potential to be developed as a source of nutraceuticals. Anthocyanins are natural compounds that create the red color of the apple skin. These and closely related compounds called anthocyanidins are members of larger classes of chemical compounds termed flavonoids and phenolics, which are widely considered to benefit human health as antioxidants, a major focus of the multi-billion dollar nutraceutical industry. In previous work, we analyzed three naturally occurring apple cultivars for anthocyanin content and antioxidant capacity. These cultivars either accumulate abnormally high levels of anthocyanins in skin, or accumulate anthocyanins in the flesh (turning the flesh a dark red color). The three cultivars tested are known as novelties and have no current market value. However, these and similar varieties could easily be developed as a source of extractable anthocyanin. As these compounds are relatively scarce in nature, and demand for natural flavonoids far exceeds supply, their ready availability in apple would almost certainly lead to an exceedingly profitable market for Michigan growers.

PROJECT APPROACH

During the period of natural fruit ripening (mid-August through early November) in 2009 and 2010, we evaluated and documented both internal pattern and intensity of anthocyanins within fruit internal tissues in four major apple (*Malus*) live collections: the USDA-ARS collection in Geneva, NY, the UK National Fruit Collection in Brogdale, Kent, UK, the Canadian Clonal Genebank in Harrow, Ontario, and the Michigan State University *Malus* collection in East Lansing, MI. In all, we analyzed over 3,000 distinct domestic apples, crabapple varieties, and wild species. We classified these into groups based on similarity of anthocyanin pattern and intensity, and established genetic relationships using molecular genetics techniques and historical records. We also compiled limited yield and disease resistance data for a subset of the most potentially valuable red-fleshed apples that we identified. We extracted juice from a variety of red-fleshed apples for biochemical analysis and anthocyanin identification. Juice was subjected to analysis for acidity (pH and extractable acidity), color, sugar content, and total phenolics. This information is immediately useful to growers considering using the varieties for red juice.

GOALS AND OUTCOMES ACHIEVED

Significant results, accomplishments, conclusions and recommendations: Our work revealed several aspects of red-fleshed apples that should be of interest for production and breeding. We identified many, generally unrecognized genotypes that exhibited internal pigmentation that was typically intense and broadly distributed within the flesh. Most of the most popularly planted ornamental crabapples are derived from open-pollinated progeny of 'Niedzwetzkyana', or from 'Niedzwetzkyana' x *M. baccata*. These ornamental varieties are notoriously susceptible to diseases including apple scab and fire blight (Jefferson, 1970). However, included in the parentage of other red-fleshed varieties are a diverse range of species (*M. coronaria*, *M. halliana*, and *M. sieboldii*) and interspecific hybrids [*M. x scheideckeri* (= *M. floribunda* x *M. prunifolia*), *M. atrosanguinea* (= *M. halliana* x *M. toringo*), and *M. x arnoldiana* (= *M. baccata* x *M. floribunda*)]. This genetic diversity should be exploiting to create informed crosses generating new cultivars with superior qualities for industrial nutraceutical production from fruit, including disease resistance, yield, ease of mechanical harvesting, and degree of anthocyanin accumulation. We performed biochemical analysis of juice and extracted and documented anthocyanins. Some of the varieties showed high levels of anthocyanins and this will be studied further to develop nutraceutical products in the future.

P. Schwallier managed propagation of the selected varieties, and is maintaining these and managing orchard trials. M. Nair was responsible for anthocyanin analysis of the fruit. S. van Nocker managed the evaluation and documentation, and otherwise directed the study.

For this project we completed the following activities:

- Evaluation and documentation of fruit flesh color and pattern among over 3,000 apple cultivars in Michigan, New York, England and Canada
- Literature review and compilation of data on production characteristics and disease resistance for selected cultivars
- Biochemical analysis of juice derived from a subset of red-fleshed apple cultivars
- Extraction and analysis of anthocyanins by HPLC
- Nursery propagation and test orchard establishment for ten selected cultivars
- Production of a manuscript for publication in a peer-reviewed scientific journal
- Production of an article submitted to a fruit grower's newsletter
- Reporting of results to the Michigan apple industry at a regional industry meeting

We also made progress towards long-term objectives. Red-fleshed apple varieties identified in this study could easily be developed as a source of extractable anthocyanin to provide a complementary, potentially highly profitable market for Michigan growers. However, to make this idea a reality, two additional hurdles have to be overcome. First, methods for extraction and processing of the compounds need to be optimized. Second, marketing and market assessment devices must be implemented. Although these aspects were not included in this project, they would form the basis for long-term work. Also, although not proposed here, the work would also be the first step in the development of a 'super-charged' antioxidant apple as a novel functional food specialty crop fine-tuned for Michigan growers. All original objectives of the project were completed.

The project has only long-term quantitative goals, that being the establishment of industrial anthocyanin production within Michigan. This will be measured by value of the industry compared with present (zero).

BENEFICIARIES

Existing and prospective apple growers in Michigan and elsewhere can use this analysis in selection of varieties to be grown for industrial anthocyanin production. Scientists and plant breeders can use the information for selection of varieties for further optimization through breeding.

Potential economic impact of the project:

We hope to identify a low-maintenance, high profit apple crop. This is possible as many of the varieties are disease resistant, require no intensive training systems, and are amenable to mechanical harvesting and processing. Juice would be expected to command a premium price. There is also potential for red ciders. The development of a nutraceutical apple industry would provide immediate profits to growers, could expand the industry, and offers potential for Michigan's new bio-economy.

LESSONS LEARNED

This effort was greatly facilitated by maintenance and organization of large numbers of *Malus* accessions in nationally-funded germplasm collections. This trait is but one of hundreds that could contribute to the health of the apple industry. For many of these traits, these collections hold key varieties that can be used in breeding to greatly improve current varieties. The research carried out was preliminary and more work needs to be done. There are no pitfalls identified so far related to this project except that the high anthocyanin yielding plants are not yet abundant enough to afford enough fruits for processing.

Michigan apple growers are finding it increasingly difficult to compete nationwide for fresh market and are also frequently at a competitive disadvantage for juice production. Specialty varieties optimized for Michigan production will be increasingly important to ensure the continued viability of the Michigan apple industry. In this project, we initiated the development of a new market for Michigan apple growers, by identifying novel apple varieties and wild species that produce high levels of valuable anthocyanin compounds in the fruit, selecting those that are optimal for Michigan cultivation, and providing growers with the resources needed to establish such varieties as rich sources of anthocyanin for juice and food additives. Such compounds are generally considered to benefit human health as antioxidants, anticancer and anti-inflammatory agents, and are in very high demand. The ready availability of these compounds in such apple varieties will provide a complementary market for Michigan apple growers that would sustain the industry over seasons that are non-profitable for traditional (juice and fresh) markets.

CONTACT PERSON

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ADDITIONAL INFORMATION

- A manuscript detailing the genetics aspects of this project, titled "Genetic diversity of red-fleshed apples (*Malus*)", has been submitted for publication in the plant breeding journal *Euphytica*.
- Another manuscript describing the results of biochemical analysis of fruit is in preparation.
- A website is in development (redfleshedapples.org) that can provide a resource for producers, scientists, educators, and the general public.
- The project provided training opportunities for numerous undergraduate and high-school students in basic agriculture and genetics.

http://www.michigan.gov/documents/mda/MSU_New_Apple_Varieties_Optimized_791N02_00091_Final_353584_7.pdf

PROJECT TITLE

State-Wide Weed Control Initiative for Michigan Nursery and Landscape Industries

PROJECT SUMMARY

1. Maximize pre-emergence herbicide efficacy by evaluating specific herbicide/weed interactions in different regions of Michigan, factors affecting herbicide degradation (irrigation; substrate components; herbicide rates), timing of application and ornamental plant tolerance.
2. Investigate strategies for controlling weeds with non-chemical cultural practices, such as bio-herbicide mulch combinations and bio-rational approaches to reduce overall costs and amounts of herbicides applied.

PROJECT APPROACH

Characterize the diversity and abundance of weedy plants present in the propagule banks at different nurseries and adjacent wild areas in Michigan.

GOALS AND OUTCOMES ACHIEVED

Addressing Objective 1:

A. Phytotoxicity and efficacy of several products to control liverwort

Significance to the industry: Weed control is essential in containerized nursery crops and continues to be a major expense for nursery growers, with some crop species having few, if any labeled herbicides. The IR-4 program helps to alleviate nursery growers' problems by adding new uses to existing pesticides or new pesticides for nursery/landscape use and other 'minor use' cropping industries. Growers should use the IR-4 program because it is based largely on growers' needs. Anyone can go to the website www.ir4.rutgers.edu and list the needs of their operation. The objectives of this trial were to look at phytotoxicity and efficacy of a number of pesticides for control of liverwort. Plant forms such as silver thread mosses (*Bryum argenteum*) and common liverwort (*Marchantia polymorpha*) are problematic in container production (Mathers, 2003) and have spread throughout the United States nursery industry at an alarming rate (Fausey, 2003). Both are considered highly invasive and difficult to control pests in containerized ornamentals (Fausey, 2003). Reasons for their spread are not always clear. Ornamental liners commonly infested with liverwort or moss are produced in one region of the country and then shipped to another for finishing, and shipped again for retail. Liverwort is in the division Bryophyta. They are very primitive plants that have no leaves, roots, stems or vascular tissue and reproduce vegetatively and/or by spores. Products that have performed well in this study merit further testing are Scythe, SureGuard and TerraCyte.

Detailed information on the materials and methods can be found in the report located in "additional information".

Phytotoxicity.

Spring Meadow. At 1 and 2 WA1T, it was difficult to distinguish phytotoxicity because plants were either still dormant or just coming out of dormancy at all locations. This is evident in the visual ratings from one evaluation to the next. At Spring Meadow Nursery, phytotoxicity was not evaluated at 1 and 2 WA1T. However, by 4 WA1T, all species had come out of dormancy. *Syringa* expressed phytotoxicity from applications of Bryophyter and Scythe; many of the treatments, including the controls, had visual ratings higher than commercially acceptable due to death unrelated to the treatments. *Hydrangea* was unacceptably injured by Scythe, SureGuard, and Terracyte.

Lincoln. At 2 WA1T, the only treatment not phytotoxic to any of the species at Lincoln Nurseries was the WeedPharm. *Buxus* was unacceptably injured by Champ, Scythe, SureGuard, and Tower and also by Bryophyter and Racer at 2 WA1T. Bryophyter and Racer may have just caused a delay in bud break, as these two treatments did not cause harm at any other evaluation date. *Berberis* was unacceptably injured by Scythe, SureGuard, Tower, and Terracyte, and by 4 WA2T, many were dead from these treatments. There were only two treatments that did not affect *Ilex* at any evaluation date, Racer and WeedPharm. All other treatments injured *Ilex* at some point; however, Scythe, SureGuard, and Tower consistently provided unacceptable ratings across evaluation dates, starting with 2 WA1T. *Buxus* and *Ilex* were affected by application timing, and the timing also seemed to affect bud break. The effect of early applications on delaying bud break could explain some of the variation in visual ratings across dates. *Thuja* was injured significantly by a few treatments in comparison to the control, but once again, Scythe caused commercially unacceptable ratings.

Zelenka. Only two treatments, SureGuard and Bryophyter, were applied at Zelenka due to the small amount of liverwort present. SureGuard injured all species tested; however, *Viburnum*

and *Juniperus* were injured only briefly after the first application and fully recovered by the end of the trial. *Euonymus* and *Chaenomeles* were significantly injured by SureGuard and did not recover.

Efficacy.

Scythe is a nonselective, "contact" type herbicide that is very fast acting on susceptible species; it quickly kills liverwort. However, Scythe does not provide residual control, so frequent applications are necessary. This is evident in the evaluation ratings for Scythe across dates. By 4 WA1T, liverwort in the Scythe treatment had begun to re-infest, especially at Spring Meadow. SureGuard is primarily a preemergence herbicide, although it does have some activity on small weeds. SureGuard acts differently on liverwort, killing it slowly with high efficacy. SureGuard by 4 WA1T provided 100% control of liverwort at Lincoln and Spring Meadow and almost 100% control at Zelenka. In previous research at OSU, liverwort has been controlled postemergence by SureGuard, and SureGuard also has provided up to six months of residual control of liverwort. Tower provided some control of liverwort, but not as well as SureGuard or Scythe. Tower is very slow acting, and the second application seemed to help increase control of liverwort. The only other treatment providing acceptable levels of control was Terracyte, and only at Spring Meadow at 4 WA2T. Other treatments provided little control of liverwort at the rates tested.

SureGuard and Scythe were the only treatments that consistently controlled liverwort, but they also caused the highest levels of phytotoxicity. Scythe killed or injured *everything*. These trials demonstrate that Scythe can be used for spot treatments or as a direct spray, which is indicated on the label. The other treatments provided inconsistent levels of control; i.e. there was some control in some pots, but no control in others. We speculate that increasing the rates of these treatments could provide additional control. From these trials, SureGuard could be used over the top of *Thuja*, *Viburnum*, and *Juniperus*, and possibly *Syringa*. As previously stated, from earlier trials at OSU, SureGuard has provided long residual control of liverwort at the same rates used in this trial. Decreasing the rate could provide acceptable control while also decreasing phytotoxicity. Although Tower did suppress liverwort postemergence, it did not provide complete control. Tower should be studied further to see if it could provide preemergence control of liverwort. Increasing the rate of Tower would not be advised, especially during bud break. Photos and descriptions can be found in the report in "additional information".

Addressing Objective 1:

B. Phytotoxicity of selected herbicides to ornamental plants at three Michigan nurseries

Significance to the industry. Weed control is a major expense faced by the ornamental industry. With the large number of species and the constant addition of new species and cultivars, chemical companies struggle to perform all the research needed for labeling. The IR-4 program was developed by the federal government in association with universities and chemical companies in order to expand pesticide labels for minor use crops, and many companies now rely on the IR-4 program for label expansion for minor use crops. Additional information is needed on the factors that impact herbicide longevity in environments where high organic substrates and irrigation is used to promote plant growth. This information may result in the development of management strategies that increase herbicide longevity. This study has shown Biathalon, FreeHand, the granular form of F6875 and Tower all merit further evaluations in MI nurseries in field and containers. SedgeHammer also merits further field testing due to its ability to deal with some of Michigan's particularly difficult weeds.

Results and discussion. Unless otherwise specified, refer to Table 5 in the report in “additional information” for all herbicides and species discussed below.

Biathalon. Biathalon was tested on *Berberis* at all three locations and *Cornus* and *Potentilla* at Lincoln and Spring Meadow. Biathalon was not injurious at any rate to any of the species tested. Biathalon is a premix of oxyfluorfen + prodiamine for grass and broadleaf control. Biathalon appears to be an excellent combination herbicide for the nursery market, at least for the woody shrubs in this trial.

Certainty. All species that received applications of Certainty were injured by at least the higher rates of Certainty, which included *Berberis* at all three locations, *Buddleia* at Spring Meadow and Zelenka, *Clematis* at Lincoln, and *Viburnum* at Spring Meadow. The *Berberis* at Lincoln was damaged by all rates of Certainty. In addition to severe stunting, Certainty also caused the plants to turn bright red. From previous research (data not shown), Certainty is injurious to a number of ornamental plants and also not very good for weed control at the lowest rate (0.059 lb ai/ac). Certainty is an acetolactate synthesis (ALS) inhibitor; the herbicides in this family are very selective, yet all the herbicides in the ALS family are very different from each other in what they injure or kill. ALS herbicides would be an option for postemergence control of weeds; however, because they are very selective, crop tolerance would be species, and sometimes cultivar dependent.

FreeHand. FreeHand was applied to *Ceanothus xpal*. 'Marie bleu' at Spring Meadow and *Chamaecyparis* at Spring Meadow and Lincoln. FreeHand was not injurious to *Chamaecyparis* at any rate; however, at high rates, it can be injurious to *Ceanothus xpal*. 'Marie bleu', although not beyond commercially acceptable. Other trials (data not shown) indicate that FreeHand will cause stunting to *Ceanothus xpal*. 'Marie bleu' especially if under stress. In this study the Δ GI does indicate a slight stunting injury to *Ceanothus xpal*. 'Marie bleu' compared to the control. FreeHand is already on the market for ornamentals and has a wide label, but caution is urged to not apply too high of a rate.

F6875. F6875 was applied as either liquid or granular, both at the same rates of ai/ac. *Coreopsis* at Lincoln and Zelenka was not injured by the granular formulation of F6875. The liquid formulation of F6875 was applied to *Hydrangea* and *Echinacea* at Lincoln and Zelenka; both species were injured by F6875. The first application was much more injurious than the second as indicated by visual ratings on *Hydrangea*, especially at Lincoln. At Zelenka, the injury included a burn and severe epinasty of the leaves and twigs. The granular formulation of F6875 appears to be more viable for the ornamental market, at least in containerized material.

Tower. Tower was only applied to *Hemerocallis* at Lincoln; it caused slight stunting and yellowing, especially at the highest rate. Tower is currently labeled for ornamentals, exhibits good activity on grasses, and can suppress yellow nutsedge. Tower can cause burning when applied shortly after bud break, which is indicated by the label, so caution should be used. This study indicates that Tower can be used on *Hemerocallis*, but not at high rates.

Mesotrione. *Euonymus* was injured at all rates by mesotrione at the Spring Meadow site. Although mesotrione provides excellent weed control, it can cause severe bleaching (i.e. whitening) to susceptible species such as *Euonymus*. Deciduous trees seem to be the most tolerant of mesotrione based on data from The Ohio State University (2008 Yearly Research Summary Report) (data not shown) and mesotrione should be studied for field use in deciduous trees.

