New Jersey Department of Agriculture

Specialty Crop Block Grant Program (SCBG)

SCBG Agreement # 14-SCBGP-NJ-0034

Final Report

Submitted; December 28, 2017

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SCBG Project Reports;

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FINAL PERFORMANCE REPORT
Specialty Crop Block Grant Agreement # 14-SCBGP-NJ-0034
Effective End Date; 09/29/17
Final Report Due to NJDA; 12/15/17
(Revised 5/1/2018)

Project Title

"Growing Beach Plums for Profit"

PROJECT SUMMARY

1) Provide a background for the initial purpose of the project, which includes the specific issue, problem, or need that was addressed by this project.

Our biggest challenge is that there are not enough good-tasting varieties available. What we need to do now is select the best beach plum plants we have, and develop them into commercial varieties. As these new varieties begin to produce a crop we will also need to increase marketing and promotion to the public. Farmers in Cape May County have been actively growing beach plums commercially since 2006. There are many groups and people in Cape May County who are interested in working on this project. We would work with the Cape May County Technical High School's Agri-science Program, the USDA NRCS Plant Materials Center (PMC) and Rutgers NJAES Cooperative Extension of Cape May County. Our plan is to work with these partners to increase the number of plants available to us (the farmers) for commercial production. We will also teach the high school Agri-science students about fruit production through paid internships while they work with us to increase the number of plants available. Our County Agricultural Agent will educate other farmers and educators on the information we learned by doing the project.

2) Describe the importance and timeliness of the project.

The fledgling industry would like to plant more beach plums due to the growing popularity of products made from them like jam, jelly; wine and salad-dressing is in demand with our tourist market. Better varieties of the plant are needed for development. There is a buzz in Cape May County about beach plums. There have been many local newspaper articles and interviews with growers. Recently the Chosen Board of Freeholders of Cape May County even passed a resolution announcing the beach plum as the Official Fruit of Cape May County. The local Agri-science students recently developed a system to root beach plum cuttings hydroponically.

3) If the project built on a previously funded project with the SCBGP or SCBGP-FB describe how this project complemented and enhanced previously completed work.

The project was not built on any previously funded projects with the SCBGP or SCBGP-FB.

PROJECT APPROACH

Briefly summarize activities and tasks performed during the entire grant period. Whenever possible, describe the work accomplished in both quantitative and qualitative terms. Specifically, discuss the tasks provided in the Work Plan of the approved project proposal. Include the significant results, accomplishments, conclusions and recommendations. Include favorable or unusual developments.

Work Plan:
October 2014-October 2017

Key Tasks	Executer	Timeline
Pre-test (baseline) of student knowledge of beach plum.	High School	10/2014
Set up hydroponics system.	High School	10/2014 – 1/2015
Harvest cuttings (for hydroponic experiment).	High School	11/2014 – 1/2015
Hydroponic experiment on rooting cuttings. (total failure)	High School/Interns	1-4/2015
Harden-off cuttings (not done because of rooting failure)	Interns	5/2015
Plant the rooted-cuttings. (not done)	Interns	6/2015
Post-test of knowledge gained.	High School	6/2015
Summer Assistant to water and tend plants at High School. (not done; no plants to manage)	Assistant	6-9/2015
Consumer survey conduction at farmers markets and events. Sample product marketing by Washington Inn. (not done)	CMCBPA	07/08/15
Assessment by the Agri-science teacher of intern performance.	High School	9/2015

Collect soft-wood cuttings for more experiments. (not done because of experiment failure)	Interns	7-8/2015
Beach plum harvest education for the Agri-science class. (teacher died; no replacement at this time)	High School	9/2015
Pre-test (baseline) of new student knowledge of beach plum. (not done)	High School	9/2015
Planning twilight meeting for grant participants.	Rutgers	10/2015
File annual report	CMCBPA	10/2015
Develop advertising for the twilight meeting.	Rutgers	11/2015
Harvest cuttings (not done; new teacher was not familiar with program)	High School/ Interns	11/2015 – 1/2016
Twilight meeting (will also deliver pre- and post-tests)	Rutgers	12/2015
Presented results at Vegetable Growers' Convention in Atlantic City, NJ. Survey audience (20) for knowledge gain.	Rutgers	2/2016
Presented at the Mid-Atlantic Fruit and Vegetable Convention in Hershey, PA.	Rutgers	2/2016
Hydroponic experiment on rooting cuttings. (did not happen; new teacher) Replaced this with cleft grafting (140 grafts)	High School Dr. Rick Uva	1-4/2016
Harden-off cuttings. (did not happen)	Interns	5/2016
Plant the rooted-cuttings. (did not happen)	Interns	6/2016
Summer Assistant to water and tend plants at High School. (did not happen)	Assistant	6-9/2016
Consumer survey (79) conduction at farmers markets and events. Sample product marketing by Washington Inn.	CMCBPA	7-8/2016
Collect soft-wood cuttings (500) for more experiments. (bud grafts)	Interns	7-8/2016
Assessment by the Agri-science teacher of intern performance. (did not happen; no interns)	High School	9/2016
Cleft grafting survival rate determined (see attached)	CMCBPA	9/2016
Pre-test (baseline) of new student knowledge of beach plum. (not done; new hire)	High School	9/2016
File annual report.	CMCBPA	10/2016
Continued experiments did not occur because of new hire at Technical School.	High School/ Interns	9/2016-5/2017

Marketing campaign	CMCBPA	5-9/2017
Summer Assistant to water and tend plants at High School. (not done)	Assistant	6-9/2017
National Association of County Agricultural Agents (NACAA) presentation at the annual meeting (Agricultural Agent, Jenny Carleo). Will survey audience for knowledge gain.	Rutgers	7/2017
Consumer survey conducted at Rarec NJAES (Rutgers Great Tomato Tasting Event). An estimated 600 surveys were conducted. Sample product by Washington Inn were used. 1200 samples were distributed.	Rutgers	7-8/2017
Assessment by the Agri-science teacher of intern performance. (not done)	High School	9/2017
File final report (sent 22 December 2017)	CMCBPA	10/2017

If the overall scope of the project benefitted commodities other than specialty crops, indicate how project staff ensured that funds were used to solely enhance the competitiveness of specialty crops.

Beach plums are a specialty crop and no other commodities benefitted.

Present the significant contributions and role of project partners in the project.

We worked with the Cape May County Technical High School's Agri-science Program, the USDA NRCS Plant Materials Center (PMC) and Rutgers NJAES Cooperative Extension of Cape May County. Our plan is to work with these partners to increase the number of plants available to us (the farmers) for commercial production. Note that the effort involving the CMC Technical High School was set back when the teacher (JoAnn Sopchak) had passed away during the grant period and was not replaced by a teacher who was familiar with the grant.