SedgeHammer. SedgeHammer was applied only to *Buxus* 'Green Mountain' in the field at Zelenka Nursery. For the first two evaluations after the first application of SedgeHammer, the *Buxus* appeared uninjured. SedgeHammer, with only one application was efficacious to two very invasive perennial weeds, mugwort (*Artemisia vulgaris*) and Wild Garlic (*Allium vineale*), which were growing in the fields at time of application. SedgeHammer provided stunting of both weeds and residual control, even after the plots were hand weeded. Due to the invasive nature of these weeds and lack of viable control options, further exploration of SedgeHammer at the lowest rate (1X) with various timings to control these weeds is warranted. Phytotoxicity was lowest at the 1X rate and just at commercially acceptable. The second application made apparent the ability of SedgeHammer to cause yellowing and stunting of the *Buxus* (Fig.13). SedgeHammer has caused injury to *Buxus* in containers (2008 OSU Nursery Yearly Research Summary Reports) (data not shown) which this trial confirms. SedgeHammer should not be applied to actively growing *Buxus* in containers or field.

Conclusions

Biathalon, FreeHand, the granular form of F6875 and Tower merit further evaluation in MI nurseries in the field and containers. SedgeHammer also merits further field testing due to its ability to suppress some of Michigan's particularly difficult weeds.

Addressing Objective 2:

A. Bio-herbicide mulch combinations and bio-rationale approaches to ornamental weed control

This study had two objectives: 1) determine the efficacy and duration of weed control of different control methods, including two bark sizes applied as a single layer on the container surfaces; and, 2) assess the phytotoxicity of the different methods in containers.

Results and discussion. Fourteen of the 25 treatments evaluated provided efficacy ratings at or above commercially acceptable ≥ 7 . Seven of these 14 were bio-herbicide combinations with mulch and one was a bio-herbicide + Ronstar mulch combination. Three of the 14 provided phytotoxicity ratings at or above commercially acceptable. These three were all conventional herbicides (SureGuard applied alone, SureGuard $>1''$ and Ronstar $>1''$). The $>1''$ bark was involved in 11 of the 13 highest phytotoxic treatments and there was a significant species by treatment interaction with *Euonymus fortunei* 'Emerald Gaiety' accounting for the majority of the phytotoxicity in the trial. Even the untreated $>1''$ bark provided a rating of slightly above 3 combined over species. We speculate that $>1''$ bark caused plants to be buried too deep as it contained an abundance of fine material. Eight of the bio-herbicide combinations provided phytotoxicity ratings of less than two. The six most efficacious bio-herbicide treated mulch combinations all provided efficacy and phytotoxicity ratings of ≥ 7 and ≤ 2 , respectively, 90 DAT. The Vinegar on $< 1''$ pine bark was very efficacious and provided the same level of weed control as the conventional herbicide Ronstar with less than half the phytotoxicity at 90 DAT. The BH1 plant extract, DU 200ml at 10% and 5% on $<1''$ bark was statistically as efficacious as the Vinegar $<1''$ and the Ronstar; however the phytotoxicity with BH1 was less than half that of even vinegar. Vinegar and BH1 as bio-herbicides combined with mulch evaluated in this study warrant further testing. Comparisons of horticultural vinegars to the industrial 200 grade vinegar used in this trial and the BH1 extract should also be evaluated with various mulches types.

Conclusions

The Vinegar on $< 1''$ pine bark was very efficacious and provided the same level of weed control as the conventional herbicide Ronstar with less than half the phytotoxicity at 90 DAT. The BH1 plant extract or DU 200ml at 10% and 5% on $<1''$ pine bark was statistically as efficacious as the

Vinegar <1" and the Ronstar; however, the phytotoxicity with BH1 was almost half that of even vinegar and 3.5 times less than the Ronstar. The potential of vinegar and BH1 as bio-herbicides combined with mulch shown in this study indicate that further testing is warranted. Specifically, the industrial 200 grade vinegar, horticultural vinegars and BH1 extract should be tested on various mulch types. Also the results warranted testing in a field setting to determine their suitability for use in landscape and nursery field operations.

Addressing Objective 2:

Bio-herbicide mulch combinations and bio-rationale approaches to ornamental weed control 2nd Year

Objectives:

This study continued the 2009 bio-herbicide testing at Sheridan nursery and had two objectives: 1) determine the efficacy and duration of different weed control methods in field, including three barks applied at 2" depth (Vineland Research and Innovation Centre); 2) assess the phytotoxicity of the different methods in the field (Vineland Research and Innovation Centre). Only efficacy data will be presented as phytotoxicity was minimal.

Results and discussion. Five of 28 treatments evaluated provided efficacy ratings at or above commercially acceptable ≥ 7 at 50 DAT, 200 grain Vinegar on Hardwood bark, the Engage Agro vinegar on Hardwood, Scythe applied to any of the three barks with cedar or hardwood slightly better performing than pine. The BH1 at 10% on hardwood from the 2009 experiment had a rating of 6.8 which was not significantly different than the treatments with ratings of seven. At 35 DAT (data not shown) the BH1 at 10% on hardwood had an efficacy rating of 7.0. The WeedPharm, the 200 grain vinegar and the Scythe applied directly provided less than 50% of their efficacy when combined with bark. At the initiation of the trial, we assumed that the three horticultural vinegars would perform the same as each was 20% acetic acid; however, at 35 and 50 DAT there were significant differences in performance. The best horticultural vinegar is the Munger, especially with hardwood bark. The least efficacious vinegar with bark was the WeedPharm. The performance of the Scythe as a bio-herbicide combined with any bark type was a surprise. We had no previous evidence to indicate Scythe would combine well with bark to provide residual weed control. Although the BH1 did not perform as well as in 2009, it was still in the top six treatments for 2010. The field conditions of 2010 were a more stringent test for the bio-herbicides than the containers of 2009. Weed pressure was extremely high as indicated by the control phytotoxicity rating at 50 DAT (3.4 rating). The BH1 10% on hardwood merits further testing in field conditions due to its performance in 2009 and the 2010 evaluations.

Of the six most efficacious treatments, only one, Scythe on pine, provided a phytotoxicity rating above commercially acceptable ≤ 3 . Five additional treatments were phytotoxic (≥ 3): WeedPharm direct, 200 grain vinegar direct, DU 10% on pine, 200 grain vinegar on cedar and the control (data not shown).

Conclusions:

Munger Horticultural Vinegar Plus and Scythe should be evaluated further on various barks especially hardwood, as these were the best treatments in the 2010 evaluation. The BH1 plant extract or DU 200ml at 10% due to its high efficacy and low phytotoxicity warrants further examination with different carriers and perhaps surfactants. More testing with other alleopathic plant extracts could also be performed.

Addressing Objective 3:**A. Characterize the propagule-bank at Michigan nurseries.**

There is a need to develop more data regarding plant groups (e.g. deciduous trees, value, acreage and pests) to help quantify the impacts of Invasive Alien Species, trade (etc.) on U.S. nursery stock. In this project, we will discover whether nursery sites are increasing the frequency of weedy and/or invasive plants *into* natural areas and if certain practices are also responsible for increasing spread. We hypothesize that utilizing standard weed control programs [glyphosate, DNA's, and triazines (in nurseries only)] will give rise to higher frequencies of viable propagules than sites practicing newer IPM approaches: alternating MOA's, utilizing combinations of control (i.e. mulches, physical controls, chemical controls, etc.) and weed scouting.

Propagule banks will be characterized at 4 sites: two representative (defined by plant palette) field nursery sites in MI, Lincoln Nurseries (Grand Rapids, MI) and Zelenka Nursery (Grand Haven, MI), and two natural areas (within a half-mile radius of these nursery). The number and species composition of seeds and other propagules of potentially invasive and noxious weed species in the soil propagule-bank will be sampled during early fall (after most seedlings have emerged) using methods described by Cardina and Sparrow (1996) at each site. Randomly chosen ten 1-meter² plots at each site including five plots "on-site" in active nursery fields and five plots in "wild areas" bordering the nurseries were taken in Sept. 2010. In each of the plots, actively growing plant species were identified, their presence recorded and multiple soil cores were taken to a depth of 25 cm to obtain approximately 1.5-L of soil per plot. Soil samples were taken to a greenhouse at OSU to grow the propagules.

Plants were identified, counted, and removed. Correlations of actively growing species between the nursery fields and wild areas were performed. Correlations of species obtained from soil samples growing in greenhouses at OSU have not yet been evaluated as emergence of all species will not be complete until spring. The evaluation of the propagule bank at Michigan nurseries compared to Ohio and Ontario nurseries will continue in 2011. Several years of data need to be collected to conduct a meaningful analysis.

Results and Discussion. At this point in the study, there is no evidence of a correlation between the wild areas and the cultivated areas at either nursery evaluated. This indicates that nursery field weed infestations are not occurring from the surrounding area or are nursery species grown invading into surrounding areas. Weed diversity is much higher at Lincoln Nursery than at Zelenka in their cultivated areas. This could be a possible indication of more herbicide usage at Zelenka Nursery. Elsen (1990) found a link between increased herbicide use and reduction in weed diversity on farm land. In addition to the loss of weed diversity at Zelenka, the main species that now predominate are very resistant to ornamental weed control programs, such as mugwort (*Artemisia vulgaris* L), creeping yellow field cress (*Rorippa sylvestris*) and Red Stem Filaree (*Erodium cicutarium*) which were only found at Zelenka. Six species were found in greatest frequency: at both sites: mugwort, found at 100% of Zelenka nursery cultivated sites; Erodium, found at three Zelenka cultivated sites and one wild site; marehail *Conyza canadensis*, found at 2 Lincoln cultivated, one Lincoln wild, and three Zelenka cultivated sites; dandelion, found at 2 Lincoln cultivated and four Zelenka cultivated sites; chickweed, found at 3 Lincoln cultivated, two Lincoln wild, and two Zelenka cultivated sites; and purslane found at 5 Lincoln cultivated and one Zelenka cultivated sites. Four species of greatest concern are highlighted below.

Creeping yellow field cress or Kik (*Rorippa sylvestris*), a perennial that spreads by rhizomes is unlike marsh yellowcress (*Rorippa islandica*), an annual, creeping yellow field cress which is more familiar to MI growers. A three-centimeter piece of Kik can make 2000 plants in one year (C. Elmore, personal communication). Unfortunately, *R. sylvestris* can also cross with the annual *R. islandica* increasing its ability to spread and reproduce. The leaves of Kik are more finely cut than those of marsh yellowcress (Uva et al. 1997). It overwinters as a rosette of finely lobed leaves. The leaves are alternate and pinnatifid with 3-7 irregularly toothed lateral lobes and a larger terminal lobe (Uva et al. 1997). It tolerates a wide range of soil types and conditions, but is often found on heavy, wet or poorly drained fields. Suggested control is a 2, 4-D product + Gallery (isoxaben). Casoron (dicholbenil) at 2 to 4 lb ai /ac is another suggestion; however, both of these controls need to be used with extreme caution around nursery stock due to potential phytotoxicity issues. Check the label carefully for stock tolerance and restrictions. For example, do not apply Casoron when soil temps are above 16°C or on sandy soils or soils with less than 2-3% organic matter. 2, 4-D products are broadleaf postemergence weed killers and generally only used in non-crop nursery areas, never as over-the-top applications and with extreme caution even as directed sprays.

Mugwort or false chrysanthemum (*Artemisia vulgaris* L.)

Mugwort (*Artemisia vulgaris* L.) is a non-native perennial aster that has naturalized in parts of Canada and much of the eastern U.S. Mugwort foliage appears similar to common ragweed (*Ambrosia artemisiifolia* L.) and ornamental chrysanthemums (*Chrysanthemum* spp.). Unlike cultivated chrysanthemums and common ragweed, the lower surfaces of mugwort leaves are covered with a dense, silver-white pubescence. Mature *A. vulgaris* stems, which can grow 2 m (6 ft.) tall, yield rankly aromatic flower heads in panicles of composite flowers, each consisting of 15 to 30 greenish-yellow disk-shaped florets, in late summer. Seed set is variable, an attribute of climatic factors. At optimum, individual plants may generate 200,000 seeds in a season. In the eastern U.S., few seeds are viable. Weed dispersal in nurseries and landscape plantings occurs primarily by rhizomes transported on contaminated cultivation equipment and ornamental nursery crop plants. Once established, mugwort rhizomes gradually expand outward from the source, excluding other plants and forming a dense, monotypic stand. Mugwort is extremely adaptable to soil and climatic variation, extending across 56 countries. It has been named one of the 10 most problematic weeds in nurseries of the eastern U.S.

Red Stem Filaree (*Erodium cicutarium*)

Red stem filaree is also known as filaree or common storksbill (Uva et al. 1997). It is a winter annual or biennial that overwinters as a prostrate basal rosette. Stems elongate the following spring and can reach 10-50 cm in height. Leaves and stems are often reddish. The flowers are pink to purple and 5-8 mm long (Uva et al. 1997). Each flower produces a beak-like fruit that separates into 5 sections (mericaps) when mature. Each section consists of a seed and spirally twisted hairy tail that coils under dry conditions and uncoils when moist (Uva et al. 1997). This tail creates a corkscrew action with the seed digging itself into the ground. It is usually found on dry, sandy soil and is a problem in many perennial crops including nursery, orchards, and Christmas trees. Nursery growers in other states have found success using a combination of Goal and DNA herbicides, such as OH II (oxyfluorfen + pendimethalin) (C. Elmore, personal communication). In a search of C&P Press, Surflan (oryzalin) and Snapshot (isoxaben + trifluralin) were the only two DNA and DNA containing herbicides (respectively) that were registered for use. OH II did not appear as a registered product. Another suggested control is Goal 2XL (oxyfluorfen) applied in the fall. Since filaree is primarily a winter annual this approach has worked (C. Elmore, personal communication).

Again, check the label carefully for stock tolerance and restrictions as Goal can be quite injurious to many nursery crops and is quite volatile. Gallery 75DF (isoxaben) applied in the fall is another suggestion.

Horseweed/ Marestalk (*Conyza canadensis*)

Horseweed (*Conyza canadensis*) is becoming an increasing problem in many crops across the Midwest. Horseweed is developing resistance to a number of herbicides, including glyphosate. Horseweed is an annual/biennial that reproduces by seed that has a pappus allowing it to be windblown for up to a mile. Dimension, Gallery, Snapshot, OHII, Regal O-O are all options to control horseweed. Marestalk can follow a winter annual (emerging late August) or a summer annual (emerging March) life cycle; therefore, it can emerge in either fall or spring. Fall emerging Marestalk will have a more extensive root system than those that emerge in the spring (Johnson and Nice, 2003). The more established root system of the fall emerging plants make them more difficult to control because they can resprout from meristems in the lower part of the stem and roots. Therefore, systemic postemergence herbicides are required in "high enough quantities" to inhibit this resprouting (Johnson and Nice, 2003). SureGuard (flumioxazin) is also effective on Marestalk as a preemergence. SureGuard also offers an alternative mode of action and is best used for this weed as your fall preemergence in nursery fields. Unfortunately, SureGuard is not registered for use in the landscape. It is registered for use in deciduous trees in nursery fields and containers.

The four weed species reported above are becoming serious weed problems in MI nurseries that are using standard herbicide-based weed control programs (glyphosate, triazines, and DNA's). The standard programs are actually increasing the weed populations of these species by releasing them from competition from other weeds. Research is needed to evaluate a variety of preemergence herbicides alone, or in combination, that might control these three species.

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BENEFICIARIES

This research project benefited Michigan greenhouse and nursery growers by examining weed control issues and practices, which will assist growers for future plantings.

LESSONS LEARNED

In this research we have investigated liverwort in the division Bryophyta. As very primitive plants that have no leaves, roots, stems or vascular tissue and reproduce vegetatively and/or by spores, their control is very different from vascular plants. A large variety of products were tested. Those that performed well in this study and that merit further testing are Scythe, SureGuard, TerraCyte and Weed Pharm with comparison to other horticultural vinegars. We also conducted phytotoxicity trials that were set up on April 29, 2010 and evaluated at three

nurseries in Michigan: Lincoln Nurseries, Inc., near Grand Rapids, Spring Meadow Nursery, Inc., near Grand Haven and Zelenka Nursery, LLC, also near Grand Haven. Six to nine species were selected by the individual nurseries from the IR-4 priority 2010 list for a total of 22 container trials and one field test at Zelenka. Of the nine herbicides evaluated in this research Biathalon, FreeHand, the granular form of F6875 and Tower all merited further evaluation in MI nurseries in field and containers. SedgeHammer was also found to merit further field testing due to its ability to deal with some of Michigan's particularly difficult weeds discussed on pages 33-35.

Two experiments with alternative and bio-rational approaches to nursery weed control were also evaluated in this project using novel previously untested bio-herbicide mulch combinations and herbicide treated mulch. Possible patenting of some of the bio-herbicides evaluated in this research is being pursued. Thus, details regarding these products are not given; however, their general performance without specifying their names is provided. In the first experiment, a 200 grain Vinegar on < 1" pine bark was very efficacious and provided the same level of weed control as the conventional herbicide Ronstar with less than half the phytotoxicity at 90 DAT. The BH1 plant extract or DU 200ml at 10 and 5% <1" was statistically as efficacious as the Vinegar <1" and the Ronstar; however, the phytotoxicity with BH1 was almost half that of even vinegar and 3.5 X less than the Ronstar. The potential of vinegar and BH1 as bio-herbicides combined with mulch shown in this first study indicated that further testing with horticultural vinegars compared to 200 grade vinegar and the BH1 extract, with different kinds of mulches, was warranted. Also, the results warranted testing in a field setting to determine the suitability in landscape or nursery field operations. In the second study with three vinegar formulations, the Munger Horticultural Vinegar Plus provided the best results. Further evaluations of the Munger HVP and of Scythe on various barks especially hardwood should be conducted. The BH1 plant extract or DU 200ml at 10% due to its high efficacy and low phytotoxicity also warrants further examination with different carriers and perhaps surfactants. More testing with other alleopathic plant extracts should also be performed.