GOALS AND OUTCOMES ACHIEVED

- **Describe the activities that were completed in order to achieve the performance goals and measurable outcomes identified in the approved project proposal or subsequent amendments.**

Goal #1: Increase the numbers of available, high quality plants to 1,140 by 2018.

Discussion: Development and expansion of plant selections was significantly set back by the failure of the hydroponic experiment at the CMC Technical High School and by the untimely death of JoAnn Sopchak, the teacher working on the grant. The cleft grafting activities resulted in approximately 225 trees by 2017. Materials are available for approximately 500 cleft grafts to 2018. The hydroponic experiment will not be repeated.

Goal #2: Education of 25 Agri-science High School Students

Discussion: Prior to her death, Ms. Sopchak taught a class for this grant. The students completed the in-class section but, because of her death, did not complete the field work. The students completed both pre- and post-test assessments. The school did not hired a full time teacher to replace Ms. Sopchak until recently. The program has resumed this past semester and will be taught again in 2018.

Goal #3: Run a beach plum marketing and promotion program.

Discussion: Prior to grant activities, public awareness of beach plums and beach plum products was low. The CMCBPA and Rutgers Co-operative Extension (CMC) have conducted many consumer surveys and given several presentations through New Jersey and Pennsylvania which have raised public awareness. The CMCBPA routinely does outreach and provides promotional material to anyone who requests it. In the past July at the CMC Fair, the CMCBPA did promotional radio spots for the three days with three different radio stations who served three different markets. Product giveaways were available at the County Fair. The CMCBPA was one of the Fair's sponsors.

Goal #4: Extension Education Program

Discussion: Rutgers Extension did an ultra-niche program on beach plums as well as twilight programs for farmers (see attached addendum material).

Prior to the outreach program conducted as part of this grant, there were no agricultural extension efforts. Now there have been two types of programs: the ultra-niche crop growing program at the extension center in Cape May Court House and the twilight program for farmers (although it is open to the public) about beach plums. More programs are in the works.

- **If outcome measures were long term, summarize the progress that has been made towards achievement.**

Goal #1: Increase the numbers of available, high quality plants to 1,140 by 2018.

As mentioned above, the goal of producing 1140 plants by 2018 will not be reached for various reasons beyond our control. However, our experiments with grafting have shown which scion wood varieties are compatible with various root stock (of those we used; see attached). We now have confidence that we can produce stock which will make commercially viable trees that

produce uniform fruit, solving a problem that has plagued beach plum growing for decades. The trees that have been produced are currently being grown out so that may be sold as early as 2018. A much larger cleft grafting production is scheduled for this coming spring, using new, improved varieties of scion wood (along with possibly additional BP1-1 aka "Jersey Gem").

Goal #2: Education of 25 Agri-science High School Students

A pre-test and post-test assessments to measure knowledge gain of the 25 students to be involved in this project on beach plum traits and/or varieties will be conducted. Standard educational measures were used. Since a replacement teacher has been hired by the CMC Technical High School, student education will be initiated for the coming calendar year.

Goal #3: Run a beach plum marketing and promotion program.

Goal #4: Extension Education Program

Assessments of current awareness will be done by the Agricultural Agent. Use of pre- and –post tests to measure knowledge gained by 50 farmer participants.

Outcome #3; Nearly 400 consumer surveys have been conducted to gauge awareness of the beach plum community events to gauge awareness of the beach plum at local community events (farmers markets and local festivals). The CMCBPA and Rutgers Extension will continue their marketing in the future.

Outcome #4: Extension Education Program

Prior to the outreach program conducted as part of this grant, there were no agricultural extension efforts. Now there have been

two types of programs: the ultra-niche crop growing program at the extension center in Cape May Court House and the twilight program for farmers (although it is open to the public) about beach plums. More programs are in the works.

To conduct outreach a grower's twilight meeting was held to share the results of this project, a Rutgers fact sheet was created to summarize the results and the information was presented at the International Horticultural Society Symposium in Philadelphia, PA and also the New Jersey Vegetable Growers Convention and Trade Show.

- **Provide a comparison of actual accomplishments with the goals established for the reporting period.**

Goal #1: Increase the numbers of available, high quality plants to 1,140 by 2018.

Development and expansion of plant selections available based on desired qualities. We will produce 380 high-quality beach plum plants each year for 3 years. While achieving the goal as described will not occur, what will be achieved will amount to a significant portion of that goal. The shortfall is due to factors beyond our control.

Goal #2: Education of 25 Agri-science High School Students

Although the achievement of this goal has been delayed, the educational program is back on track to substantially complete this goal.

Goal #3: Run a beach plum marketing and promotion program.

A program to increase public awareness of the fruit as a crop is in place. The program will continue beyond the grant period. The program included increased outreach event locations and the use of radio market and social media (Facebook)

Goal #4: Extension Education Program

The program to educate growers and the public on the findings of the research through Extension is in place and will continue beyond the grant period. (see attached addendum)

- **Clearly convey completion of achieving outcomes by illustrating baseline data that has been gathered to date and showing the progress toward achieving set targets.**

Goal #1: When the grant period began, there was very little information available to describe which scion wood was compatible with which rootstock. This lack of information has delayed the development of commercially viable trees. Our experiments have shown which of several varieties of scion wood are potentially successful with which of the selected root stock. This enables us to predict that future cleft grafting will successfully produce viable stock.

Bud grafting (300) was not successful. The scion wood and stock was not ideal and the grafting was done late. This failure provides us with a baseline for any proposals for large scale bud grafting attempts in the future.

The hydroponic and medium-based cutting system experiments at the CMC Technical High School and two medium-based cutting experiments at Cumberland County College, Vineland, NJ failed. The medium-based cutting experiments at both locations were identical. The failure may be attributed to scion selection and methodology. This gives us a baseline for any future similar experiments in the future.

The number of cleft grafts attempted (approximately 300) with a 50% survival rate indicates this method may be best for commercial production. The grafts will need to be surveyed for a more accurate survival rate after their first winter season for 2017-18.

Goal #2: Education of 25 Agri-science High School Students

The course material used as part of this grant came from Dr. Rick Uva. The material was part of his published doctoral dissertation and was supplemented by pre-and post-test assessment. (see attached).

Goal #3: Run a beach plum marketing and promotion program.

Prior to the outreach efforts of the CMCBPA and Rutgers Extension, public awareness of beach plums and beach plum products was very low. The outreach program that was part of this grant reached nearly 700 people over the course of two summers. Updates to the brochure, webpage with the addition of radio market campaign and social media outlet (Facebook) will continue in the future.