The last study we conducted as part of this report evaluated the propagule banks at four sites: two field nursery sites in MI, Lincoln Nurseries and Zelenka Nursery, and two adjacent natural areas. The number and species composition of seeds and other propagules of potentially invasive and noxious weed species in the soil propagule bank were sampled during early fall after most seedlings had emerged using methods described by Cardina and Sparrow (1996) at each site. Randomly chosen ten 1-meter² plots at each site five in active nursery fields and five in adjacent wild areas bordering the nursery were taken in Sept. 2010. Weed diversity was much higher at Lincoln Nursery than at Zelenka in their cultivated areas, possible indicating greater herbicide usage at Zelenka Nursery. In addition to the loss of weed diversity at Zelenka, three very herbicide resistant weeds, mugwort (*Artemisia vulgaris* L), creeping yellow field cress (*Rorippa sylvestris*) and Red Stem Filaree (*Erodium cicutarium*) were found at Zelenka. The six species found in greatest frequency at both sites were: mugwort, found at 100% of Zelenka nursery cultivated sites; Erodium, found at three Zelenka cultivated sites and one wild site; Marestartail, found at 2 Lincoln cultivated, one Lincoln wild, and three Zelenka cultivated sites; Dandelion, found at 2 Lincoln cultivated and four Zelenka cultivated sites; Chickweed, found at 3 Lincoln cultivated, two Lincoln wild, and two Zelenka cultivated sites; and Purslane found at 5 Lincoln cultivated and one Zelenka cultivated sites.

We have found that the standard programs used at some MI nurseries are actually increasing weed populations of difficult weed species by releasing them from competition from other weeds. Continued research is needed to evaluate a variety of pre-emergence herbicides alone,

or in combination, that might control these three problematic weed species without causing phytotoxicity to frequently grown MI nursery crops.

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ADDITIONAL INFORMATION

[http://www.michigan.gov/documents/mda/MNLA -
State Wide WEd Control 791N0200092 FINAL 353589 7.pdf](http://www.michigan.gov/documents/mda/MNLA_State_Wide_WEd_Control_791N0200092_FINAL_353589_7.pdf)

PROJECT TITLE

Improving Carrot Quality and Yield through Strip-Tillage and Enhanced Carrot Stand Establishment

PROJECT SUMMARY

Michigan carrot growers face a number of challenges that threaten the viability of the industry including 1) an increasing occurrence of severe weather events which destroy tender seedlings 2) shrinking markets for carrot culls due to the recent ban on deer baiting and 3) insufficient information on optimal carrot population densities for maximizing profit under these new market conditions.

Loss of deer-bait market. It is estimated that in 2008 as many as 2,000 acres of carrots in Michigan were planted solely for the baiting market. In addition, growers of carrots for fresh market and processing have lost a major market for culled carrots that do not meet the demands of purchasers due to splits, breaks, decay and malformation. To maintain the economic viability of carrot production in Michigan, growers must seek alternative markets for culls and work towards reducing the percentage of carrots with defects through changes in management practices.

Poor stand establishment. Carrots are among the slowest vegetable crops to establish in the field and their tender seedlings are extremely vulnerable to pathogens, heavy rainfall and wind. As a result, problems with stand establishment occur almost every year resulting in losses in carrot quality, yield and profitability. For example, in the spring of 2008, heavy rainfall in many carrot production regions of the state resulted in stands with ½ or less the intended population, and in some cases, complete crop failure. Thin and patchy carrot stands have more variable sizes and a greater percentage of defects like splits than stands with consistent populations. Given the loss of markets for carrot culls, practices which can protect tender seedlings and help growers attain optimal population densities are of increasing importance. Even without the baiting ban, these practices will improve yields of marketable carrots and farm profitability. Strip tillage has strong potential for protecting vulnerable seedlings while promoting soil health. Several innovative growers have begun planting cover crops before carrot season and maintaining them as wind breaks by tilling only the strips where carrots are to be planted.

These pre-established cover crops can reduce erosion due to wind and Brainard, SCBG, MDA, Final Report: Improving Carrot Quality and Yield Page 2 heavy rain by serving as wind breaks and holding soil in place. While this system is being adopted for its benefits related to wind

protection, growers have encountered problems that must be resolved before this new system is more fully embraced. In particular, side-wall compaction and subsidence in stripped areas has been observed in some fields. Alternative point and shank types are likely to reduce these problems, but need to be evaluated before recommendations can be made. “Seed priming” (soaking seed in polyethylene glycol and drying before planting) offers another approach to protecting carrot seeds and seedlings and establishing stands with closer to optimal densities. Primed seed is faster to germinate and more capable of withstanding stressful conditions than unprimed seed. However, seed priming imposes additional costs on the grower that may or may not be justified given economic constraints. Given stand losses in recent years, it is likely that the additional cost of primed seed is justified, but little information is currently available to Michigan growers to make this assessment.

Optimal population densities for different varieties and markets are not well understood. Population density has a major impact on total marketable yield. With loss of carrot cull markets, optimal population densities are likely to increase, since higher densities are thought to reduce the number of split carrots—the major category of culls for many growers. However, the effect of planting density on carrot quality and yield is likely to vary with variety and climate. Little work has been conducted to evaluate the effect of planting density on carrot quality and yield. Our proposed work will address this knowledge gap.

PROJECT APPROACH

Strip-tillage and compost. Field trials were conducted, in 2009 (MSU Horticultural Research Farm in Holt, MI), and in 2010 (Montcalm Potato Research Farm) examining the effects of tillage (conventional vs strip till) fertility management (fertilizer vs fertilizer+compost) and carrot variety (Canada, Finley, and Reoleta or Cupar), on carrot quality and yield. All treatments received approximately 120 lbs N/A (80 lbs/N initial + 40 lbsN/A side-dressed). In compost treatments, dairy manure based compost (Morgan Compost “Dairy Doo”; 1.2-0.63-1.2 NPK on dry weight basis) was applied at a rate of 2.8 T/A with an estimated available N content of 5-10 lbs N/A. In strip-till treatments, a barley cover crop was drilled in mid April. In early May, strips were established 18” apart in 3-row beds using an Unverferth Ripper-Stripper set at 12-14” depth followed by 9” wide roto-tiller set at approximately 2” depth. Conventional tillage was accomplished with a chisel plow followed by two passes with a field cultivator. Carrots were planted the same day at an approximate rate of 200,000 seeds per acre. In early October, carrots were harvested from a 20’ section from each sub-plot and categorized as described above for planting density trial.

Seed treatment effects on establishment. Two field trials were conducted on muck soil at the MSU Muck Farm examining the effects of seed priming on establishment and yield of 2 fresh market carrot varieties. Seeds of two varieties (Apache and Sun 255) with 3 seed treatments (none, fungicide treated and primed) were sown either in early spring or mid-summer. Crops received standard herbicide and pest management treatments. Effects of seed treatments on carrot yield and quality were assessed.

Planting density effects. On-farm trials were conducted on sandy soil in Oceana County in both 2009 and 2010 to evaluate the effects of planting density on quality and yield of four processing carrot varieties (Canada, Finley, Reoleta and Cupar). Plants were sown at approximately 177,000, 207,000 and 248,000 seeds per acre. The plots were arranged in a split-plot design with four replications, with seeding rate as the main plot factor, and variety as the subplot factor. Carrots were managed using strip-tillage with spring-sown barley as the cover crop in 2009 and fall-sown wheat as the cover crop in 2010. In early October, carrots from four 5’ sections from

each sub-plot were counted and weighed by category. Carrots were categorized as either marketable, cracked, sprangled (forked) or too small (<1.25" in diameter).

GOALS AND OUTCOMES ACHIEVED

The goal of this research was to improve the quality, yield and profitability of Michigan carrot production. Specific objectives to accomplish this goal were: 1) *Optimize strip-tillage systems* to protect vulnerable seedlings from extreme weather events. 2) *Improve carrot germination and stand establishment* through variety evaluation and seed priming to reduce stand losses and help growers attain optimal population densities. 3) *Determine optimal planting densities* for important Michigan carrot varieties to improve quality and profitability given current market conditions.

Strip-tillage and compost. Heavy nematode populations at the research farm resulted in low yields and a high percentage of forked carrots. Canada was the highest yielding variety at the research farm in both years. Strip-tillage had no Brainard, SCBG, MDA, Final Report: Improving Carrot Quality and Yield Page 4 effect on yields or culls for any of the varieties compared to conventional tillage. In 2009, addition of compost increased marketable yields of Canada by approximately 10 T/A, and 5 T/A for Reoleta, but had no impact on Finley (Figure 3C). For Canada, approximately half of this increase in yield due to compost was the result of fewer forked carrots. In 2010, compost had no effect on marketable yield, but increased the percentage of forked carrots in some cases.

Seed treatments. For the early planting date trial, primed seeds resulted in higher marketable yield than either un-treated or fungicide treated seeds for both varieties. Although standard herbicides (Lorox/Dual) were applied, yellow nutsedge pressure was very high. Under these conditions, seed priming resulted in greater survival of carrot seedlings and close to 50% improvement in yields compared to standard fungicide treated seeds. For the late planting date trial, similar improvements in yield were observed for the variety Apache, but not for Sun 255. In contrast to the early planted trial, few weeds escaped herbicide treatments. For the second trial, carrot stand and leaf number counts conducted 17 days after planting revealed more rapid early growth of both varieties. We speculate that this more rapid establishment helped protect emerging carrots from early stress, reduce stand losses, and improve carrot yields primarily through increases in carrot density. However, more research is needed to assess the mechanisms for this yield improvement.

Planting density and variety. Averaged across all three varieties, carrot yields increased with final population densities up to approximately 150,000 plants/A in both years. Yields in 2010 were lower than those in 2009 due in part to a high incidence of bacterial blight which necessitated early harvest. The percentage of forked carrots decreased at higher densities in both years. As expected, the percentage of split carrots decreased with higher densities in 2009. However, in 2010, higher densities resulted in a higher percentage of split carrots. Overall, the percentage of culls declined from 20 to 2% in 2009 and from 25 to 15% in 2010 as final density increased from 60,000 to 160,000 plants per acre. In contrast to research farm trials, the highest yielding variety was Finley in 2009, followed by Reoleta. In 2010, yields of all three varieties were equivalent; Finley produced the greatest total weight, but had a higher percentage of forked carrots than the other two varieties.

BENEFICIARIES

Improvements in carrot stand establishment, resilience to extreme weather events and soil health will help improve the profitability of carrot producers in both the short and longer term. We anticipate that our proposed work with carrot seed treatments, strip tillage, compost

applications and higher seeding rates will improve carrot stand establishment, thereby allowing growers to save costs of re-planting and/or costs of yield or quality reductions due to sub-optimal planting densities.

LESSONS LEARNED

In 2009-10 field trials we found: 1) higher population densities were associated with higher yields and fewer carrot culls; 2) strip-tillage had no effect on carrot quality and yield relative to conventional tillage; 3) compost applications resulted in higher yields and lower percentages of forked carrots in a field heavily infested with root-knot and lesion nematodes; 4) primed seed improved carrot stand establishment and yield relative to standard fungicide treated seed.

Our findings suggest that growers of carrots should consider 1) increasing their seeding rates and 2) investing in high quality primed seed. These practices are likely to improve carrot yields substantially particularly under conditions of high stress, including heavy rainfall, high winds and high weed pressure, all of which are quite common in carrot producing areas of MI. We estimate that adoption of these practices could result in a 5- 10% improvement in marketable yield and a direct increase in cash receipts of over \$1 million for MI carrot producers. Continued studies and demonstration trials will improve our understanding of the consistency of these results and provide growers with increased confidence that the extra seed costs are justifiable.

Although we saw no improvements in yield under strip tillage in our trials, the fact that strip-tillage *did not reduce yields* is an important result that should increase grower confidence that this approach is useful. Indeed, three major growers of carrots for processing have adopted strip-tillage, primarily as a means of reducing risk of stand losses due to heavy wind. Heavy winds were not an issue in our two years of trials, but under the strip tillage system, cover crop windbreaks are maintained through the early season, to help insure that stand losses do not occur.

Finally, our results provide evidence that under conditions of high nematode pressure, addition of compost may be a worthwhile investment. We saw reductions in carrot culls under compost treatments in one year, although no benefits were seen in the second year. Growers have expressed interest in this result, and it is spurring additional research to further understand the potential benefits of this practice.

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ADDITIONAL INFORMATION

http://www.michigan.gov/documents/mda/MSU_Improving_Carrot_Quality_-_Brainard_Final_Report_346517_7.pdf

PROJECT TITLE

Enhancing the Competitiveness of Michigan's Fresh and Processed Asparagus Industries through Increased Promotional and Updated Information

PROJECT SUMMARY

There were two main objectives of this project. The first was to conduct a detailed survey of all commercial asparagus producers in Michigan and the second was to enhance sales and grower profitability through radio promotion in SE Michigan.

PROJECT APPROACH

Asparagus is a perennial crop, coming into full production four to five years after seed planting, and producing a commercially viable crop for 11-20 years. Many factors affect the productivity and longevity of an asparagus planting, the most significant being the variety selected and any adverse weather event during field life. Raw product price and the normal decline in productivity in later years are major considerations in determining when a field will be removed.

The decade beginning in 2000 saw major changes and shifts in the asparagus industry in Michigan. At, or below cost-of-production prices in four of 10 years, a major shift in varieties planted, and a 1 in 100 year weather event (17 inches of rain) in May of 2004 left growers, fresh packers, processors and grower organizations all questioning the true potential production in the upcoming years.

All involved parties agreed that a comprehensive survey measuring field age, condition, variety planted, planting and plowing intentions would greatly serve the entire industry. Raw product pricing, marketing focus and planting decisions would all benefit from having up-to-date potential production information.

The second objective of the project was to raise consumer awareness of the availability of Michigan "locally grown" fresh asparagus and thus enhance grower returns.

Fresh Michigan asparagus becomes available in late April and can be purchased until late June. Promotable quantities are generally available starting mid-May followed immediately by peak production which then tends to tail-off as the season progresses. This relatively narrow window (2 of 12 months) offers a unique marketing challenge each spring. Past experiences with the "Select Michigan" promotion program has shown that consumers in Michigan and neighboring states have a strong desire to purchase Michigan fresh asparagus but need to be reminded each year that the season has started. Many consumers have lost touch with the seasonality of Michigan's asparagus harvest due to the asparagus harvest due to the year-round availability of fresh asparagus from South America, Mexico and the western US.

The sales of Michigan fresh asparagus have grown steadily from 2.7 million lbs in 2004 to six million lbs in 2009. This growth in the fresh market has occurred over a period when total state production has been trending downward and Michigan's processing asparagus market has been challenged by cheap off-shore imports. Michigan shippers have reported that much of the growth in the fresh market can be attributed to sales in Michigan and surrounding states. They also report that these sales tend to offer the highest returns to growers is the result of higher per-box selling price and lower shipping costs. It is estimated that in-state sales return 5-7 cents per lb higher grower net than sales made on the East coast or SE United States.

GOALS AND OUTCOMES ACHIEVED

The Michigan field Office of the USDA National Agricultural Statistics Service (NAAS) was contracted to conduct the survey of the Michigan asparagus industry. NAAS employees met with industry representatives in late 2009 to develop the parameters of the survey. The Michigan Asparagus Advisory Board (MAAB) informed growers of the importance of the survey through newsletters and grower meetings. Surveys were mailed out in late December 2009,

and non-respondents were contacted by phone and if needed in person. Dave Kleweno, NASS, have a power point presentation of the results of the survey to the MAAB for critique on March 4, 2010. NASS then released the survey publicly as well as presented the survey to the entire industry at Oceana Asparagus Day in Hart, Michigan on March 11. A crowd of 170 growers, processors, packers and industry representatives were on hand to accept the survey. Copies of the survey were attached to the Fall 2010 MAAB newsletter and sent to all Michigan asparagus growers.

Objective 1

MAAB contracted with the Citadel Radio Group to run a series of radio ads on three stations in SE Michigan to promote fresh asparagus sales. A total of 76 spots were run on 93.1 "Doug" FM with a net reach of 393,100; 50 spots on 96.3 FM WDVD with a net reach of 416,000 and 40 spots on WJR News/Talk 760 AM with a net reach of 259,000, beginning on May 17 and ending on May 30. Total cost for this radio promotion was \$16,110.00.

AMAB also contracted for three additional fresh promotional activities in other areas of the state.

Objective 1 Outcomes

The asparagus survey was accepted with great interest by the Michigan asparagus industry. After analyzing survey data, it is projected that asparagus acreage in Michigan will decline from present levels of 10,000 acres down to 8,500 before stabilizing.

The survey was released a bit late to have significant effect on the price discovery process between MACMA asparagus division (*growers) and processors for the 2010 crop season. (The negotiated price for cut and tip asparagus was \$0.62 in 2010; down from \$0.66 in 2009) However, the MACMA asparagus committee feels the survey will be a valuable tool in advancing the processing price in years to come.

Perhaps of greater long-term significance, a study committee was formed to review all aspects of the industry. This committee will deliver to the industry recommendations encompassing everything from maintaining fiscal health of key organizations (Advisory Board, Marketing & Bargaining & Research), structural changes to the Marketing and Bargaining process, to seed procurement and quality monitoring.

Based on the MASS survey, we are projecting the following outcomes:

- 1) The Marketing and Bargaining Board will be able to secure higher grower prices anticipating lower average volumes and targeting the highest paying customers.
- 2) Revenue for key asparagus organizations is dependent on harvested volume. These organizations have a valuable tool for projecting income and maintaining fiscal health.
- 3) Growers will begin an aggressive replanting program.

Objective 2

The RBS Media Group, LLC was contracted to run in-store radio promotions in the 238 Spartan Group (Family Fare, D&W, Glen's, Felpausch, VG's plus 142 independents) stores from May 9 – June 5, 2010. Total cost of this promotion was \$3,000.

The MAC Donald Broadcasting Company was contracted to air 150 spots between May 20 and June 6, 2010, on WHZZ, covering central Michigan including the greater Lansing area. Total cost for this promotion was \$3,000.

REGENT Broadcasting of Grand Rapids was contracted to air 180 spots between May 17 and June 6, 2010, 90 spots on 95.7 WLHT and 90 spots on 100.5 WTRV covering west Michigan

including the greater Grand Rapids area. In addition to the radio spots the following items were included: two Meijer remotes (5/15 at Knapp's Corners & 6/5 at Standale) which included live interviews prior to each remote, 30 streaming commercials per week x three weeks on WLHT, Video Gateway on WLHT.com, Banner Ad on WLHT.com with click thru, and E-mail blasts to database of 4,500. Total cost for this promotion was \$9,000 and was paid by MAAB on May 14, 2010.

Objective 2 Outcomes

The fresh asparagus promotion on radio stations covering the lower half of the Lower Peninsula had a significant impact on the volume of fresh asparagus sold within the state and overall grower returns. Record fresh volumes were committed and would have been delivered had it not been for dismal weather conditions experienced during the 2010 asparagus harvest season. Abnormally high temperatures in April brought the crop out of the ground early only to be devastated by May frosts and June heat. The total volume of asparagus harvested in Michigan in 2010 was the lowest recorded in over 50 years. 15.2 million lbs of asparagus was harvested statewide in 2010 compared to 21.9 million lbs in 2009, a 30% reduction. Despite this huge loss in production, fresh sales were nearly identical to the previous year only dropping from 5.8 to 5.4 million lbs. In contrast to the relatively good fresh volumes, sales to the processing market dropped from 16.1 million lbs in 2009 to 9.8 million lbs in 2010.

Record high grower returns for fresh deliveries were reported in 2010. Michigan's two largest fresh packers, representing 3.5 million lbs of the 5.4 million lbs sold shared information for this report. Net grower returns on gross lbs delivered to them in 2010 was \$0.95 compared to \$0.76 in 2009 and \$0.72 in 2008.

The high returns experienced in 2010 were a direct result of average to tight supplies coupled with high demand for Michigan grown product throughout the state. The highest volume of fresh sold coupled with the highest price per lb occurred during the three week radio promotion starting mid May and ending the first week of June. Michigan asparagus shippers that responded to a request for information indicated that 38% of the pack was sold in-state, higher than the previous year.

It is estimated that less than four of 10 asparagus farms in Michigan sold asparagus into the fresh market in 2010. Many farms that sold 50% or more of their crop fresh in 2010 reported that despite lower yields their net revenue on asparagus was equal to the previous season. Farms that sold their entire crop to the processing market reported net revenues of only 70% of the previous year.

BENEFICIARIES

Asparagus producers and processors are beneficiaries in that many farms that have sold their entire crop to the processing market, are now exploring entering the fresh market with a percentage of their crop. The result of this should create higher demand and higher prices for processed asparagus and reduce risk in their own operations.

LESSONS LEARNED

Declining production in Michigan has resulted in lower assessment income and that coupled with a larger investment in research has limited MAAB's ability to increase promotion expenditures. MAAB, working with MDA's Ag Development office and the "Select Michigan" program have effectively covered Central, West, and Southwest Michigan with radio and in-store fresh promotion programs in the past. Unfortunately, due to the relatively high cost of radio spots, MAAB has not been able to effectively cover Michigan's most densely populated

region – SE Michigan. This grant enabled the Michigan industry to, for the first time; cover that important area of the state.

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ADDITIONAL INFORMATION

http://www.michigan.gov/documents/mda/MI_Asparagus_Inventory_Report_791N0200094_353574_7.PDF

PROJECT TITLE

“Assessment of Narrow Row Technology” for the Michigan Dry Bean Industry

PROJECT SUMMARY

This project was needed to assess the potential for adoption and use of ‘narrow row technology’ by Michigan dry bean growers. This innovative cropping system is essential for growers to be competitive with other crops such as soybeans and corn and enhance the commercial viability and sustainability of this important sector of Michigan’s diverse agricultural base. ‘Narrow row technology provides numerous economic and agronomic advantages for production of dry beans.

The traditional dry bean cropping system is contrasted with ‘narrow row technology in the following means: 1. Traditional cropping requires many more field passes to achieve proper tillage while ‘narrow row technology’ employs fewer operations from planting to harvest. 2. Traditional harvesting requires multiple field passes to first pull and windrow plants for field drying followed by a subsequent pass with a combine for thrashing. This procedure exposes beans to inclement weather and increased levels of stones which are raised when the plants are uprooted. 3. Direct harvesting requires the use of plant desiccants to defoliate the plant prior to harvest to enable seed and plant dry down. Most of the desiccants have limitations for use in dry beans and new desiccants must be found to eliminate rotation restrictions, residue contamination and extremely high toxicity problems. 4. Traditional cropping allows dry beans to be lodged and close to the ground. There was a need to develop dry bean varieties to stand erect with elevated pods to aid in direct harvesting operations.

PROJECT APPROACH

To assure validity of the results and subsequent recommendations, a plan of work included: 1. Research Farm plot trials, 2. Grower-based strip trials, 3. Fungicide trials to control white mold, 4. Canning trials conducted on dry bean varieties grown in grower-based strip trials and dry bean nurseries of elite dry bean lines, 5. University based research on new dry bean varieties and 6. University based research on new desiccants and herbicides in commercial dry bean production systems.

Greg Varner conducted small plot trials at the research farm comparing 15, 20 and 30 inch rows on navy, black and small red beans. Small plot trials were also conducted on black and small red bean populations. He also conducted five grower strip trials in the major dry bean counties of Michigan. The white mold fungicide trial was conducted at the Montcalm Research farm where adequate irrigation provides excellent white mold disease expression. Canning trials

were conducted at the Michigan State University Food Science Pilot Canning Plant on campus. Dr Christy Sprague conducted desiccant and herbicide trials at the research farm and herbicide trial at the main campus of Michigan State University. Dr. James Kelly conducted dry bean variety trials at the research farm.

GOALS AND OUTCOMES ACHIEVED

Field Plot Trials

Title: Row Width and Plant Populations in Dry Beans

Principal Investigator: Gregory Varner, Research Director, Michigan Dry Edible Bean Research Advisory Board. Michigan Bean Commission, 1031 S. U.S. 27, St. Johns, MI 48879

Field research trials were conducted at the Saginaw Valley Research and Extension Center north of Frankenmuth, Michigan. The five trials examined the effect of varying row widths and dry bean populations on: 1) plant height, 2) lodging, and 3) yield. Three dry bean classes and individual varieties were Medalist and Vista navy beans, Shania and Zorro black beans and Merlot small red beans. Three row widths used were 15, 20 and 30 inch spacing. Planting populations used in the Merlot small red trial were 125,000, 115,000 and 100,000. The Zorro black bean planting populations were 150,000, 140,000, 130,000, 120,000 and 110,000.

The Saginaw Valley trial location received 35% of normal rainfall from planting to harvest. The severe drought reduced dry bean yields 50% or higher when compared to 2009.

The Merlot small red row width trial showed no significant difference in yields between the three row widths. The 30 inch row width spacing showed the tallest height followed by the 20 inch spacing over the 15 inch rows. Lodging was constant with all the row widths.

Vista and Medalist navy beans planted in 30 inch rows were taller than the 20 and 15 inch rows. Vista yielded higher than Medalist in the 15 inch row spacing; however there was no difference in yield at the 20 and 30 inch spacing.

Shania and Zorro black beans planted in 30 inch rows were taller than the 20 and 15 inch rows. Across all three trials, the 30 inch rows had the tallest plant height. Plant to plant competition within the row is more aggressive in the 30 inch rows. There was no significant difference in yield between the 15 and 30 inch rows. The 20 inch row spacing yielded the least and Shania yielded significantly lower in the 20 inch row spacing when compared to both the 15 and 30 inch row spacing. Zorro yield significantly less in the 20 inch rows when compared to 15 inch rows. Zorro black beans planted in five populations showed no yield increase between the 15 inch and 20 inch row spacing. Average plant height was highest in the 20 inch rows. Plant population counts revealed seed mortality and emergence loss of 20%. It would be expected to lose 10 - 15% from the planting population to the harvest population.

Merlot small red beans planted in 15 inch rows yielded higher than 20 inch rows. This yield variation was not significantly different. Plant height was very similar in both the 15 and 20 inch rows.

Evaluation of fungicide treatments to control white mold disease in dry beans was conducted at the Montcalm Research Farm in Entrican, Michigan. Merlot small red beans were planted on June 22 with 20 inch row spacing. During pod set to pod fill (reproductive stage); the trials had two weekly supplemental (.5 inch) irrigations to promote sclerotia germination and white mold infection on the bean plants. Fungicides were applied at 100% bloom (100% of the bean plants have at least one open flower). Some treatments were sprayed the second time, seven days after the first spray. Fungicides used in the trial were Topsin M, Omega, Endura, Proline, Propulse, Headline and a combination of Topsin M and Endura. Endura, Omega, Propulse Topsin M and the combination of Endura and Topsin M treatments provided good control and yielded significantly higher than the untreated beans. Proline did yield significant higher with two sprays. The Headline treatments showed lower disease infection, but yielded lower than

the untreated beans. This would support past research data on Headline showing no efficacy on white mold disease.

Grower Strip Trials

Two navy bean strip trials were grown at the Voelker farm in Pigeon and the Lakke-Ewald farm in Unionville. The Voelker navy bean strip trial ranged in yields of 26.0-34.7 cwt per acre. Medalist navy had the highest yield in this trial. The Lakke-Ewald trial ranged between 26.4-30.8 cwt per acre. Medalist was also the highest yield in the Lakke-Ewald navy bean strip trial. Vista navy was the second highest in both strip trials. Plant populations varied between the navy varieties in both locations. This variation difference was likely caused by seed size differences. Smaller seed size generally will plant thicker because of more doubles being planted from the seed plate. The early (June 1) Voelker trial suffered more seed mortality than the later (June 15) trial. Medalist had the lowest seed population in both trials at 98,271 and 98,794. This would suggest navy populations of 100,000 are adequate to achieve maximum yields. There may be different optimum populations for each variety tested. New variety releases should be tested at different populations. The early Volker trial had less lodging than the Lakke-Ewald trial.

The Stoutenburg black bean strip trial in Sandusky ranged in yields of 24.3-28.9 cwt per acre. Black Velvet had the highest yield. The Schindler black bean trial in Auburn ranged between 20.5-26.5 cwt per acre. Zorro had the highest yield with 92,418 plants per acre. This Schindler trial received 2.5 inches of rain 6 days after planting. We had a higher percent of emergence losses in this trial than the Stoutenburg Trial. These two trials varied in planting population of 145,000 versus 125,000. Most dry beans have the ability to produce more pods per plant and compensate for a lower plant population. The overall plant height was taller in the Schindler trial. This was probably due to the later date of planting (June 21 vs. June 10).

The Schindler pinto bean strip trial in Auburn ranged in yield of 18.8 and 22.6 cwt per acre. This trial received 2.5 inches of rain on June 27 slowing down overall growth in this trial. Buster pinto had the highest yield. The popular La Paz variety from North Dakota had the tallest height and Buster was the shortest. ADM 06203 was very erect, but had the lowest yield.

Dry bean samples from the five grower strip trials were processed at the Michigan State University Food Science Pilot Canning Plant. Canned product was opened and evaluated. One navy and two pinto bean cultivars showed poor canning quality. Canning quality ratings used a 1-7 scale with seven being perfect appearance and two and one being poor appearance.

A strip trial was also planned to evaluate a biological control agent, *Coniothyrium minitans* (Contans) that shows promise in managing white mold in various crops. Contans was applied on the Bernia farm in Akron at planting and the field was heavily damaged by excessive rainfall. Fungicide sprays were planned for late July, but the trial site was abandoned due to severe stand losses. For details on the evaluation, please see report in "additional information".

Activity: "Evaluation of dry bean promising breeding lines and elite genetic material suitability for 'narrow row' production systems". Development and Maintenance of High-Yielding, Disease Resistant, Processor Quality Dry Bean Varieties suitable for Direct Harvest in Michigan

Improve yield, architecture, disease resistance, stress tolerance and canning quality traits of the major commercial dry bean market classes important in Michigan.

Activities, Accomplishments: A total of 2994 plots were harvested for yield in 2010 and over 2600 single plant selections were made in the early generation nurseries. Yield trials included 36-entry standard navy test; 64-entry standard black test; 16-entry preliminary black test; 56-entry prelim navy and black test; 36-entry standard GN and 64-entry standard pinto tests; 12-entry standard Tebo test; 16-entry GN PYT test; red/pink test with 30 entries; 42-entry Co-op and regional test that includes pinto, GN, red and pinks; bush cranberry test with 25 entries;

kidney test with 42 entries; three white mold tests: one with 64-entries and two 96-entry pinto trials; one 36-entry certified organic trial in Tuscola county; one potato leaf hopper (PLH) trial with 80-entries on campus; two canning quality trials for CONAGRA: 8-entry navy and 14-entry pinto and 400 single row plots as part of the BeanCAP project. All trials except for kidney, cranberry and white mold were direct harvested using new plot combine. Plots in Frankenmuth suffered from severe drought (3.25 inches rain from planting to harvest) that resulted in lower yields (average yield reduction exceeded 50% across nurseries compared to 2009) and some entries remained green and never matured. Plots at Montcalm had adequate rainfall and severe white mold infection developed under supplemental irrigation. As a result the program was able to identify sources of drought resistance in black, navy, pinto, red and great northern market classes and modest levels of white mold tolerance in cranberry and kidney bean trials.

Progress in black bean breeding: Zorro performed very well in statewide trials ranging from 21 to 33 cwt/a with an average yield of 27.6 cwt. Shania was next highest black bean at 26.4 cwt/a. Zorro yielded 18.2 cwt under drought in Frankenmuth followed by Loreta at 17.6 cwt and Shania at 16.8 cwt/a compared to test mean for the test of 15.7cwt for 64 entries. Only two lines outperformed Zorro in the test suggesting that it has good levels of drought tolerance. Zorro exhibited the highest level of resistance to root rots at a test site in Geneva NY. A number of new black beans lines with resistance to CBB and anthracnose continue to show promise and one line are under increase in the MDA greenhouse. CBB and anthracnose resistance is currently being integrated into the Zorro genetic background.

Progress in navy bean breeding: The order among navy bean varieties changed in 2010 due to drought. A new line from Canada OAC7-2 (17.4cwt) was the best among the named entries followed by Vista (15.2cwt) and T9905 (14.8cwt) with a trial mean 14.3cwt/a. Long season varieties like Medalist produced 11.5 cwt/a and Lighting dropped to 9 cwt/a suggesting that there is a dramatic difference in drought tolerance among navy bean varieties. Seed quality (fish mouth) problems were common in navy beans. The program has identified a group of lines that have high levels of resistance to CBB and anthracnose but canning quality and agronomic traits of these lines needs to be further evaluated before a final decision on release can be made.

Progress in pinto bean breeding: La Paz was the highest yielding pinto variety with yield ranging from 16.8 to 21.8 cwt. P07863 pinto was the next highest yielding entry for the fourth year in the MSU trials and topped all entries in statewide trials at 38 cwt under irrigation in Montcalm. It has outstanding yield potential, full season, very erect, stays green late but goes to harvest maturity in seven days. It is a clear candidate as a direct harvest high yielding pinto to compete against other market classes and was tested extensively in statewide trials to determine if it meets all those criteria for yield and direct harvest in a pinto seed type. Drought severely reduced the yields of Lariat, Stampede and Santa Fe varieties and many western pinto varieties did not mature in 2010.

Progress in GN/Tebo bean breeding: The drought dramatically reduced yield of Fuji tebo bean to under 5 cwt in 2010 as plants remained green due to continued pod drop. Seed quality problems (fish mouth due to incomplete seed coats) were very common in GN lines including Matterhorn. One anthracnose resistance line G09303 that outyielded Matterhorn did not display this problem and will tested further. Seed quality is a major selection criterion in this class.

Progress in small red/pink bean breeding: Merlot was the best small red variety in statewide and MSU trials. It yielded 17.7 cwt followed by Sedona pink at 16.5 cwt/a under drought. Two new lines from ND were tested but drought severely impacted their yield. A number of new red lines show potential but seed color and quality is not as good as Merlot. In general pink/red beans showed better tolerance to drought than other seed types.

Progress in kidney/cranberry bean breeding: The program continues the evaluation of K06619 and K06604 LRK lines that topped yield trials two out last four years. K06619 is an attractive bean, and ranked behind Chinook 2000 which had an excellent season in 2010. DRK

lines, K08222 and K08228 were evaluated in statewide trials in 2010 and were competitive in yield. These lines were more competitive in absence of irrigation. White kidney K08961 topped the yield trial (36.8cwt) for second year and outperformed Beluga for the third year and matured four-days earlier. An early maturing selection of Beluga was 5d earlier and yielded 3cwt more. Canning quality of all these lines needs to be confirmed before they are advanced for further testing. In cranberries Bellagio was competitive against Chianti (+1.5cwt) in statewide trials. White mold was severe in trials at Montcalm but the same lines that showed resistance in the past continued to show promise in 2010.

A table for this experiment is in the final report “additional information” link.

Activity: “Evaluation of selected treatments (herbicides and plant desiccants) to enhance dry bean ‘narrow row’ efficiency and productivity”. Optimizing row width and plant populations to improve weed management and yield in Michigan dry bean production systems.