- **Highlight the major successful outcomes of the project in quantifiable terms.**

There have been about 200 successful, surviving grafted plants of consistent quality currently being grown out for sale in 2018, although some will be retained. See attached for survivability data. Significant numbers (in excess of 600) persons have been educated about beach plums and beach plum products. The ultra-niche program was sold out (about 25) and 41 farmers attended the twilight meeting.

BENEFICIARIES

- **Provide a description of the groups and other operations that benefited from the completion of this project's accomplishments.**

Farmers have benefitted from the educational outreach conducted by the Rutgers Extension. Farmers will benefit from improved nursery stock which will be available in 2018 and beyond. Students will benefit (and some already have) from the program at the

CMC Technical High School. Consumers have benefited and continue to benefit from knowing about beach plums and beach plum products. Merchants will also benefit from the increased demand for merchandise that increased consumer demand will stimulate.

- **Clearly state the number of beneficiaries affected by the project's accomplishments and/or the potential economic impact of the project.**

It is difficult to give totally accurate figures for beneficiaries from this grant but we do know that over 700 consumers have learned about beach plums and products. At least 60 farmers have an increased awareness of beach plum production. Twenty-five Agri-science students have completed in-class instruction about beach plums.

LESSONS LEARNED

- **Offer insights into the lessons learned by the project staff as a result of completing this project. This section is meant to illustrate the positive and negative results and conclusions for the project.**

One significant lesson that was learned comes from the cleft grafting portion of the project. Not only were many trees produced, but we now have significant information that shows which combinations of scions and root stocks were successful and which were not. Additional information about unsuccessful bud grafting, hydroponic, and medium-based misting system was developed. Comparing the successful cleft grafting results with these latter failures points very strongly at preferred production methods for the future.

- **Describe unexpected outcomes or results that were an effect of implementing this project**

We did not anticipate the death of a major partner during the course and the difficulties involved in restarting the classroom component at the CMC Technical High School. We did not expect the attendant failure of the hydroponic and medium-based misting experiments.

- **If goals or outcome measures were not achieved, identify and share the lessons learned to help others expedite problem-solving.**

While the number of beach plums that were our goal will not be reached, the lessons learned about the survival rates for grafts and the preferred grafting methods are significant and reproducible.

4) Lessons learned should draw on positive experiences (i.e., good ideas that improve project efficiency or save money) and negative experiences (i.e., lessons learned about what did not go well and what needs to be changed).

The biggest positive experience that we had was the success of the cleft grafting. We learned what sorts of production methods should not be used or should not be used in the way that we implemented them.

ADDITIONAL INFORMATION

See attached reports.

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Cumberland County Board of Agriculture
Specialty Crop Block Grant Agreement # 14-SCBGP-NJ-0034
Final Performance Report
12/18/2017
Project Title:
"Cumberland Grown: Promoting Specialty Crops in Cumberland County, NJ"

Project Purpose;
The primary purpose of this project is to raise the awareness of the general public of the importance of agriculture in Cumberland County, NJ, specifically with regards to the specialty crops produced here. A secondary purpose of the project is to enhance the marketing skills of current and new specialty crop direct marketers within the county.

The issue addressed by this project is the relatively low quantity of locally grown specialty crops purchased directly by local residents. The core issue is two-fold. One is relatively low awareness of local residents in the urban and suburban areas of the county of the breadth of the number and types of specialty crops grown within the county. Secondly, only a small number of local specialty crop growers offer their products for sale through direct to consumer sales.

This project is important and timely in that it seeks to create an immediate and ongoing
increase in the awareness of local residents to the importance and availability of specialty crops grown in Cumberland County, and to promote 'buying local' within the County. While Cumberland County is a leader within the State of New Jersey in the production of several categories of specialty crops, there are over 54,000 residents of the county who live in areas classified as food deserts by the Economic Research Service.

PROJECT APPROACH

In order to address the low quantity of locally grown specialty crops purchased directly by local residents, the Board attempted to raise awareness among residents regarding the importance of agriculture in their own county. The main effort toward this goal was in person-to-person outreach at local fairs/events with a secondary goal of increasing online communication with our residents.

The Board outfitted and staffed a booth at 3 events in 2015 and 5 events in 2016. Board members spoke with 1,000s of residents at these events and distributed materials about locally-grown specialty products and created a Facebook page to communicate with residents about seasonality and availability of these products.

The Board also helped to sponsor the production of a half hour show which featured Cumberland County farms and farmers who grow specialty crops. This episode is available online.

The Board also planned to host a direct marketing workshop for farmers in order to help to educate farmers who may be interested in trying to sell their crops direct to consumer. This workshop never came to fruition for a number of reasons.

GOALS AND OUTCOMES ACHIEVED

In order to accomplish the established objectives of this project, the Board endeavored to create handout materials which would educate local residents and/or inspire them to visit and follow our Facebook page for ongoing education about locally grown and marketed specialty crops.

A Facebook page was created for the Board of Agriculture during the first year of this grant. This page serves as a continual online presence where the Board can share information about produce seasonality and the availability of locally grown crops. This page is managed by several members of the Board and updated throughout the growing and harvest seasons for the specialty crops grown in Cumberland County. Shortly after the creation of this page, the Board worked to develop and print a brochure that identifies and promotes locally grown specialty crops. This brochure included a seasonal availability chart for our local specialty crops as well as the link to our Facebook page.

During the summer of 2015, the Board staffed a booth at the Cumberland County Fair to conduct consumer research. The Board also staffed a booth at the Jersey Fresh Festival in Vineland, Cumberland County, and another event showcasing local agriculture in Bivalve, Cumberland County, NJ. This booth allowed us to interface directly with consumers and talk to them about their buying habits for locally grown specialty crops. At these events, we also asked people to complete a short survey to help shape our grant work and establish some baseline information about local produce consumption.

Over these three events, 105 people completed our survey which consisted of three basic questions:
Have you seen our Facebook page?
Do you purchase Cumberland County specialty crop products?
Where do you purchase Cumberland County specialty crop products?

This survey showed that only 22% were aware of our Facebook page. In contrast, slightly over 80% answered that they did purchase specialty crops. Of these respondents, 34% frequented roadside stands, 13% utilized chain supermarkets, 27% chose independent markets, and 12%

purchased direct from a farmer.

These numbers showed that many of our surveyed population were already purchasing specialty crops directly from local farmers or roadside stands. Many people responded with more than one stand or market where they purchased their local products.

Following the results of these surveys, as well as the Board's interactions with local residents at the three events that we attended, the Board worked to create more handout materials for future events. These handouts focused on driving more people to our Facebook page for local produce information as well as continuing the education around produce seasons. We found the seasonal availability chart hand out to be the most popular as well as the most inspiring for continued conversation. The Board also worked to create reusable shopping bags that urged residents to choose locally-grown specialty crops and identified the Board's Facebook page. Lastly, the Board created some display materials in order to better draw attention to our tent in crowded festivals and fairs. The project goal was to have these materials available for the summer of 2016 to facilitate our attendance at the Cumberland County Fair, the Bayshore Festival known as Bay Day, and the Vineland Jersey Fresh festival.

These three festivals, with a combined attendance of over 14,000 people provided an excellent opportunity to talk to Cumberland County residents about the availability of local produce and specialty crops grown in Cumberland and to encourage residents to "follow" and "like" our Facebook page for information about these crops. The booth was staffed for over 40 hours during this time.

Surveys were again collected from visitors to the booth. 91 residents chose to complete the survey. Awareness of the Board's Facebook page was slightly improved to 25% of people. 89% responded that they did purchase local produce, also a slight increase. Our Facebook followers also increased modestly to 122.

Our original grant proposal called for the purchase of billboard space for the promotion of local specialty crops. However, during the course of 2016, an opportunity to help sponsor a half-hour show featuring some Cumberland County Farms which grow and market specialty crops. The Board made monetary and development contributions to the production of this show which will air first on FoodyTV, a web based platform. This show is part of a series being made all about New Jersey farms, farm markets, roadside stands, urban gardens, gleaning and cooking fresh.

The "Cornucopia" episode will feature several Cumberland County specialty crop growers how to utilize locally-grown produce and specialty crops. Our Board felt that this production had the best chance to reach a wide audience and promote the purchase and consumption of our local products. The full episode was completed and released in 2017 and can be found at: https://www.greenernewjersey.org/fresh/cumberlandcornucopia/

BENEFICIARIES

Members of the general public benefited from an increased awareness and understanding of the sources and availability of locally grown specialty crops in Cumberland County. This was accomplished through the distribution of written materials at the various public functions where the Board had a presence as previously discussed in this report, as well as online via a FaceBook page.

Viewers of the FoodyTV network will increase their awareness and understanding of the sources and availability of locally grown specialty crops in Cumberland County by viewing the "Cornucopia" episode of the program, which was produced in part via funds from this project. This will be an ongoing benefit of the project.

Farmers and Nurserymen in Cumberland County benefited from the increased awareness of the specialty crops that they produce in Cumberland County.

- 40,000 local residents attended the public events where the Board had staffed a booth promoting Cumberland County specialty crops. The booth was in a prominent location at these events and most participants were able to view the materials presented.
- A FaceBook page created for this project had 122 followers at the time of the completion of this project.
- The number of viewers of the "Cornucopia" webisode which this project helped to produce is estimated to be 1500 at the time of completion of the project.
- 204 local residents completed surveys regarding their awareness and attitudes about specialty crops.
- The Cumberland County Board of Agriculture benefited from the knowledge gained during the administration of this project, and is comprised of almost 500 members with a 24-member executive committee.

LESSONS LEARNED

- It is sometimes difficult to engage with the general public (or even the agricultural community) on topics related to specialty crops. This is likely due to the fact that the general public does not refer to specialty crops as 'specialty crops'. It is important to use language that the public understands and avoid uncommon terms, such as specialty crops. The average citizen refers to "specialty crops" as fruits, vegetables, etc.
- One must account for the amount of time and energy involved in the bureaucratic side of administering a grant project before considering applying. It is a costly and inefficient process that can drain the limited resources of a volunteer – led organization. This is

particularly true when the organization has limited funds to operate with in light of a reimbursement style grant. Timing of activities and expenditures must account for the lengthy time between submission of grant reimbursement requests and the receipt of funds.

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New Jersey Agricultural Society
USDA AMS (14-SCBGP-NJ-0034)
Final Performance Report
12/15/17

PROJECT TITLE: Agricultural Leadership Development Program

PROJECT SUMMARY

1) **Provide a background for the initial purpose of the project, which includes the specific issue, problem, or need that was addressed by this project.**

It is increasingly important for specialty crop producers' growers to identify and develop new skills to meet the challenges of the evolving marketplace. This project was designed to provide training and networking opportunities to both specialty crop producers and agribusiness professionals. The purpose was to enhance the competitiveness of specialty crops by increasing grower and agribusiness networks and building knowledge of specialty crop production and issues. The project also updated the NJ Agricultural website with specialty crop links and information.

2) **Describe the importance and timeliness of the project.**

The New Jersey Agricultural Leadership Development Program has built a strong agricultural community within New Jersey. The project enables growers to see that they are not alone in the issues they face, and enables growers and professionals in the industry to better understand one another and opportunities for growth. Together, they must come together to find solutions for these issues. This program is filling this need by providing participants with the network, resources, and leadership skills needed to increase sales, educate the public, and serve as leaders in the industry.

3) **If the project built on a previously funded project with the SCBGP or SCBGP-FB describe how this project complemented and enhanced previously completed work.**

The project built upon previously funded SCBGPs. The project enabled the New Jersey Agricultural Society to expand upon the Agricultural Liaison role created in previous grants to provide one-hour "hot topics" discussions at all seminars, attend the domestic tour focusing on specialty crops to provide educational discussion with the class, and to review the curriculum and promote it within

the industry. Kurt Alstede's expertise as a specialty crop producer and leader in the agricultural community, enabled the class members to gain insight into real-world issues, advancements, and innovations relating to specialty crop production. The project also complemented previous grants by inviting alumni from previous classes to speak to the class, and to serve as judges and committee members. The first alumni event was held to bring together alumni, with the intention of maintaining a strong, connected network to support the program and industry.

PROJECT APPROACH

Program Director, Jennifer Matthews, and Agricultural Liaison, Kurt Alstede, were hired to develop the course content for the workshops and field trips. Jennifer Matthews also completed clerical work related to the project of scheduling speakers, creating agendas, and arranging lodging and travel. Executive Director, Kristina Guttadora, also provided oversight of the process and seminars, and assisted with the surveys and grant administration. (Her time was not charged to the grant). NJ Agricultural Society Staff, the NJALDP Committee and the Board of trustees held meetings to discuss the course direction and revisions.

The project consisted of five seminars and one alumni networking event. Attendance at all sessions was mandatory, and therefore 14 class members and 2 specialty crop producers (Jenn Matthews) were present to gain benefit from the program. The Agricultural Liaison, Kurt Alstede (also a specialty crop producer) was present for most of the programming as well and benefitted from the program.