Accomplishments:

Previous research in other crops has indicated that narrow rows often suppress weeds, and several studies have also suggested that narrow rows may also improve yield. In order to determine the benefits and limitations of growing dry beans in narrow rows in Michigan, two field research studies were conducted in 2010 at two locations, the Saginaw Valley Research and Extension Center near Richville and the MSU Agronomy farm in East Lansing. The first studied examined the effect of varying row widths and bean populations on: 1) weed suppression, 2) plant architecture, 3) white mold development, 4) western bean cutworm egg laying and survival, and 5) yield in two classes of dry edible beans. The two dry bean classes examined were ‘Zorro’ black beans and ‘Merlot’ small red beans. Three row widths were examined at one location: 1) 15 inch, 2) 20 inch, and 3) 30 inch rows, while at the other location only 15 and 30 inch rows were examined. The three populations examined for black beans were 1) 79,500 plants per acre, 2) 106,000 plants per acre, and 3) 132,500 plants per acre. For small red beans, the populations were 1) 60,000 plants per acre, 2) 79,500 plants per acre, and 3) 106,000 plants per acre. Dry bean yield results varied between the two locations. The Saginaw Valley location suffered from drought, resulting in average yields of 15 hundred weight per acre for both black and small red beans. Under weed-free conditions black bean population did not have a significant affect yield, however row width had a major impact. The main effect of row width indicated that black bean planted in wide rows (30 inches) benefited under drought conditions compared with black bean planted in 15 inch rows. However, yield of black bean planted in 20 inch rows were not different from black bean planted in 30 or 15 inch rows. At East Lansing when moisture was not as limiting yield was favored for dry bean planted in narrow rows. Average black bean yield for this trial were 27 hundred weight per acre. The main effect of row width showed a 4.2 hundred weight advantage for black beans planted in 15 inch rows over black beans planted in 30 inch rows. The row width by population interaction was significant at ($P = 0.0916$), favoring black bean planted in narrow rows at the mid-population. For small red beans at East Lansing, regardless of row width or bean population the average yield was 22 hundred weight per acre. Indicating the ‘Merlot’ small red beans may have the ability to compensate for space regardless of population or row width. White mold did not develop in any of these trials and there did not appear to be a row width or population effect on the low level of western bean cutworm that was found in these trials. At East Lansing, one thing we observed was the ability of narrower row widths to suppress weed growth in our POST only treatments in these trials. We also observed that the small red beans significantly reduced weed growth compared with the black beans. Lower weed populations at Richville did not show any differences in weed suppression.

The second study examined the effect of six different weed management strategies in dry beans planted in wide and narrow rows on 1) weed suppression and 2) yield. The cultivar planted in this study was 'Zorro' black bean at a consistent population of 106,000 plants per acre in both 15 and 30 inch rows. The narrow row width consistently reduced overall weed populations at one location, and at the other it reduced them in the herbicide treatments that exhibited poor control. Control of several weeds was better in the narrow row plots than in the wide row plots within certain weed control strategies. Narrow rows provided slightly higher yields at one location ($P=0.1$), although it appeared that there was not a good relationship between row width and herbicide treatment at the other location. At one location with high weed pressure, the total POST treatment resulted in inferior weed control, while at the other, which suffered drought conditions throughout the growing season, all three PRE treatments performed poorly. At one location, yields were similar for all weed control strategies except the untreated plots, where yields were lower. At the other, late rains in September influenced the development of the fungal pathogen, *Alternaria* pod rot that may have affected harvestable yield.

Potential preharvest options for narrow row dry edible bean desiccation

Even dry down of dry edible beans is important for direct cut harvest operations. These harvest operations often favor planting dry beans in narrow row widths. Growers often need to apply a preharvest herbicide application help aid in desiccation of dry edible beans. Currently, there are four herbicide options labeled for preharvest application in dry edible beans. The current options aren't always 100% effective and there are potential issues with herbicide residues found in the harvested crop if applications are not made at the appropriate time. In late-summer of 2010, 17 potential preharvest treatments were evaluated for the speed and effectiveness of desiccation of dry beans planted in narrow rows. These treatments included the current standards of Gramoxone and glyphosate (Roundup) and also newer registered compounds of Aim and Valor. The treatments also included various tank-mixtures of registered products and three non-labeled potential products. One of the newer products Sharpen (saflufenacil) provided the quickest most complete control. The other two products were natural products that did not dry down any different than the non-treated control. We will be working with the manufacturer of Sharpen for registration, potentially offering Michigan dry bean producers a more effective, potentially safer dry bean desiccation option.

Dissemination of Results (Year 1):

Presentation of results to Michigan growers and agri-business representatives:

Saginaw Valley Research and Extension Center Field Day. August 24, 2010. Richville, MI. – Holmes, Powell, and Sprague.

Results from the first year of this research will be presented at several county dry bean meetings in the winter of 2011.

Presentation of results at Scientific Meetings:

Holmes, R.C. and C.L. Sprague. 2010. Weed control strategies and row width in an upright variety of black bean. Proc. North Cent. Weed Sci. Soc. 65:103.

Scheduled Scientific Presentations for FY11:

One presentation is scheduled at the 2011 Weed Science Society of America annual meeting in February in Portland, OR and the North Central Weed Science Society in December 2011.

Projected Activities: To be conducted outside of the scope of the SCBG 2009, we will conduct the second year of field research and finish analysis on canopy closure and economic impact data. Continue to disseminate results at grower meetings, field days and scientific conferences. Publish research in peer-reviewed scientific journals.

Impacts:

- Development of recommendations for Michigan growers with the benefits and limitations of narrow row dry bean production
- Reduction in soil erosion and compaction by eliminating the use of inter-row cultivation for weed control
- Improved sustainability and profitability of dry bean production in Michigan

Effect of row width, population, and herbicide treatment on dry bean yield (Saginaw Valley Research and Extension Center – 2010)

Figures and tables are in the final report link in “additional information”.

Summary: This trial was conducted to determine the effect of row width and population on yield of two classes of dry bean. This trial was conducted at two different locations, this location the Saginaw Valley location suffered from drought, resulting in average yields of 15 cwt/A for both black and small red beans. Black bean population did not have a significant affect yield; however row width had a major impact (Table 1). The main effect of row width indicated that black beans planted in wide rows (30 inches) benefited under drought conditions compared with black beans planted in 15 inch rows. However, yield of black beans planted in 20 inch rows were not different from black bean planted in 30 or 15 inch rows. There was a three-way interaction for yield of the small red beans (Table 2). With small red beans, yield was generally higher either at lower populations or narrower row-widths. Due to lower weed populations at this location we did not observe any differences in weed suppression for any of the treatments. Black and small red beans reacted differently to row-width and population under these drought conditions. This research was funded by Project GREEN and the Michigan Dry Bean Commission grant from the Michigan Department of Agriculture Specialty Crops.

Effect of row width, population, and herbicide treatment on dry bean yield (MSU Agronomy Farm East Lansing – 2010)

Christy Sprague, Ryan Holmes, and Gary Powell, Michigan State University

Figures and tables are in the final report link in “additional information”.

Summary: This trial was conducted to determine the effect of row width and population on yield of two classes of dry bean. This trial was conducted at two different locations. At this location, East Lansing, moisture was not as limiting as the Richville location. Yield was favored for dry beans planted in narrow rows. Average black bean yield for this trial were 27 cwt/A. The main effect of row width showed a 4.2 cwt/A advantage for black beans planted in 15 inch rows over black beans planted in 30 inch rows. The row width by population interaction was significant at ($P = 0.0916$), favoring black bean planted in narrow rows at the mid-population. For small red beans, regardless of row width or bean population the average yield was 22 cwt/A. Indicating the ‘Merlot’ small red beans may have the ability to compensate for space regardless of population or row width. White mold did not develop in this trial and there did not appear to be a row width or population effect on the low level of western bean cutworm found. One thing we observed was the ability of narrower row widths to suppress weed growth in our POST only treatments in these trials. We also observed that the small red beans significantly reduced weed growth compared with the black beans. Under these environmental conditions

there was a clear yield and weed suppression benefit to planting black beans in narrow rows. This research was funded by Project GREEN and the Michigan Dry Bean Commission grant from the Michigan Department of Agriculture Specialty Crops.

BENEFICIARIES

The beneficiaries of this research are the 1300 dry bean growers in Michigan, this research will also be passed on to growers in other areas of the United States. For Michigan, the research was presented in both a "take Home" brochure entitled "2010 Dry Bean Research Report: Assessment of Narrow row Technology" and was also presented via a power point at six county meetings and one state meeting. This research will allow the beneficiaries (growers) to identify and compare different lines of beans within a class for their ability to perform within narrow rows.

The following are specific outcomes providing direct benefit to Michigan Dry Bean Growers:

Identification of navy bean lines N09175 and N08003 and black bean line B09174 with excellent architecture and yield for narrow row direct harvest dry bean production.

Identification of a new desiccant product Sharpen (saflufenacil) from BASF potentially offering Michigan dry bean producers a more effective, potentially safer dry bean desiccation option.

Identification of a new fungicide Propulse from Bayer Crop Science potentially offering dry bean growers another fungicide alternative for white mold control.

Plant populations at 100,000 in narrow rows at the grower level achieved excellent yields. Sprague's research confirmed a plant population of 106,000 achieved maximum yields.

Identification of poor canning quality in certain navy and pinto varieties grown in Michigan.

LESSONS LEARNED

Figures and tables are in the final report link in "additional information".

This trial was conducted to determine the effect of row width and population on yield of two classes of dry bean. This trial was conducted at two different locations. At this location, East Lansing, moisture was not as limiting as the Richville location. Yield was favored for dry beans planted in narrow rows. Average black bean yield for this trial were 27 cwt/A. The main effect of row width showed a 4.2 cwt/A advantage for black beans planted in 15 inch rows over black beans planted in 30 inch rows. The row width by population interaction was significant at ($P = 0.0916$), favoring black bean planted in narrow rows at the mid-population. For small red beans, regardless of row width or bean population the average yield was 22 cwt/A. Indicating the 'Merlot' small red beans may have the ability to compensate for space regardless of population or row width. White mold did not develop in this trial and there did not appear to be a row width or population effect on the low level of western bean cutworm found. One thing we observed was the ability of narrower row widths to suppress weed growth in our POST only treatments in these trials. We also observed that the small red beans significantly reduced weed growth compared with the black beans. Under these environmental conditions there was a clear yield and weed suppression benefit to planting black beans in narrow rows. This research was funded by Project GREEN and the Michigan Dry Bean Commission grant from the Michigan Department of Agriculture Specialty Crops.

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ADDITIONAL INFORMATION

http://www.michigan.gov/documents/mda/Bean_Commission-Narrow_Row_Technology_348425_7.PDF

http://www.michigan.gov/documents/mdard/MI_Bean_Commission_Narrow_Row_FINAL_Appendix_A_SCBG-09-Budget-Expenses_354783_7.pdf

http://www.michigan.gov/documents/mdard/MI_Bean_Commission_Narrow_Row_FINAL_Appendix_B_2010_Dry_Bean_Research_report_354782_7.pdf

Presentation of results to Michigan growers and agri-business representatives:

- 1) Saginaw Valley Research and Extension Center Field Day. August 24, 2010. Richville, MI. Showed 180 growers the five small field trials showing varying row widths and plant populations.
- 2) Bay, Gratiot, Huron, Montcalm, Sanilac and Tuscola County Dry Bean Tours. August 18-September 1 2010. Showed 240 dry bean growers commercial and experimental dry bean cultivars planted in 20 inch rows.
- 3) Michigan Dry Bean Variety Trials and Canning Trials and First Year Dry Bean Narrow Row Research Report posted online at Michigan State University | AgBioResearch www.maes.msu.edu/ressta/saginawvalley/. The Research Report is also posted on the Michigan Bean Commission website at Home - The Michigan Bean Commission www.michiganbean.org.
- 4) Published and distributed 1000 copies of the First Year Dry Bean Narrow Row Research Report. These reports will be handed out at dry bean elevators and at the 2011 County Dry Bean Meetings.
- 5) PowerPoint Presentation on Narrow Row Grower Strip Trials and Small Plot Trials at 2011 County Dry Bean Meetings.
- 6) State Dry Bean Day in February, 2011. Dissemination of Narrow Row Research Reports and Grower Panel on Narrow Row Production Practices.
- 7) Michigan Dry Bean Commission Newsletter. Approximately 2200 circulation. November 5, 2010. Results of the two navy bean strip trials. January 3, 2011. Results of the two black bean strip trials.
- 8) YouTube, Harvesting the "Stoutenburg black bean grower strip trial" YouTube - 2010 Drybean Plot Harvest @ Stoutenburg Farms - Title:2010 Drybean Plot Harvest @Stoutenburg Farms.

PROJECT TITLE

Implementation of the Michigan Grape Grower Sustainability Assessment Workbook to Enhance the Competitiveness of the Michigan Grape Industries.

PROJECT SUMMARY

National Grape Cooperative and the Michigan Grape & Wine Industry Council are advocating sustainable production practices to meet the marketing and regulatory needs of their organizations. National Grape has committed to have all of its Michigan grower members

develop an action plan for improving their sustainability and the Michigan Grape & Wine Industry Council has listed sustainability as one of their top priorities for the Michigan wine industry. Consumers are becoming more concerned about how their food is produced and major food retailers, such as Walmart, are requiring suppliers to demonstrate sustainability as part of the overall process from field to table. In order to become a preferred supplier, companies like National Grape must have a sustainability program in place with their growers. In response to National Grape's initiative to increase the sustainability of its grower members, a Michigan grape grower sustainability assessment workbook was developed in 2009. This workbook, called Grape*A*Syst, was a collaborative effort between National Grape, Michigan State University, and the Michigan Department of Agriculture. This project provides the Michigan grape industries with additional resources needed to implement the Grape*A*Syst program with Michigan grape growers, increase grower interest for becoming MAEAP verified, and enhance the competitiveness of Michigan's grape industries.

PROJECT APPROACH

Assist Michigan grape growers with completion of the Grape*A*Syst Program and develop an action plan to facilitate the adoption of sustainable viticulture practices (Obj. 1 and 2). National Grape Cooperative hired three technicians to assist Michigan grape growers with completion of the Grape*A*Syst program and to develop an action plan for their vineyard(s) in 2010. Todd Tapper and Suzanne Forraht worked with growers in Van Buren County and Berrien County, respectively, and Jay Briggs worked with growers in northwest Michigan (primarily Leelanau and Grand Traverse Counties). Paul Jenkins was hired by National Grape to be the project leader, and worked with the technicians and National Grape Cooperative to complete the objectives and project requirements outlined in the grant agreement. Increase grape grower participation in the Michigan Agriculture Environmental Assurance Program (Obj. 3). Through the engagement of growers in the Grape*A*Syst program, grower knowledge of MAEAP should increase. Growers will see firsthand how attainable verification is for their farm(s). Where applicable, MAEAP verification criteria represent the highest level of sustainability for a particular production practice. By completion of the workbook, growers will be exposed to the MAEAP program and the benefits for becoming verified, including Right-To-Farm protection and State record keeping requirements.

GOALS AND OUTCOMES ACHIEVED

In 2010, the first year of this work, technicians worked with 130 Michigan grape growers to complete the Grape*A*Syst workbook and action plan. As stated in the proposal, the first unit of measurement of this project is completion of the workbook (generation of scores), and we projected to have 75% of all juice grape producers and 25% of all wine grape producers complete the Grape*A*Syst program by the end of the fourth year of this project (2013). Please note that the total number of grape growers in Michigan has been approximated since we are relying on NASS data that was last updated in 2007. In 2010, approximately 32 Michigan grape growers started the Michigan Agriculture Environmental Assurance Program (MAEAP) verification process. After the first year of this work, we are on target to meet the goals of this objective (25% increase in grape grower verifications by 2013).

1. How progress was made to achieve long term outcome measures for each project.

Data collected from this project will be used as a benchmark for measuring the sustainability of Michigan's grape producers. Increased sustainability of the Michigan grape industries will be monitored through tracking the progress of Grape*A*Syst workbook scores over time.

BENEFICIARIES

Michigan grape growers benefited by becoming MAEAP verified and by obtaining educational information on growing practices. We worked with approximately 33% (130/400) of grape growers in Michigan during 2010 and surpassed our first year goal set for this objective (25%).

LESSONS LEARNED

In the *Lessons Learned* section, you indicate that a comparison of workbook scores over time “will be done after the second year of this work (2011), and be included in the final report of year two of this project.” Since this is a final report, please clarify that this activity will be continued under other funding in a project that will build on this project.

It is our plan to continue with annual or biennial comparisons of growers’ self assessment results. The purpose is to monitor performance trends. We will continue to do this even after the current grant program expires, but at present we don’t have a addition project or funding source in place. We will have to take a hard look at the economics of self funding the program (by the cooperative or members) or we will have to identify additional funding sources/partners in order to assure the continuation of the Grape-A-syst sustainable viticulture program over the long term future.

Performance toward meeting our expected outcomes was measured: 1) by the number of growers who complete the Grape*A*Syst program workbook on an annual basis, and 2) by comparing workbook scores over time. Our measurement for the number of growers who completed the Grape*A*Syst workbook in 2010 surpassed our expected outcome. For the first year of this work, 130 Michigan grape growers completed the program. This is approximately 33% (130/400), which is above our first year goal set for this objective (25%). As stated in our proposal, we expect to have 75% of all juice grape producers and 25% of all wine grape producers (300 grape producers in total) complete the Grape*A*Syst program by the end of the fourth year of this project (2013). Since we only have one year of data for this project, we are currently unable to compare workbook score over time. This will be done after the second year of this work (2011), and be included in the final report of year two of this project. Performance will be measured by total program performance and not by individual growers since data is confidential.

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ADDITIONAL INFORMATION

http://www.michigan.gov/documents/mda/Natl_Grape_-_MI_Grape_Grower_Sustain791N0200096_353580_7.pdf

PROJECT TITLE

Increasing Michigan Fruit Purchases by Restaurateurs

PROJECT SUMMARY

The National Restaurant Show (NRA) is a high-profile opportunity to reach thousands of chefs, public and private sector menu planners and restaurant owners and encourage them to use a

wide variety of Michigan fruit. Michigan apples, cherries, blueberries and peaches are a critical component to Michigan's fruit processing industry, and by combining resources in creating an innovative, multi-commodity exhibit. The show has an untapped promotional synergy of using those fruits in all types of food dishes. By utilizing space in the Michigan Pavilion (organized and sponsored by the Michigan Department of Agriculture), we were able to showcase a comprehensive presentation of Michigan fruit desserts and other dishes. Attending NRA in Spring 2009, Michigan Apple Committee (MAC) had a successful first experience and sampled three types of processed apple items for foodservice markets. Michigan Apple Association (MAA) noticed that the handful of booths that really engaged the buyers featured demonstration and narration. While this project could have been done individually with apples, every Michigan fruit wins from a more broad presentation. Hiring distinguished chefs to attract visitors to the booth was important, as the ability to cook and engage passers-by simultaneously are specialized skills.

PROJECT APPROACH

The overall goal of this project was to collectively showcase and increase awareness of the four leading specialty crops grown in Michigan, processed in Michigan, and sold in the foodservice sector at the nation's largest restaurant show. With this grant, Michigan Apple Association (MAA) developed synergy and excitement by promoting four major Michigan processed fruits: Apples, blueberries, cherries and peaches in one trade show booth while showcasing Michigan as a one-stop destination for locally-grown fruit. The booth was at the National Restaurant Show (NRA) in Chicago May 22-25, 2010. It is the US's leading restaurant show attracting large numbers of restaurateurs conveniently located near Michigan. MAA arranged for a series of professional chefs to cook on-site, demonstrating unique ways to include Michigan processed fruits in desserts, appetizers, entrees and cocktails. The triple-booth space helped maximize exposure in Spring 2010 to the show's estimated 57,000 attendees, representing various segments of the restaurant and food-service industries.

The entertaining demonstrations conducted by the talented cooks attracted passers-by to watch the cooking techniques as well as sample the delicious recipes. MAA also distributed fresh-cut apples, which allowed for staff to engage in further conversation with the attendees. Each of the stakeholders in this grant provided the necessary Michigan fruit product for their demonstrations as well as display product for the booth. Each group was invited to attend the NRA Show and talk with the restaurateurs/potential buyers.

The NRA fruit booth featured the following chefs and recipes:

- "Aussie" Personal Chef Paul Penney – Cherry Chili, Peach Ice Cream, Blueberry Posset & Chicken w/Apples
- TV Personality & Chef Eric Villegas – Michigan Fudge Nachos with Michigan Fruit
- Award-Winning Bakery Owner Linda Hundt – Michigan Fruit Pies
- College Professor & Chef "Nick" – Michigan Apple Carmel Tempura, Great Lakes Flambe with Cherries
- Grower Patrice Hartman – Blueberry Sliders, Lemon & Blueberry Orzo Pasta & Fruit Salsas
- Chicago Restaurant Mixologist Charles Joly – Cocktails featuring Michigan fruits and fruit products

In advance of the show, a postcard was designed and printed with grant funds, then mailed to a database of restaurants and other foodservice companies encouraging people to stop by our booth. Postcards touted the chefs and live cooking demonstrations that would include everything from savory meals to cocktails.

GOALS AND OUTCOMES ACHIEVED

At the NRA show, MAA staff utilized a lead retrieval system to gain access to a list of interested chefs, restaurants, buyers, etc. Following the show, MAA emailed a survey twice to 750 potential buyers whose badges were scanned about their future fruit buying habits. (The survey was sent twice because the response rate was very low.) The lead retrieval system only allows emails to be sent directly from their system. This can make the email appear to be “spam” and it’s likely that many of the buyers did not even see the email survey due to this system limitation. Of those responding:

- 33 percent said they purchase Michigan fruit whenever possible.
- 67 percent said they will either continue to purchase the same amount of Michigan fruit or purchase more in the coming year.
- 58 percent said they would prefer to purchase Michigan fruit.
- 63 percent said that the chef demonstrations inspired them to use and cook with Michigan fruit.

These results, if they may be extrapolated to the 750 visitors to the Michigan fruit booth, show that two thirds are predisposed to buy Michigan fruit. As usual, the challenge will be converting the leads into actual purchases and connecting new recipe knowledge and enthusiasm with existing products available to processors. To that end, MAA did provide the names of potential buyers to Michigan fruit processors and the partnering commodity groups immediately following the show so the actual sales organizations (rather than commodity groups) could proceed to turn the leads into actual sales. MAA – as well as partner commodity groups – also now has a mailing list of 750 bakers and restaurateurs, highly concentrated in the Upper Midwest, with whom it can share recipes and health information. This will keep the Michigan apple, in the minds of restaurant bakers and restaurant operators. As a second measure of effectiveness, MAA polled the processors after the show to determine if any sale opportunities resulted. Unfortunately, the processors in our state were unable to trace any actual sales back to the lead retrieval list or the booth at the show. Attributing the sales to a specific action - such as a supplying trade show leads - is difficult, at best. Prior to the show, MAA discussed the possibility of a “Show Buy” ticket that could be distributed at the show to potential costumers and allow processors a chance to offer special deals to potential customers. This was another sales tool MAA thought could benefit the Michigan fruit processors. Unfortunately, none of the processors believed it was a good fit at the time and MAA did not pursue it. Both questionnaires and the incentive program were developed by the project participants. The program was shaped with the processed fruit industry in mind to increase future sales.

BENEFICIARIES

The beneficiaries of this project were the Michigan apple, blueberry, cherry and peach industries. All potential leads garnered from the show were passed on to each of these groups to send out to the fruit processors in their industries. Individual fruit processors are unwilling to share their private sales information with us and we are unable to determine, or divulge, whether any sales were garnered from the show. Peaches and to a lesser extent blueberry, especially benefited by this project. Having no trade association to organize, fund or execute such a promotional effort, the Michigan peach and blueberry processors and growers had major visibility at the largest restaurant show.

LESSONS LEARNED

The development of this project and implementation of the show provided much education for our organization. The sheer volume of logistics involved with the implementation of a chef

demonstration was overwhelming at times. Coordinating with each of the groups with their chefs allowed our group to gain a better understanding of those commodities which helped us at the show level. Each of the groups was invited to attend the show and help out in the booth. This program was a definite benefit to the Michigan processed fruit industry. Taken all of the things learned at the NRA 2010 and will use that knowledge to better showcase processed apples in the future including at NRA 2012. MAA's presentation at NRA 2011 will reflect the much-larger NRA 2010 booth.

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ADDITIONAL INFORMATION

[http://www.michigan.gov/documents/mda/MI Apple Assoc - Increasing MI Fruit Purchases-791N0200097_353572_7.pdf](http://www.michigan.gov/documents/mda/MI_Apple_Assoc_-_Increasing_MI_Fruit_Purchases-791N0200097_353572_7.pdf)

PROJECT TITLE

Improving Petunia Production Efficiency through Cultivar Selection and Development of Molecular Tools

PROJECT SUMMARY

Rising energy costs are forcing greenhouse growers to become more efficient in the way they produce bedding plants. In fact, in a recent survey, greenhouse producers identified energy and labor costs as the two biggest threats to profitability for the industry. Both of these costs are a direct function of how long a crop is in the greenhouse. Reducing crop production time is one critical component of increasing production efficiency. For this project, two approaches were taken to reduce crop production time. The first involved evaluating crop production time of numerous cultivars *Petunia* cultivars to identify early flowering varieties. Selecting early flowering varieties among currently available cultivars is a *short-term* approach to improving production efficiency. The *long-term* goal of this project is to develop *Petunia* cultivars exhibiting earlier flowering under the non-optimal production conditions of Michigan (low light, cool temperatures, short days during the production season) as a means to improve production efficiency. For this second approach to improving production efficiency, we developed resources that will be useful for understanding the genetic control of crop timing and allow the breeding of earlier flowering cultivars.

PROJECT APPROACH

The specific goals for this project were to:

1. Screen currently available *Petunia* germplasm to identify early flowering cultivars for Michigan conditions and make recommendations for Michigan growers.
2. Evaluate interspecific hybrid *Petunia* populations for early flowering under non-optimal conditions to assess genetic diversity.
3. Develop genetic linkage maps for segregating populations of *P. axillaris* × *P. exserta* and *P. integrifolia* × *P. axillaris* to aid our long-term goal of identifying molecular markers for early flowering.

Project Director Dr. Ryan Warner and graduate student Joseph Tychonievic were responsible for phenotyping the panel of petunia cultivars and mapping populations for early flowering, and extracting DNA from the populations for Simple Sequence Repeat (SSR) marker genotyping for the development of genetic linkage maps. Co-PD Dr. Cornelius Barry oversaw the bioinformatics analysis of the sequencing data for SSR identification and evaluation.

GOALS AND OUTCOMES ACHIEVED

We evaluated flowering time in response to temperature for 17 petunia cultivars, comprising both trailing and upright varieties. Plants were grown at 14, 17, 20, 23 and 26°C. While decreasing temperature increased time to flower of all varieties, there was considerable variability in the increase in flowering time as temperature decreased (Table 1). For example, decreasing temperature from 20 to 17 °C increased time to flower by 11 days for petunia 'Dreams Rose Morn' and 'Prism Sunshine' while increasing time to flower by 17 days for 'Double Cascade Blue'. Additionally, flowering time of several wild *Petunia* species that have potential as sources of genetic diversity for breeding programs were evaluated. The increase in flowering time as temperature decreased from 20 to 17 °C was only 7 days for *Petunia exserta* and *Petunia axillaris*, less than any of the commercial cultivars evaluated. These data indicate that there is sufficient variation in crop timing among current commercial cultivars for growers to select cultivars exhibiting minimal delay in flowering with decreasing temperature and that wild relatives of the cultivated petunia may be useful genetic sources for breeding programs to

develop faster flowering cultivars. We have also determined the impact of photoperiod on flowering time for the wild species. While all species were classified as quantitative long-day plants, there was considerable variability in the strength of the photoperiodic response which may be exploited to breed cultivars with reduced photoperiod sensitivity. For detailed data and results, please see the report in “additional information”.

We have evaluated flowering time and crop quality traits for two interspecific hybrid *Petunia* F₂ populations. The populations are hybrids of *P. axillaris* × *P. exserta* and *P. integrifolia* × *P. axillaris*. The common garden petunia (*Petunia hybrida*) is a hybrid between *Petunia axillaris* and *Petunia integrifolia*. Therefore, we are essentially recreating the germplasm base for *P. hybrida*. As *P. hybrida* has been inbred for commercially desirable traits over the last 100 years, much genetic diversity has been lost. Recreating the original cross allows us to recapture much of that diversity and introgress novel traits back into the commercial gene pool.

Variability in development rate across Petunia genotypes: The rate of node appearance (i.e. leaf unfolding rate) is one factor determining crop timing. Many greenhouse crop growers in northern climates have reduced greenhouse temperature in an attempt to reduce heating costs. Leaf unfolding rate is a temperature dependent process; therefore lowering greenhouse temperature decreases the rate of development, leading to increased production time. Developing cultivars with faster development rates at lower temperatures is one long-term strategy for improving the energy efficiency of greenhouse crop production. Initial experiments indicated that the wild relative species of the cultivated petunia, *P. axillaris* and *P. integrifolia* have higher leaf unfolding rates than any of nine elite *Petunia hybrida* cultivars, and that the interspecific hybrid F₂ populations *P. axillaris* × *P. exserta* and *P. integrifolia* × *P. axillaris* exhibit transgressive segregation for leaf unfolding rate and node number below the first flower.

To further analyze variability in crop timing and quality traits among the two interspecific mapping populations, approximately 200 F₂ individuals of each mapping population were grown under a cool temperature regime (17°C). Plants were evaluated for crop timing traits, including the leaf unfolding rate and the number of nodes forming below the first flower, as well as several crop quality parameters, including flower size (width and length), flower bud number, branch number and plant height.

For detailed data, please see the report in “additional information”.

These phenotypic data will be utilized to identify genetic loci controlling these traits following generation of the genetic linkage map. These data indicate that both populations exhibit considerable diversity for all of the evaluated traits, which will greatly facilitate identifying molecular markers associated with these traits that can be utilized in petunia breeding programs.

SSR marker and genetic linkage map development

To develop genetic linkage maps, we are utilizing molecular markers termed simple sequence repeats (SSRs), or “microsatellites”, which are based on DNA sequences consisting of short repeated strings of nucleotides (e.g. TGTGTGTGTG or GACGACGACGAC). We have mined the currently available DNA sequences for *Petunia axillaris* to identify SSRs that are being used to screen for DNA polymorphisms across the parents of our mapping populations. Within the approximately 20,000 available sequences, we have identified over 500 SSR sequences fitting the selection criteria of a minimum of seven repeats for di-nucleotide motifs, five for tri-nucleotide motifs, four for tetra-nucleotide motifs, and three for penta-nucleotide motifs. We have screened these markers on our populations to identify polymorphic markers. Additionally,

we screened over 100 SSR markers developed for *Petunia hybrida* and identified numerous markers that will be useful for developing genetic linkage maps on our populations.

We identified 94 polymorphic SSRs between *P. axillaris* and *P. integrifolia* and 67 polymorphic SSRs between *P. axillaris* and *P. exserta*. We have genotyped 164 individuals from the *P. integrifolia* × *P. axillaris* population with 51 markers to generate a preliminary genetic linkage map (Fig. 2). Additionally, 10 dCAPS markers developed in Dr. Cris Kuhlemeier's lab at University of Bern, Switzerland have been screened on this population and integrated into the linkage map.

BENEFICIARIES

This work will benefit multiple sectors of the floriculture industry as well as the broader research community. The cultivar selection work will directly benefit greenhouse growers, particularly those in northern locations such as Michigan, by identifying cultivars that require less energy to produce. Our work has shown that proper cultivar selection can reduce crop production time by 15-20%, thereby also reducing fuel usage for heating. The result for the genetic mapping of crop timing traits will benefit floriculture crop breeders by providing tools to breed faster developing cultivars. The genetic resources developed through this project (the mapping populations, molecular markers and genetic linkage maps) will benefit commercial floriculture breeders as well as the broader petunia research community. While we are focused on crop timing traits, these populations also exhibit considerable variation for a number of crop quality traits, including flower size and color, branching habit and plant height, and will therefore be useful for breeding and understanding the genetic control of these traits as well.

LESSONS LEARNED

The results of this project indicate that while current petunia cultivars do vary in development rate, the range of variation is limited, especially to the range exhibited by the wild progenitor species of *Petunia hybrida*. This suggests that the wild species will be very useful sources of genetic diversity to introgress into the commercial breeding germplasm in order to breed faster developing and earlier flowering varieties. Our results also indicate that crop timing traits such as leaf unfolding rate and leaf number below the first flower are quantitative traits (i.e. controlled by multiple genes). Therefore, developing molecular markers for these traits should facilitate rapid introgression of superior alleles for crop timing traits while minimizing negative phenotypes (so called "linkage drag").

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ADDITIONAL INFORMATION

http://www.michigan.gov/documents/mda/MSU_Improving_Petunia_Production_791N0200098_final_353585_7.pdf

PROJECT TITLE

Michigan Pavilions for Specialty Crops at Domestic and International Trade Shows

PROJECT SUMMARY

The Michigan Bean Commission worked with the MDA International Marketing Program, to secure booth space at major domestic and international trade shows for Michigan specialty crop commodity groups and companies to exhibit at during 2010. The project assisted specialty crop commodity groups in promoting their products both domestically and internationally. The specialty crop groups attended the shows to showcase Michigan specialty crops and focus on increasing sales of the products. Exhibiting at these shows helped to open up new opportunities for Michigan specialty crops, which is extremely beneficial especially in years when large crops are expected.

ANTAD Show in Mexico, Guadalajara, Mexico - March 17-19, 2010.

The show is a major retail show for the Mexican market but is very expensive show. MDA worked with Food Export Association of the Midwest to help off-set the cost of booth space for specialty crop exhibitors and to provide additional services so they would have a successful show.

Food Marketing Institute Show (FMI), Las Vegas, NV – May 11-13, 2010

This show is the largest retail show in the U.S. Booth space was purchased for the Michigan Bean Commission and the Michigan Apple Committee to exhibit from and promote their products.

National Restaurant Association (NRA) Show, Chicago, IL – May 22-25, 2010

This is the largest food service show in the U.S. Booth space was purchased for the Michigan Bean Commission and the Michigan Apple Committee to exhibit from and to promote their products. The Michigan Apple Committee Booth also promoted cherries, blueberries, and peaches.

SIAL Paris, Paris, France – October 17-21, 2010

This show is the second largest food show in the world, occurring every other year. Booth space was purchased for the Michigan Bean Commission and the Michigan Cherry Committee to exhibit at and promote their products. The booth also promoted other Michigan specialty crops for those not able to participate in person at the show.

American Food & Beverage Show, Miami, FL – October 26-27, 2010

This show targets buyers from the Caribbean and Central and South American markets. Booth space was purchased for the Michigan Bean Commission and the Michigan Apple Committee to exhibit from and showcase their products. Other companies from Michigan with products containing specialty crops were also able to participate in the Michigan Pavilion for a nominal cost that helped to pay for the booth space and signage.

PROJECT APPROACH

The Michigan Bean Commission worked jointly with the Michigan Department of Agriculture to offer a number of domestic and international marketing opportunities to Michigan specialty crop groups. The groups participating in the various activities included commodity groups, Michigan farmers, growers and producers as well as companies and cooperatives.

Booth space was purchased at a number of domestic and international shows for the specialty crop companies to exhibit at and to showcase their products. This approach was a great way for the groups to see existing customers as well as find new buyers and markets.

An e-mail was sent to all Michigan commodity groups representing specialty crops. The e-mail was used to generate interest and participants for all of the events that were selected by the committee of commodity groups to participate in during the 2010 calendar year.