August 2016 Seminar

Specialty Crop Hot Topics - Vertical Farming, Minimum Wage
Rutgers Agricultural Experiment Station Tour - Basil, Hazelnut research
Leadership Topic: Interpersonal Communication
NJ Nursery and Landscape Association Dinner and Session
Foodscaping with Edible Ornamentals - how to grow your market with edible crops
USDA NRCS - farm tour to discuss conservation plans/erosion control

November 2016 Seminar

Farm Bureau Convention - networking with specialty crop producers/Farm to Table Dinner
Hot Topics - farm labor, immigration reform, hiring a teenage workforce
National Agricultural Issues and the Importance of Leadership
Crisis and Media Management
Social Media Advocacy - Building a Broader Customer Base

January 2017 Seminar

Domestic Agriculture Study Tour - Phoenix Arizona
Tours - Citrus, Olives, Pecans, Wine, Organic Vegetables, Roses and Hydroponic Vegetable Production
Food Safety
Various conference sessions while at American Farm Bureau convention
Hot topics - variety of topics affecting specialty crop production

February 2017 Seminar

Class presentations of specialty crop tours in Phoenix
New Jersey Vegetable Growers Convention workshops
State of the State of Agriculture - with the NJ Secretary of Agriculture
Agricultural Education/FFA
How to Run an Effective Meeting

June 2017 Seminar

Evergreen Farm Tour - Asian Pears
Screamin' Hill Brewery and Bullock Farms - Hops and Beer Production, Sunflowers, Pumpkins, Christmas Trees.
Hot Topics
Alumni Networking Event - Attendance: 32 alumni (many of whom are specialty crop producers) attended, 14 class members, and 4 board members (specialty crop producers)
Trenton - Urban Agriculture - vegetable gardening in urban spaces and Beekeeping
NJ Beneficial Insects Laboratory

In addition to these seminars, class members and alumni were informed of a variety of topics, conferences, and current issues relating to specialty crops through the NJALDP Facebook page. The Facebook Group page now has 90 members. The website has also been updated to include specialty crop information, resources and alumni successes.

Surveys were conducted as part of the work plan at the conclusion of each seminar.

1) **If the overall scope of the project benefitted commodities other than specialty crops, indicate how project staff ensured that funds were used to solely enhance the competitiveness of specialty crops.**

Only a portion of funding (approximately 25% of total budget) for each seminar was charged to the grant.

1) **Present the significant contributions and role of project partners in the project.**

We utilized the help of a variety of partners in the project in providing tours and training sessions. Alumni supported the project during seminars by providing insight into their experiences during panel discussions. The New Jersey Farm Bureau provided meeting space for seminars and a variety of speakers who visited during the convention met independently with the class. They also assisted in the Domestic Agriculture study tour where class participants toured farms with other specialty crop producers from New Jersey who were attending the American Farm Bureau convention. The New Jersey Vegetable Growers Association provided complimentary admission for the class members to attend their convention and time was provided for class members to attend sessions prior to the formal sessions run by the class. Lastly, tours to farms provided by industry specialty crop producers and industry leaders enabled class members to directly observe and discuss specialty crop production and issues.

GOALS AND OUTCOMES ACHIEVED

1) **Describe the activities that were completed in order to achieve the performance goals and measurable outcomes identified in the approved project proposal or subsequent amendments.**

A variety of programming with class speakers, discussions, individual and team exercises, industry tours and networking events helped us achieve our performance goals.

After each class, we surveyed the participants to determine their level of prior experience with each topic, level of competency following instruction, and their view of the usefulness of the topic as an industry leader. We also completed a final survey with the class.

2) **If outcome measures were long term, summarize the progress that has been made towards achievement.**

We were able to measure the outcomes - results are provided below.

3) **Provide a comparison of actual accomplishments with the goals established for the reporting period.**

The goal was for 14 class members to develop the experience necessary to serve as leaders in the specialty crop industry. Our target was for the class to show a 20% increase in overall competency with the seminar topics and for “usefulness” of content in

preparing them as leaders to be rated as “very useful”.

4) **Clearly convey completion of achieving outcomes by illustrating baseline data that has been gathered to date and showing the progress toward achieving set targets.**

We surveyed class members and asked them to select the level of experience they had with the subject prior to instruction. For each seminar, students ranked the topics using this scale: (1= Very Experienced), (2 = Moderately Experienced), (3 = No experience).

Class members also documented the “usefulness of the content presented in the seminar in preparing you to serve as a leader in the agricultural industry” using this scale: (1=Very Useful, 2 = Somewhat Useful), (3 = Not Useful).

August Seminar:
Level of Prior Experience: Class Average 2.10
Level of Experience Following Instruction: Class Average 1.59
Average Experience Level Increase = 17%
Average “Usefulness” rating = 1.76 (Very Useful)

November Seminar:
Level of Prior Experience: Class Average 1.91
Level of Experience Following Instruction: 1.19
Average Experience Level Increase = 24%
Average “Usefulness” rating = 1.13 (Very Useful)

January Seminar
Level of Prior Experience: Class Average 1.89
Level of Experience Following Instruction: 1.20
Average Experience Level Increase = 23%
Average “Usefulness” rating = 1.8 (Very/Somewhat Useful)

February Seminar
Level of Prior Experience: Class Average 1.80
Level of Experience Following Instruction: 1.20

Average Experience Level Increase = 20%
Average "Usefulness" rating = 1.3 (Very Useful)

June Seminar
Level of Prior Experience: Class Average 2.3
Level of Experience Following Instruction: 1.5
Average Experience Level Increase = 26%
Average "Usefulness" rating = 1.4 (Very Useful)

5) **Highlight the major successful outcomes of the project in quantifiable terms.**

Our surveys following the seminars showed a 17-26% average increase in the experience with the subject matter. Class members on average ranked all seminars between very useful/somewhat useful.

Our final survey showed that 100% of the participants who returned the survey (12 of the 14) said that the program enhanced their leadership skills. 11 out of 12 are currently serving in leadership roles. 11 out of 12 indicated that they would like to serve in a leadership role on a board or organization. 11 out of 12 indicated that their involvement in NJALDP has increased their understanding of specialty crop production in New Jersey. 9 out of 12 indicated a new insight that helped to better market specialty crops or advocate or educate the public about specialty crops. Of those who are specialty crop producers (6 of the 12 surveyed), 4 of the 6 indicated that they are better able to expand sales of specialty crops as a result of the program. 11 of the 12 indicated that they could better advocate for specialty crop producers as a result of the program.

BENEFICIARIES

1) **Provide a description of the groups and other operations that benefited from the completion of this project's accomplishments.**

The project benefited a variety of commodity producers including those producing nursery, fruits, vegetables, organic fruits and vegetables, honey, grapes, and cut flowers.