Dear Specialty Crop Commodity Group,

On behalf of the Michigan Bean Commission, I am pleased to announce that we have secured funding from the Specialty Crop Block – Farm Bill 2009 for booth space at some of the largest international and domestic trade shows in 2010.

The goal of the Specialty Crop Block Grant is to promote Michigan specialty crops in the international arena. The trade shows we selected are among the most prominent in the world, which will bring high quality Michigan specialty crops to the forefront of the international buyers.

Booth space at large international trade shows can be quite costly. Creating Michigan Pavilions will help defray some costs and bring national and world attention to our Michigan specialty crops.

MDA will manage and administer the booths at these shows. If you are interested in exhibiting one of the following shows, please complete the attached document indicating the shows you are interested in exhibiting at during 2010. You can also contact Jamie Zmitko-Somers, International Marketing Manager for the MDA at (517) 241-3628 or zmitkoj@michigan.gov for more information.

2010 Michigan Pavilions for Specialty Crops:

- *Expo Antad: Guadalajara, Mexico; March 10-12*
- *U.S. Food Export Showcase: Las Vegas, NV; May 11-13*
- *American Food Fair at NRA: Chicago, IL; May 22-25*
- *SIAL Paris: Paris, France; October 17-21*
- *America's Food and Beverage Show: Miami, FL; October 26-27*

GOALS AND OUTCOMES ACHIEVED

ANTAD Show

The goal was to have Michigan specialty crops highlighted at this major retail show in Mexico. Two groups with specialty crops participated in the show and reported anticipated export sales of \$100,000 as well as 13 new foreign buyer contacts. Michigan dry beans as well as fruits and vegetables were highlighted during the show. The booth highlighted quality specialty crops that are available in Michigan for export to Mexico.

FMI Show/NRA Show

The goal was to have Michigan specialty crops highlighted at this major retail and food service shows in the U.S. Additional goals and outcomes are reported in the evaluations summaries included in the additional information at the end of the report.

SIAL Paris Show

The goal was to have Michigan specialty crops highlighted at this major international food show to buyers from around the world. Additional goals and outcomes are reported in the evaluations summaries included in the additional information at the end of the report.

American Food & Beverage Show

The goal was to have Michigan specialty crops highlighted at this major show in the U.S. The booth highlighted quality specialty crops that are available in Michigan for export to the Caribbean and Central America as well as domestic buyers from the U.S. A total of 6,940 people from 83 countries attended the show with 76% coming from the U.S. and 24% being international attendees. Buyers from the key target regions of the Caribbean and Central and South American markets totaled 1,303, showing the importance of this show to expanding exports into those regions. Additional goals and outcomes are reported in the evaluations summaries included in the additional information at the end of the report.

BENEFICIARIES

ANTAD

Participants included the Michigan Bean Commission and Graceland Fruit (GF) Cooperative. Michigan apples and other Michigan specialty crops were also promoted at the booth. A solid trade lead for canned fruit was brought back from the show and was sent to Michigan companies that could supply the product.

FMI Show

Participants included the Michigan Bean Commission and Michigan Apple Committee. Michigan apples, dry beans and other Michigan specialty crops were promoted at the booths. The commissions and committees promote and represent all of Michigan's growers and producers of the various specialty crops being represented.

NRA Show

Participants included the Michigan Bean Commission and Michigan Apple Committee. Michigan apples, dry beans, cherries, blueberries and peaches were promoted at the booths. The commissions and committees promote and represent all of Michigan's growers and producers of the various specialty crops being represented.

SIAL Paris

Participants included the Michigan Bean Commission and Michigan Cherry Committee. The commissions and committees promote and represent all of Michigan's growers and producers of the various specialty crops being represented. Michigan specialty crops of all types were also promoted at the booth, with a booklet that was created talking about all of Michigan's specialty crops.

American Food & Beverage Show

Participants included the Michigan Bean Commission and Michigan Apple Committee. The commissions and committees promote and represent all of Michigan's growers and producers of the various specialty crops being represented. Additional Michigan companies in the pavilion selling specialty crop.

LESSONS LEARNED

ANTAD

This is a major trade show for the Mexican market but it also pulls buyers from other Latin countries, which makes the show even more important for Michigan Specialty Crops. We also learned that it is necessary to help specialty crop companies participate in this show as it is very expensive and difficult to register for as the materials are in Spanish. There was a lot of interest in Michigan specialty crops especially fruit and dried beans. There were also some mixed results from the show as well with one company not seeing a strong chance of sales in the next

6-12 months. Therefore, the findings from this show were good for certain industries but not from others. It was recommended not to participate in this show for 2011 due to the lack of results and the current security situation in Mexico as well. Mexico is still a very important market for Michigan as the number three export market. Additional marketing opportunities for this market will be sought out for future years.

FMI Show

This is a major trade show for the U.S. retail market but it also pulls buyers from all over the world, which makes the show even more important for Michigan Specialty Crops. The FMI Show has seen a number of changes over the past few years so the results were mixed for the commodity groups that participated. The Michigan Bean Commission has some positive comments and results while the Michigan Apple Committee did not feel that the show was as successful as past shows. Some good contacts were made at the show for buyers that were interested in specialty crop commodities from Michigan. The show is now held every other year and will not occur again until 2012. For participation in future years the show will need to be evaluated and determine if it is still an important show for the domestic and international buyers in the retail trade.

NRA Show

This is a major trade show for the U.S. food service industry but it also pulls buyers from all over the world, which makes the show even more important for Michigan Specialty Crops. The NRA Show continues to grow each year with more U.S. buyers interested in local and fresh products. This show not only provides a great opportunity to meet with foreign buyers but for our Michigan commodities it offers the ability to get in front of important buyers from the Chicago market as well. For most of the commodity groups this was the first time they have exhibited at this show. Further evaluation will need to be done in the year after the show to determine the benefits and if it is a show that will provide good results in the future.

SIAL Paris Show

SIAL Paris is a major trade show in Paris, France but it pulls buyers from around the world, which makes the show even more important for Michigan Specialty Crops. The SIAL Paris show had some issues with attendance in 2010 due to on going strikes in Paris, France that occurred during the show. A total of 136,500 professional visitors of which 62% were visitors from outside of France from 200 different countries visited SIAL Paris. Even though attendance was down it was still a great show for seeing both current buyers of Michigan specialty crops and finding new buyers. The specialty crop industry was very supportive of this show and recommends participating in future years due to the large number of international buyers in attendance.

American Food & Beverage Show

This is a major trade show for reaching buyers from the Caribbean and Central and South American markets but it also pulls buyers from all over the world, which makes the show even more important for Michigan Specialty Crops. The American Food & Beverage Show saw substantial growth in the number and quality of buyers attending the show this year. This show not only provides a great opportunity to meet with foreign buyers but also to meet with consolidators from the region as well as U.S. buyers from the U.S. For all of the companies it was the first time they had ever exhibited at this show. All of the companies said the show was very beneficial not only for finding new international buyers but for securing domestic sales as well. All of the companies said they would participate in the show again in 2011. It was determined that this is an important show to access buyers from the critical growing regions of the Caribbean and Central and South America.

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ADDITIONAL INFORMATION

Evaluation and surveys are included in the report listed at
http://www.michigan.gov/documents/mda/Final_Report_-_SCBG_2010_-_MI_Bean_342189_7.pdf.

PROJECT TITLE

Regional Agri-Tourism Marketing Project

PROJECT SUMMARY

The West Michigan Tourist Association (WMTA) has operated as a non-profit tourism marketing organization since 1917 and is the oldest continuously operating regional association in the nation. The vision and mission of the West Michigan Tourist Association are:

Vision: To be recognized best in service, knowledge, marketing and fulfillment.

Mission: To market and promote travel to West Michigan and to enhance the image and economic success of its members.

WMTA promotes the West Michigan region from Northwest Indiana to the Straits of Mackinac encompassing the entire west half of the Lower Peninsula. As a regional marketing area, it made sense for WMTA to proceed with this endeavor representing all of the specialty crops of the farms through out this large area. Thus said, WMTA is reporting the results for the Specialty Crop Block Grant Program – Farm Bill for improving the competitiveness of the farms who grow these specialty crops and for improving the awareness of Michigan’s farms as a tourism entity.

PROJECT APPROACH

WMTA proposed this project based upon what we do best – marketing – and strived to use Michigan-based businesses for all of its projects whenever possible, to keep dollars spent by WMTA in the state that produced these dollars. WMTA addressed the following issues, problems and identified these interests:

ISSUE:

- A. To make public aware of agri-tourism
- B. Promotion of the agri-tourism product to:
 - 1. Agricultural Community
 - 2. Tourism Community
 - 3. Public
- C. Stimulation of buying agri-tourism products

PROBLEM:

- A. The need for cross promotion of tourism and agriculture
- B. Cross marketing from field to consumer

1. Farm Markets
 2. U-Picks – direct to farm
- C. Understanding when products are available – seasonality

INTEREST

- A. Desire to shop locally
- B. Support of local economy
- C. Promotion of farm products as a tourism opportunity

GOALS AND OUTCOMES ACHIEVED

- In the *Goals and Outcomes Achieved* section, please report on the goals and outcomes achieved, rather than reiterating the estimates for outcomes that were in the original proposal. What do the sales data say?

Although we do not keep year over year sales data from the farm markets and also most of the sales are propriety, we can gauge success of our marketing farm markets by membership and retention of members of farm markets. In the last year we have signed up 46 members, all of which have retained membership stating they are pleased with the tradeshow support, website and publication promotions given to their effort.

Antidotal information from contact with the farm markets show growth in numbers of people visiting and sales. Also, the Michigan Farm Market Association membership has shown a 100% growth in the past two years. The MFMA does do some research on attendance, with the last reports from 2009. The can be viewed at the link [MIFMA » Reports Comments Feed](http://www.mifma.org/news/reports/)
<http://www.mifma.org/news/reports/>

- Was there an increase in sales of \$125,000 in the industry?

Although we do not have sales figures, judging by the increase in farm markets and attendance, we easily met the goal of \$125,000 increase in the industry. We have experienced additional membership and support from the farm community and farm markets in recognition of the marketing and increased business. We also have been told by the farm market organizers that they are experiencing growth in number of vendors and overall sales.

- How many of the copies of the guide have been distributed to date and to whom?

All 210,000 copies of the 2010 West Michigan Carefree Travel Guide were distributed through Michigan Welcome Centers, WMTA member properties, trade shows, AAA offices, business, and mailings.

- Is even anecdotal data available associated with the marketing campaign?

As an association we are in contact with the farm market organizers and farmers throughout West Michigan and we are being told sales and visits are up over the past two years as the locals and the traveling public come to understand what is available and where.

- Has there been an increase in traffic on the www.wmta.org website that might be at least partially attributable to this campaign? How many unique visitors have visited the site? By how much has traffic increased?

See the attached excel web sheet on internet traffic. We have seen a slight increase in numbers. Frankly, we were disappointed that the billboards did not create more traffic on the web site. In the future we would adjust message and timing to drive more views to the agri-

tourism web site. The agri-tourism portion of the site saw a total of 15,354 page views from January 2010 to April 2011. In 2010, 213,110 unique visitors came to WMTA.org, compared to 211,216 in 2009.

- Did specialty crop farms listed in the four color tri-fold brochures report an increase in farm visitors?

The specialty crops were listed in the brochure, not the farms. All of the brochures have been distributed through tradeshow, visitor centers and mailings from WMTA to potential travelers. We did not do a conversion study on those who received the information and how it translated to visits.

- In the *Goals and Outcomes Achieved* section, you indicated that the project generated nearly 550,000 visits to Michigan farms featuring specialty crops. How does this number compare to farm visits in previous years?

We do not possess year over year figures, but can gauge increases in farm market business overall by number of new farm markets, increased marketing by farm markets and WMTA and information received on increased business from the farm market organizers.

With this grant, we undertook the following for our “Regional Agri-Tourism Marketing Program” in order to familiarize the public with the availability of the specialty crops:

- I. **Premier Sponsorship of the Agricultural Tourism section of the 2010 West Michigan Carefree Travel Guide featuring farms, markets, u-picks and wineries which grow/feature specialty crops.** (pages 35 – 44 of enclosed guide) WMTA produces 250,000 copies of this comprehensive four-season guide to traveling in West Michigan and has done so annually since 1917.

Premier Sponsorship included two full pages of editorial focusing on specialty crops at the beginning and the end of the Agricultural Tourism section of the guide, along with photos for support (<http://www.bluetoad.com/publication/?i=34451&p=37>). Also included are the banner ads below each farm market/winery grid page, an eight-page section. The banners below the grid listings visually enhance this section, drawing readers to it. These ads drive traffic to WMTA.org’s new agri-tourism section and interactive map (see below for website and interactive map information). The section is closed with the chart showing harvest times, followed by “Food and Spirits,” which also has an editorial banner on page 46 above the winery ad directing the public to the interactive map at www.wmta.org. This guide was produced in March of 2010 (see enclosed copy).

OUTCOME: Based upon 250,000 copies printed, if 5% of the readers visited a farm with specialty crops, this resulted in 12,500 visitors. The average purchase of \$10.00 then generates \$125,000 for the industry, at a cost of \$17,100. (Average purchase price of \$10 was provided by Robinette’s Apple Barn & Winery.)

Long-term outcome: The grant and added partners doubled the agri-tourism section of the travel guide from five pages to 10 ½ pages. This section continues to grow even though the grant has ended as our partners realize the value in the section of the guide. WMTA added over 35 farm members to its membership during this time, the majority of which kept their membership active even after the grant expired, understanding their strong relationship with tourism.

II. **Main navigation tab on the WMTA website to the new agricultural tourism section.** WMTA's website is currently the largest and most visited site regarding travel in West Michigan. A tab on the main navigation bar to the newly created agri-tourism section (<http://www.wmta.org/agri-tourism-579/>) takes visitors to interactive maps of each of the specialty crops, farms and winery trails within WMTA's covered area. (Farms do not need to be a member of WMTA to be listed in this section.) The giveaway portion in this section gathers contact information when visitors enter to win agricultural related prizes. We have given away a wine tasting getaway to Brys Estate in Traverse City and also a \$50 Lakeshore Harvest Country Gift Certificate. A copy of the tri-fold brochure and travel guide were sent to all 741 people who entered.

III. **WMTA.org banner ad with click through to interactive agricultural trail map.** A rotating banner ad placed on all pages of the website served as a link to the agri-tourism section described above. The banner ad was online November 18, 2009 through January 1, 2011. The design of the banner reflected that of the billboard seen throughout the region.

OUTCOME: Banner enjoyed over 2.5 million impressions during the one-year period it was online at WMTA.org. If 1% of those who viewed the banner visited farms with specialty crops, 25,000 visitors to farms with specialty crops would result. The average purchase of \$10.00 of product would generate \$250,000 for the industry with a cost of \$10,088.91.

Long-term outcome: The section remains an integral part of the website and continues to grow. The trail map is always available to guide the traveler to where the specialty crop can be found in West Michigan.

IV. **Display banner promoting agri-tourism industry at consumer travel shows.** WMTA participated in nine consumer shows throughout Michigan and the Midwest in 2010. An agri-tourism banner was displayed in addition to WMTA's current trade show banners promoting travel in West Michigan. This encouraged visits to agricultural members and the agri-tourism sections of the website and *West Michigan Carefree Travel Guide*. This banner was designed by Harbor House Publishers, Boyne City, MI. Show attendees also received a promotional give-a-way promoting Specialty Crops in Michigan, which was an apple shaped jar opener.

OUTCOME: In 2010, shows were attended by approximately 436,836. Of the 436,836 attendees, if 5% of those attendees visited a farm with specialty crops, this would result in 21,841 visitors. The average purchase of \$10.00 of product would generate \$218,410 for the industry with a cost of \$6,903.30. Shows began in January of 2010 and ran through October of 2010.

Long-term outcome:

The presence of these marketing pieces expanded the thinking of the traveling public that agriculture is tourism. The high visibility of this banner at the most popular travel shows in the Midwest helped to cement the connection between the two.

V. **Four Color Tri-Fold Brochures.** A four-color brochure designed to showcase the specialty crops growing seasons was distributed at consumer travel shows (20,000), through WMTA's mail program (20,000), and through the Michigan farm markets (60,000). 100,000 brochures have been distributed.

OUTCOME: Of the 100,000 brochures distributed, if 5% of those recipients visit a farm with specialty crops, this would result in 5,000 visitors. The average purchase of \$10.00 would generate \$50,000 for the industry with a cost of \$4,153.77.

Long-term outcome: The brochures presented a calendar showing when the most popular crops would be in season, allowing the public to continually refer to this document to know when to expect to be able to pick/or buy these crops. These brochures were also very popular with the farms themselves who loved being able to distribute them to their customers, allowing a stronger relationship to foster.

- VI. **Agri-Tourism Special Announcements:** Once a month editorial features and photos were sent via e-mail to over 20,000 Travel Tips subscribers, highlighting which crops were in season, which plants were available, where to purchase, etc. These e-blasts were sent out monthly from March to November. They were then featured in the In Season section of the agri-tourism section. (<http://www.wmta.org/in-season-588/>)

OUTCOME: 20,000 e-mails sent each month for nine months result in 180,000 e-mails sent. If 5% visited a farm with specialty crops, this would result in 9,000 visitors. The average purchase of \$10.00 of products would generate \$90,000 for the industry with a cost of \$2,250.

Long-term outcome: These were not only educational but also lighthearted and used to draw interest to the different crops.

- VII. **Billboard Program.** Forty billboards located throughout Michigan round-out our marketing initiatives that drove traffic to the agri-tourism section of WMTA.org while familiarizing the public with this concept. Billboards were ordered within one week of grant acceptance and ran until December 31, 2010.

OUTCOME: According to the analytics provided from CBS Outdoors, 95,275,600 vehicles have viewed these billboards this year and if 0.5% of these viewers visited a farm with specialty crops this would result in 476,378 visitors. The average purchase of \$10.00 of products would generate \$4,763,780 for the industry with a cost of \$23,225.

Long-term outcome: Because of the relationships made, we are working on another billboard promotion for coming years for West Michigan. The billboards brought the fresh products to the forefront in the minds of the traveling public.

Overall, this project generated nearly 550,000 visits to our Michigan farms featuring specialty crops, and based on the average sale of \$10.00 per visitor, generated \$5,497,190 in sales at a cost of \$63,720.98.

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Kelly Duff
 1355 Century
 Grand Rapids 49509
kelly.duff@cbsoutdoor.com
 616-452-3171
 Billboard Company

Post Up Stand Inc.

5461 Dunham Rd
 Maple Hts, OH 44137
sales@postupstand.com
 800-935-3534
 Travel Show Display banner

Cheri Spencer

WMTA
 Accounting - Oversee
cheri@wmta.org
 616-245-2217

BENEFICIARIES

- In the *Beneficiaries* section, please indicate **how** the Michigan specialty crop producers benefited from this project.

Promotion and recognition of the Michigan farm specialty items through billboards that led them to website information on when and where products were available.

Increased participation in marketing by the farm markets as they grow in sales and overall number of farm markets selling to locals and the traveling public.

Gauging by comments and reaction to business at farms and farm markets, there was an overall increase in awareness of the diverse specialty crops grown in Michigan.

Michigan specialty crop producers benefited from the product exposure and assistance of the WMTA in marketing specialty crop products to consumers in Michigan.

LESSONS LEARNED

Overall, the project created a number of relationships between unlikely partners. We have seen a marked rise in calls coming into our office for the specialty crops. Travelers now see Michigan specialty crop farms as an attraction and a destination in West Michigan.

CONTACT PERSON

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ADDITIONAL INFORMATION

West Michigan Tourist Final Report -

http://www.michigan.gov/documents/mda/West_MI_Tourist_Assoc_Final_Report_791N0200078_353581_7.PDF

The brochure link is

http://www.michigan.gov/documents/mda/West_Michigan_Tourist_Assoc_Brochure_-_Fresh.Local.Ready_353582_7.pdf

PROJECT TITLE

Food Safety and Michigan Fruit & Asparagus Producers

PROJECT SUMMARY

Recent food scares across the nation have made food safety a top priority for Michigan fruit and vegetable producers. Because of the food scares and Michigan's fruit and vegetable business with the US Department of Agriculture, educational classes were held for producers to train them in complying with a USDA GAP audit.

PROJECT APPROACH

In order for Michigan producers to remain competitive in selling fresh and processed products, it is imperative that Michigan farmers demonstrate they are good stewards by participating in the USDA GAP program. By participating in the program, growers are required to develop a farm manual which describes practices, policies, and procedures at the farm level. These practices include implementation of a food safety program, worker health & hygiene, water usage, sewage treatment, animals/wildlife exposure, manure and municipal biosolids, field sanitation and hygiene, field harvesting and transportation and traceability.

It is important to note that not only does USDA require the GAP certification, retailers such as WalMart, Spartan, and Meijer are now asking producers for third party certification. Additionally, these retailers recognize and accept the USDA GAP certification at the farm level.

GOALS AND OUTCOMES ACHIEVED

The Work Plan called for eight grower meetings to be held in Southwest, West Central and Northern Michigan for approximately 380 asparagus, cherry, peach and apple growers. Growers were to be provided with a farm manual and a 15-minute DVD on worker health & hygiene training.

Eight grower meetings were held from January 28 through March 17, 2010. Approximately 440 growers attended the educational classes.

BENEFICIARIES

GAP Training remains a high priority for Michigan agricultural producers. Some of the 440 participants had been through the classes in 2009 but for many, it was their first introduction to the program. Overall, the program was very well received (noting the number of participants) and considered extremely successful.

Our association has received many calls since the meetings asking for additional guidance on particular questions as it pertains to certain farming operations. Growers

are to be commended for embracing the program and preparing for an actual farm audit for the 2010 harvesting season.

BENEFICIARIES

In addition to the producers benefiting from the program, retail and wholesale customers will benefit from these classes as they can assure their consumers that proper food safety is happening at the farm level. Ultimately, the consumer is an important beneficiary as well.

LESSONS LEARNED

We learned that this was a worthwhile project, and there continues to be a need and desire for this type of education and training for specialty crop producers.

CONTACT PERSON

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ADDITIONAL INFORMATION

http://www.michigan.gov/documents/mda/MACMA_USDA_Good_Agricultural_Practices_Final_Report_2_353571_7.pdf

PROJECT TITLE

Culinary Tourism: Come to the Michigan Table” - Developing Michigan’s Wine and Food Experiences as Contributors to Agriculture and Tourism Economies

PROJECT SUMMARY

This project is meeting the need for improved coordination of efforts in Michigan to promote the state’s specialty crops as part of the travel experience. These activities helped to raise awareness of the benefits of Culinary Tourism around the state and engaged more Michigan restaurants in supporting local specialty crop producers. There has been significant support of the goals of the Michigan Culinary Tourism Alliance from many sources in the food and hospitality industry.

Research and policy development activities in the Michigan Department of Agriculture in recent years have indicated that wine and food tourism can make greater contributions to the economy and provide opportunities for producers of many specialty crops. (Agricultural Tourism Commission - 2007 and Food Policy Council – 2006). To accomplish this goal, efforts must be coordinated to develop promotional messages and trip planning tools for consumers, and engage more Michigan restaurants in supporting local specialty crop producers.

This project is facilitating a partnership among key specialty crop producer groups and members of the hospitality and tourism industry to form a Michigan Culinary Tourism Alliance to develop these opportunities. The Michigan Grape and Wine Industry Council is an appropriate leader of these efforts, due to the strong regional identity of wine, existing relationships with many key partners, and a strong reputation for innovative partnerships in market development. Furthering the development of Culinary Tourism in Michigan is identified as a priority, in the Council’s strategic plan.

PROJECT APPROACH

The Michigan Culinary Tourism Alliance (MCTA) was formed in December 2009, with many organizations representing the tourism, food, hospitality and agriculture sectors of the Michigan economy. The MCTA joined the International Culinary Tourism Association as the Michigan chapter which provided the founding members of the MCTA with full membership benefits in this association.

The Michigan Culinary Tourism Association organized a one day educational conference in January 2011. The goal of this one-day event was to bring together a diverse range of Michigan businesses in an effort to network and educate attendees on ideas to promote, enhance, and celebrate Michigan's many culinary assets. This event was held in East Lansing, Michigan and was attended by more than 220 people. The activities included speakers and breakout sessions and networking opportunities. One of the highlights of the event was the number of Michigan specialty crops that were provided for the lunch.

The Michigan Culinary Tourism Alliance was honored with one of four Governor's Tourism Collaboration Awards at the 2011 Tourism Conference in Kalamazoo.

- Develop "Foodie" Itineraries

The Alliance co-ordinated the development of nine "foodie tours" by staff and a contract vendor (Sojourn Communications), which have been posted on Travel Michigan's website (the state's official tourism agency). www.michigan.org under Things to Do and Road Trips, with an emphasis being given to specialty crops.

Monthly paragraphs were written by MDA staff, highlighting upcoming Culinary Tourism activities. These were being submitted to various members of the Alliance for use in consumer and media newsletters, and to media contacts directly. Information was used in Travel Michigan's consumer newsletter during the grant period reaching 170,000 consumers.

- Trade Events with Key Restaurant Decision Makers

A Michigan Food and Wine Showcase was held at SE Michigan restaurant on April 19, 2010, to present Michigan specialty crop products to restaurants, retailers, wine distributors and consumers. The Michigan Grape and Wine Industry Council, along with the MCTA, participated in this event due to the valuable synergies in engaging a number of specialty crop producer groups.

- Michigan Restaurant Association Trade Show

The Michigan Culinary Tourism Alliance participated in the annual MRA Trade Show and Seminar Series in Novi in October 2011 with several activities. As a sponsor of the show, a focus was given in the Show to "Buying Local". Seminars on Culinary Tourism were delivered both days of the show. In the Michigan pavilion in the trade show, a chef provided wine and food pairings for sampling by small groups of participants featuring Michigan specialty crops. These occurred five times each day during the show. The Alliance has had impact on the Michigan Restaurant Association throughout the past 16 months, with numerous magazine articles to MRA members, free advertising for the Culinary Tourism Conference and a "Buy Local" theme at the association's work with ProStart, a program to introduce high school students to careers in the hospitality industry.

Our close working relationship with the Michigan Restaurant Association during this project, has significantly influenced the increase in the number of restaurants that carry Michigan wines on their wine lists.

- Other Trade and Consumer Shows

To raise awareness about Michigan's specialty crops, grant funds were used to subsidize the fee for wineries to participate in the following events. These funds enabled several smaller producers to participate in these events.

A sponsorship at the Riesling Rendezvous provided the opportunity for 200 attendees to hear a speaker (Amanda Danielson, owner of Trattoria Stella Restaurant in Traverse City). The attendees from wineries, retailers and the media around the world were educated about Michigan Riesling wines by listening to a respected colleague. Wines were donated by the participating wineries, as were the travel costs.

The Grand Rapids International Wine and Food Festival was attended by over 10,000 consumers. Specialty crop Block Grant funds were used to subsidize the cost for 26 wineries to participate in the show, reducing the booth fee from \$800 to \$400 per winery.

GOALS AND OUTCOMES ACHIEVED

1. Increase sales and profitability for Michigan specialty crop producers through increased menu offerings of local products at Michigan restaurants.
This goal was accomplished by outreach to the restaurant industry and partnership with Michigan food and wine vendors to engage in specific promotions to increase their sales with specific restaurants.
2. Promote Michigan as a destination for culinary travel experiences (where "travel" is defined as a trip more than 50 miles from home)
This goal was accomplished by developing communications materials to capture the attention of the consumer and the media, through websites, news releases, media tours and consumer events.

- Form the Michigan Culinary Tourism Alliance (MCTA)

Over 150 inquiries have been fielded by MDA staff from people and organizations wishing to get more information about the Michigan Culinary Tourism Alliance. Staff direct people to the International organization and to reports about Michigan Culinary Tourism Alliance activities posted at [Michigan Wines : Wine & Food : Culinary Tourism](http://www.michiganwines.com/culinarytourism)
www.michiganwines.com/culinarytourism.

A core group of 15 participants met quarterly on a voluntary basis and 20 additional individuals have attended at least one meeting as a guest to contribute their information to the discussions.

The International Culinary Tourism Association (ICTA) now has over 250 people from Michigan receiving their electronic newsletter each month, up from 120 in 2009. Ten new organizations from Michigan joined the International Culinary Tourism Association as a result of Michigan forming a Chapter.

Six meetings were held between January 2010 and March 2011. Notes from the meetings are posted at [Michigan Wines : Wine & Food : Culinary Tourism](http://www.michiganwines.com/culinarytourism)
www.michiganwines.com/culinarytourism. The next meeting of the Alliance is scheduled for June 2011. Funds to support the Alliance during 2011 will be provided by the Specialty Crop Block Grant Program (FY 2010).

Presentations were made on behalf of the MCTA regarding the economic benefits of Culinary Tourism enhanced by specialty crops to communities and businesses to several groups with

attendance totaled in excess of 400 people. Acknowledgement of USDA support for this project was given in each presentation.

- March 17, 2010 – Agriculture Commission Meeting – East Lansing
- April 14, 2010– MSU/ France Exchange on Ag-Tourism and Value-Added Agriculture – East Lansing
- April 29, 2010 – Sustainable Business Conference – Acme CANCELED
- May 6, 2010 – Governor’s Tourism Conference – Mackinac Island
- May 13, 2010 – Michigan Grape and Wine Industry Council – Traverse City
- June 10, 2010– Michigan Food Policy Council - Lansing
- October 2010 – Michigan Association of Convention and Visitors Bureaus – Battle Creek
- October 2010 – Michigan Restaurant Association Trade Show and Seminars, Novi
- January 10, 2011 – Creating Culinary Tourism Destinations – East Lansing
- March 2011 – Governor’s Tourism Conference, Kalamazoo
- March 2011 – Michigan Association of Counties Conference, Lansing
- April 2011 – Circle Michigan conference (Group tour operators and attractions), Frankenmuth
- May 2011 – Barry County Tourism Council, Gun Lake, MI
- October 2011 – Lake to Lake Bed and Breakfast Association annual conference

BENEFICIARIES

The wine grape industry is the primary beneficiary of this activity within the grant. The industry has a farm gate value of \$2 million (2008) and is growing at a rate of 3 – 4% per year. There are now 81 wineries in Michigan, up from 20 just 14 years ago. The wine industry in Michigan is estimated to contribute over \$300 million to Michigan’s economy. Positive impacts will be achieved by other specialty crops that are in a position to take full advantage of the proposed market development opportunities.

We have been effective in increasing the number of restaurants that carry Michigan wines on their wine lists. At the start of the project, the Michigan Grape and Wine Industry Council listed just 40 restaurants that carried four or more Michigan wines. The list has grown during the grant period to over 143 restaurants (project goal was 100).

The Michigan Specialty Crop producers benefitted by the networking opportunities and breakout sessions that focused on getting more Michigan products into food service and food related tourism experiences through conferences and trade shows.

The project is benefiting specialty crop producers by assisting them in finding new markets for their products within the Michigan restaurant community. By publicizing the Culinary Tourism offerings in Michigan, more restaurants will be encouraged to devote more attention to featuring local foods and beverages on their menus, to achieve greater consumer popularity and positive media attention. These activities will enhance the competitiveness of specialty crops by developing new markets and expanding existing ones.

The following organizations have been represented at meetings of the MCTA.

- Michigan Department of Agriculture

- Michigan Restaurant Association
- Travel Michigan
- Michigan State University
- Post-Secondary Culinary Schools
- Chefs
- Convention and Visitors Bureaus
- Michigan Farm Market and Agri-Tourism Association
- Michigan Farmers' Market Association
- Food Systems Economic Partnership

Specialty Crops impacted by this project:

Wine Grapes	Apples	Blueberry	Cherry
Cranberry	Peach	Asparagus	Pumpkin
Herbs and Spices and others	Lettuce and other greens	Honey	Maple Syrup

The project also benefits tourism and hospitality businesses that are seeking to incorporate local foods into their food and lodging offerings to the public.

LESSONS LEARNED

The project team has learned that culinary tourism is a topic of great interest to businesses in the agriculture, hospitality, and tourism sectors. We have confirmed that there is a need for coordination of information between the agri-food and tourism sectors when developing culinary tourism experiences for travelers. We have also learned that it is a challenge to get the attention of restaurant owners.

CONTACT PERSON

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ADDITIONAL INFORMATION

[Michigan Culinary Tourism Alliance Conference - International Culinary Tourism Association](#)

[News - International Culinary Tourism Association](#)

Creating Michigan Culinary Destinations

Michigan's First Conference on Culinary Tourism

Materials from conference sessions:

[The Zingerman's Experience](#) - Ari Weinzweig



[Growing Culinary Tourism](#) - Melody Johnson
[Michigan Culinary Alliance and Culinary Tourism](#) - Linda Jones
[Our Michigan Culinary Experiences](#) - Conference participants worked together to promote many culinary destinations!
[5-minute video about the conference](#) - Created by [Absolute Michigan](#)
[Conference Program and Agenda](#)
[Featured Speakers](#)

Conference Information

January 10, 2011

Kellogg Hotel and Conference Center, East Lansing

This conference brought people together to:

- Facilitate networking among people from diverse roles within Michigan's culinary and tourism communities
- Initiate specific plans and projects based on participants' interests to enhance culinary tourism in Michigan
- Celebrate Michigan's many culinary tourism assets



FOR IMMEDIATE RELEASE
March 24, 2011

Contact: Larisa Draves
TOURISM INDUSTRY COALITION
OF MICHIGAN
(231-823-0015)

2011 GOVERNOR'S AWARDS FOR INNOVATIVE TOURISM COLLABORATION PRESENTED

KALAMAZOO –The 2011 Governor's Awards for Innovative Tourism Collaboration were presented by Governor Snyder on Monday, March 21 at the Pure Michigan Governor's Conference on Tourism in Kalamazoo. Awards were presented in four categories to recognize innovative collaboration as an effective, efficient and creative operating principle for the tourism industry.

Award for Marketing/Promotion - Lake to Lake Bed and Breakfast Association.

The members of this association collaborated on marketing initiatives, which were designed to move their marketing from traditional print to new digital technologies. They created a new website, which offers more unique ways to interact with guests and promote members than any other B&B website in the country. "Blog Buddies" were incorporated into the website to present team blogging done by innkeepers on a variety of tourism topics.

Non-Traditional Partnerships - Michigan Culinary Tourism Alliance.

Culinary tourism is a growing trend in tourism as consumers spend an increasing amount of time and money engaging in authentic and unique food and beverage experiences when they travel. The partnership of the Michigan Restaurant Association, Michigan Department of Agriculture and Travel Michigan collaborated to secure US Department of Agriculture grant funding and create the Michigan Culinary Tourism Alliance. The Alliance promotes the state as a culinary destination as well as to encourage more restaurants to serve local food and beverage.

Education and Training - Michigan's Great Outdoors

Michigan's Great Outdoors is a five county partnership that promotes tourism for Manistee, Mason, Lake Newaygo and Oceana Counties. One of the group's accomplishments has been to create a fall tourism conference aimed at education, training and networking within the five counties. Participants of the conference include legislators and representatives of chambers of commerce, EDCs, and extension offices, many of whom have not typically been part of local or regional tourism planning and coordination. This has created stronger partnerships to promote tourism to this region and to strengthen the local economies of these five counties. This effort has led to a collaborative logo, website and marketing strategies.