2) **Clearly state the number of beneficiaries affected by the project's accomplishments and/or the potential economic impact of the project.**

There were 14 class members, who were the direct beneficiaries of the project. It is difficult to quantify the exact number of beneficiaries impacted by the project, because the education and training of a cadre of leaders expands to hundreds of specialty crop producers who benefit from having trained leaders representing the industry. As this cohort goes on to serve the industry, advocate for specialty crops, and bring new innovations to their farms, the impact of the project will be realized for years to come.

LESSONS LEARNED

1) **Offer insights into the lessons learned by the project staff as a result of completing this project. This section is meant to illustrate the positive and negative results and conclusions for the project.**

We realized that it is very difficult to create pre and post tests on questions pertaining to specialty crops because we use a variety of speakers and cannot always ask the specialty crop producers giving the tours to plan their questions in advance. Therefore, we felt it would be more effective to survey the class members at the conclusion of the program and as a questions that measure a gained level of experience and usefulness at the conclusion of each seminar.

2) **Describe unexpected outcomes or results that were an effect of implementing this project.**

We did not expect so many students to be serving in additional leadership roles prior to graduation from the program. Many stepped up during their time in the class, and everyone except for one student indicated interest in serving in additional leadership roles locally or statewide. One class member has expanded her sales of cut flowers as a u-pick market and has implemented educational floral design classes on her farm, using some of the skills and network gained through the program. She is growing cotton as a cut-flower, which is increasingly popular in the floral industry and is uncommonly grown in New Jersey. Other specialty crop producers were able to learn more about grant opportunities for their farms with NRCS as a result of being in class with an NRCS staff member. Mixing the class with both specialty crop producers and non-specialty crop producers has a positive effect and built a stronger program by bringing in different perspectives and enabling non-specialty crop producers to have an insider's view of the industry, through the colleagues and network supporting the program.

3) **If goals or outcome measures were not achieved, identify and share the lessons learned to help others expedite problem-solving.**

Some of the topics may have been familiar to the class members to begin with, and therefore their level of experience gained may not have met the target. Or, the topic may not have provided enough detail to feel that a high level of experience was gained. It may be best to survey the group on the tours and topics from the beginning to select areas where more growth could be shown. It is also very

important to pick the right farm, and speaker for tours. The speaker can make or break the learning experience.

It may be best to provide an introduction to Specialty Crops at the beginning of the program and put more emphasis on helping growers identify ways that they can expand their sales or enhance competitiveness of their crops by creating goals and plans of action. For example, if a producer wanted to focus on creating or expanding a u-pick cut flower market, how could the class help him/her reach that goal? There were 2 of the 6 specialty crop producers who indicated on their final surveys that they were not able to better market or expand sales. By identifying personalized goals from the beginning of the class for expanding sales, there may have been more opportunity to insure that this was achieved.

4) Lessons learned should draw on positive experiences (i.e., good ideas that improve project efficiency or save money) and negative experiences (i.e., lessons learned about what did not go well and what needs to be changed).

In planning for our Domestic Agriculture study tour, we were able to overlap with the American Farm Bureau Convention. By doing so, we had access to a wide range of specialty crop tours and speakers, all of which were provided at a very reasonable cost and made for it more efficient for our program director to plan.

We were also able to plan from previous seminars and have learned that squeezing in too many seminars or tours in one day can be counterproductive, because less time is available for discussion, questions, and analysis. We found that 3 activities per day plus a dinner session that may be a networking opportunity was the best scheduling option.

In creating the website, we realized also that there are several specialty crop production statewide organizations who may be unaware of the achievements of the program. We may invite these leaders as well to future seminars to increase awareness for collaboration and for recruitment of the next class.

ADDITIONAL INFORMATION
http://www.njagsociety.org/specialty-crops.html
http://www.njagsociety.org/class-10-njaldp.html

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New Jersey Beekeepers Association
USDA AMS Agreement Number (14-SCBGP-NJ-0034)
Final Performance Report
December 22, 2017
(Revised May 3, 2018)

Project Title
How land use affects the quality and concentration of pesticides found in fresh stored pollen in honey bee hives.

Project Summary
Honey bees are collecting pollen contaminated with pesticides. This project seeks answers to the following questions:

1. Are there land use areas where honey bees are less likely to collect contaminated pollen?
2. Are there times of the year when honey bees are less likely to collect contaminated pollen?

Together, the New Jersey Beekeepers Association (NJBA) and the State Apiarist have collected winter loss statistics for beekeepers in the state for nine years. While a previous grant attempted to address colony loss based on the late summer nectar dearth in most of the state, losses were also deemed to be due to uncontrolled levels of varroa destructor in colonies, the levels of pesticide contamination in fresh pollen was unknown. Additionally, it was unknown from winter loss surveys what role pesticides might be playing a part in the annual colony losses. Added to this were high losses of pollination colonies coming out of blueberry and cranberry pollination in more recent years. Because colony losses continue to be high, it was felt that exploring pesticide contamination at this time would enhance our knowledge of the contributing factors already known, i.e., forage availability and varroa destructor levels.
Project Approach
Initially, a committee was formed to implement the project. A laboratory was selected and contracted with to perform the analysis of the pollen, i.e., United States Department of Agricultural Marketing Service USDA, AMS, Science Program. An online survey tool, "Survey Monkey" was used to identify NJBA members willing to participate in the project, providing the geographic coordinates of their hives. These were plotted on a map of the state to determine the land use area of each apiary grouped by land use areas. An efficient travel route for the collection of fresh pollen samples was developed.

During the first year of the project, each of the 25 hives in the five land use areas was sampled weekly with the samples being frozen until month-end at which time they were overnight to the lab to be analyzed for a broad spectrum of 180 pesticides. Lab reports were

reviewed, interpreted in a graph and plotted on a map of the state. Unseasonably cold and wet weather delayed the collection of samples for a month.

The analysis detected chemicals found at the parts-per-billion levels. This has given us an idea as to how toxic various land use areas are to honey bee colonies. We also looked at the number of pesticides and their levels found by month in the five land use areas between the months of April and September.

A preliminary report by the Professional Expert was created after the first year, and was presented at a state meeting of the NJBA with several articles published in the NJBA newsletter describing the ongoing project work and findings. Because of this analysis, it was concluded that the first year's collection of pollen samples did not include about 10 pesticides that are used in Blueberry and Cranberry production. Due to the high losses sustained by commercial beekeepers contracting for pollination in Blueberry and Cranberry, and the possible production losses for the growers, it was decided to redirect the remaining tests to shift to Agriculture—Fruit Production land use test sites to include the pesticides used in Blueberry and Cranberry production. To accomplish this, the laboratory needed to develop the technique to analyze for Ziram, a newer pesticide that was being used in the state. This entailed working with a subject matter specialist from the Philip E. Marucci Center for Blueberry & Cranberry Research and Extension, creating a delay in submitting the samples, which were preserved by keeping them frozen for four to five months.

Due to the finding in 2015 that pesticides used in Blueberry and Cranberry production were missing, and the redirection of the sampling for the second year, we used eight established commercial hives in cooperation with a local NJ beekeeper, and eight new hives we started from package bees, for a total of 16 monitored hives. The commercial colonies were in established hives with old comb and were migratory, in that the beekeeper overwintered the hives in Florida, and followed by almond pollination in California, before coming to NJ for blueberry pollination. These were labeled as 'Old Hives' or 'OH'. The 'New Hives' or 'NH' were started in late April in a commercial blueberry field during the first day of blueberry pollination. All hives were left in the blueberries until the end of pollination (last week of May), then transferred to an abandoned wild blueberry site near Chatsworth, NJ for 10 days, before being placed in cranberry pollination in early June. Hives were in cranberries for 3 weeks. We had 4 treatments: NH in blueberry (NHBB), OH in blueberry (OHBB), NH in cranberry (NHCB), and OH in cranberry (OHCB).

Hives were examined on 4/26 and 5/20 in blueberries, and on 7/1 in cranberries. Comb samples of pollen and comb (10 g each) were removed from hives on 5/20 and 7/1. Each of the eight hives of the OH and the NH treatments was sampled in each crop for a total of 32 residue samples. We found 28 different residues present in the pollen/comb samples (Table 1). Some residues were from old varroa mite treatments such as fluvalinate, coumaphos, THPI (a metabolite of amitraz), and thymol. Other materials were either registered for use in blueberries and/or cranberries. A number of these products are known bee toxicants, or may act in combination with other materials and have sublethal effects on the hive. Fungicides were commonly found in both blueberry and cranberry hive samples, and in some cases the same residue was significantly higher in the cranberry sampled hives than in the blueberry sampled

hives. While in other cases the residues were higher in the blueberry sampled hives than the cranberry sampled hives. Examples of this included: azoxystrobin, chlorothalonil and chlorpyrifos being higher in cranberry (Figures 1), and boscalid, fenhexamid, and captan being higher in blueberry sampled hives than from cranberry sampled hives (Figures 2).

Table 1. Pesticide residues from new hives (NH) and old hives (OH) placed in blueberries (BB) and followed in cranberries (CB).

Trt	Azoxystrobin	Boscalid	Captan	Chlorothalonil	Chlorpyrifos	Coumaphos	Cyprodinil	Dimethenamid	DMPF	Fenbuconazole
NH BB	2	80.5	94.13	0	0	0	22.5	0	2.125	0
OH BB	19	472.5	139	0	0	1.125	33.88	0	3.125	0.375
NH CB	13428.75	18.13	21	624.38	114.38	0.125	29.88	37.75	3.25	12270
OH CB	1746.38	152.5	10.88	168.25	147.13	29.5	126.5	7.5	43.25	1801.25
Avg	3799.03	180.91	66.25	198.16	65.38	7.69	53.19	11.31	12.94	3517.91

	Fenhexamid	Fenpropathrin	Fludioxonil	Fluopyram	Fluvalinate	Imidaclo prid	Metalaxyl	Metconazole	Methoxyfenozide
NH BB	140.63	0	10.25	0	0.125	0	0	0	51.5
OH BB	190.88	0	17.75	0	3.38	0.13	0	0.13	63
NH CB	0	0	8.5	0	2	0	2.38	0	106.75
OH CB	51.38	2.125	75.75	0.25	175.5	0	25	0	96.75
Avg	95.72	0.53	28.06	0.063	45.25	0.03	6.84	0.03	79.5

	Metolachlor	Norflurazon	Pendimethalin	Prothioconazole	Pyraclostrobin	Tebufenozide	Triflur alin	Thymol	THPI
NH BB	0	0.25	15.88	79.75	35.13	0	0.13	0.875	226.75

OH BB	1.5	0.13	25	0	141.5	0	0	16.75	290.38
NH CB	0	0	0	0	6.88	0	0	8	0
OH CB	0.88	0	0	0	56.75	3.88	0	4842.5	0
Avg	0.59	0.09	10.22	19.94	60.06	0.97	0.03125	1217.03	129.28

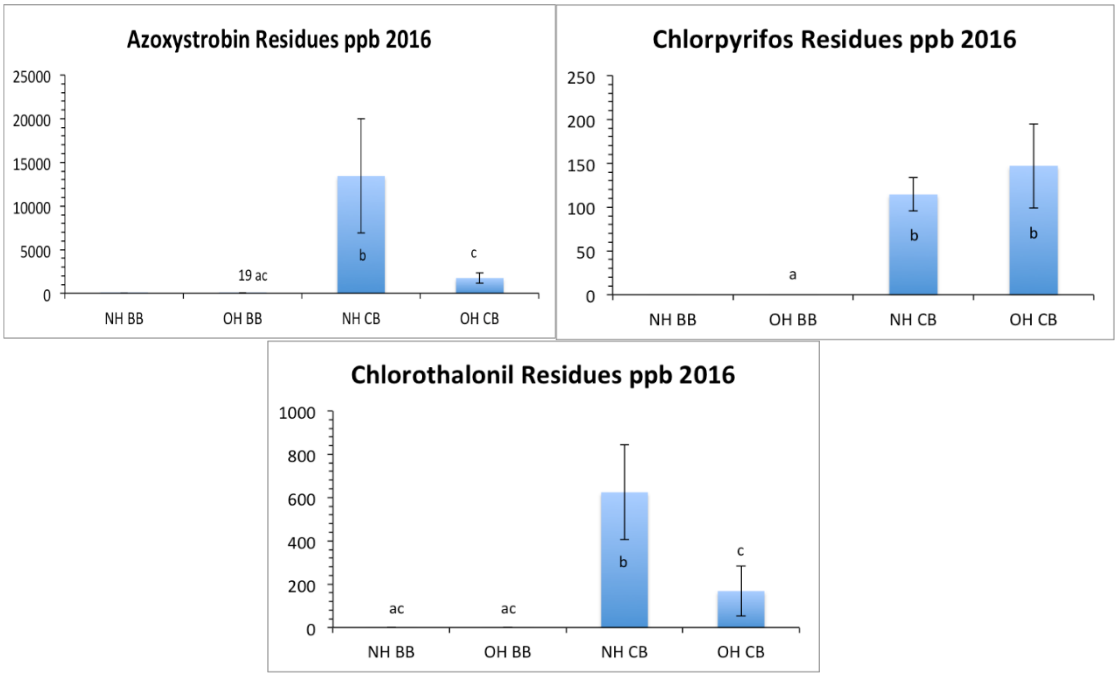

Figure 1. Azoxystrobin, chlorothalonil and chlorpyrifos residues.

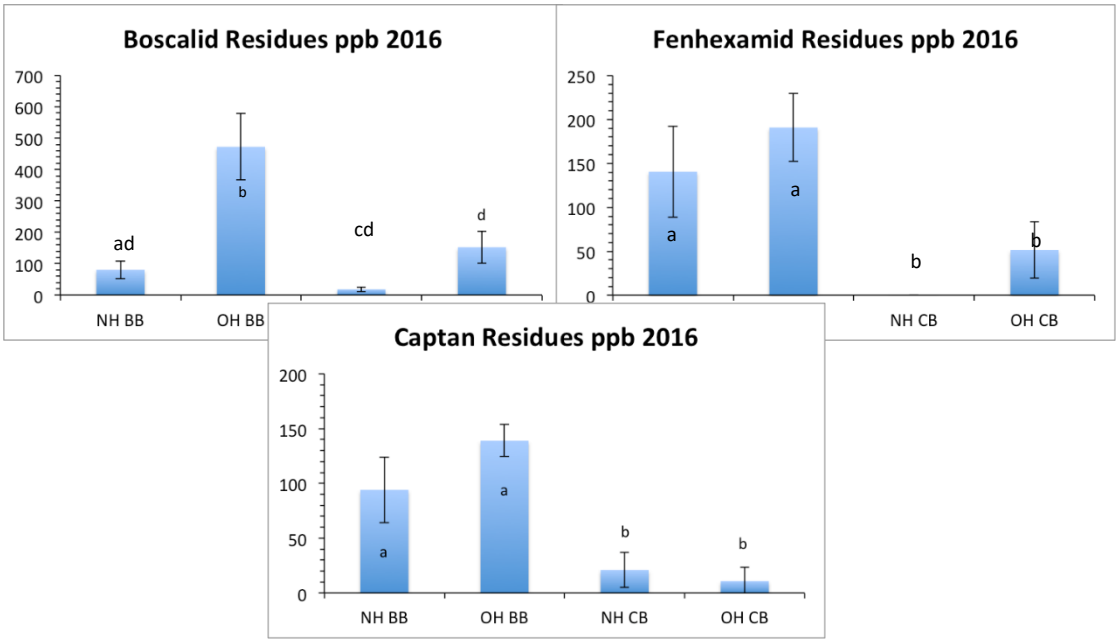

Figure 2. Boscalid, fenhexamid, and captan residues.

Goals and Outcomes Achieved
The significant number of residues found combined with the relatively high levels of some of these compounds supports the need for further and much more detailed research on the factors that contribute to colony decline in NJ. These include further work on the direct effect of various pesticides on bees, effects of diseases, parasitism, and the possible combined effects of these various stressors on colony health.

We went a long way to having scientific data to support conclusions about land use areas in New Jersey where honey bees are less likely to be exposed to contaminated pollen. The test results showed that both Urban and Suburban land use areas had the fewest number of pesticides found. Since there is a majority of small scale beekeepers living in Urban and Suburban areas, it will be useful to be able to assure them that pesticides are not their major problem, and perhaps enable us to get them to focus on managing the parasitic mite, Varroa Destructor and feeding during nectar dearth periods.

We also were able to show that Ag-Veg and Ag-Corn-Soy were the land use areas where beekeepers were most likely to encounter pesticides. This indicates to us that it might be beneficial for beekeepers who either have hives in these areas in July and August, the months where the highest finds and levels of pesticides, or who move colonies into pollination in these land use types, to use pollen substitutes, such as Ultra Bee, during these time frames in these land use areas. However, this will require more study since it is unknown if the bees will take the pollen substitute in lieu of contaminated pollen in the environment, and in what form, i.e., dry outside of the hive or in patty form inside the hive. Pollen patties can be attractive to and breeding grounds for Small Hive Beetle, in which case, the trade-off would be negative.

Lessons Learned
In our work plan we planned to collect pollen in October but were not able to do so because it was very hard to find fresh pollen in September as it was being converted to bee bread and being covered by honey and capped.

The test results revealed that there were residues of 14 pesticides found in the fresh pollen stored in the comb. The land use area Ag veg which was predominantly vegetable producing land had the highest number of positives with 8 finds of 7 different pesticides. The Ag Corn soy and Forest had the next highest number of pesticide finds at 5 each. There were 5 different pesticides in the Ag corn soy land use and 4 different pesticides in the Forest land use with Chlorothalonil being found two times, once in July and in August. The Urban and Suburban land use areas each had the fewest number of pesticides found at 1 each. It is interesting to note the only pesticide in the neonic class was found in the suburban land use area.

The most commonly found pesticide was Chlorothalonil a broad-spectrum fungicide found four times twice in July and twice in August. In both instances, it was found twice in the Forest land use area and the Ag Veg land use area. In August in the Ag veg land use the level was 522 PPB. Chlorothalonil is sold under the names Bravo, Echo, and Daconil. In 1997 it was the third most used fungicide in the US.

August and July had the most number of pesticide finds and the highest levels of those pesticides. August had 10 finds, 4 in the forest land use area, six in the Ag veg land use and one in the corn Soy land use. July had three finds in the Ag Corn Soy land use and one each in Forest and Ag Veg. May had three finds all herbicides, which makes some sense as that is planting season. June had one find of Imidacloprid in the Suburban land use. September had no pesticides found.

On the surface, it appears that it might be beneficial for beekeepers to utilize pollen substitutes during the times that higher residues of pesticides are found in pollen. This could be an area for future study. Certainly, this study will provide baseline data for future studies.

Additional Information
Presentations on the preliminary findings have been given at state meetings of the NJBA and published in the newsletter. Final power points, presentations and articles are being prepared for upcoming NJBA state meetings and for submission for publication. All reports and additional supporting material are available on the internet at http://www.njbeekeepers.org/SCBG-2015/. Username=SCBG2015, Password=Pest!!

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Final Performance Report
12/15/17
(Revised May 3, 2018)

Name of the Organization:
New Jersey Blueberry Industry Advisory Council in Partnership with Rutgers Cooperative Extension
USDA AMS Agreement Number (14-SCBGP-NJ-0034)

Final Performance Report

12/15/17

FINAL PERFORMANCE REPORT FORMAT
Specialty Crop Block Grant Agreement # 14-SCBGP-NJ-0034
Effective End Date; 09/29/17
Final Report Due to NJDA; 12/15/17
(Revised 5/4/2018)

FINAL PERFORMANCE REPORT
The final performance report should include a cover page and sections covering all of areas from Cover Page to Additional Information addressing each of the sixteen numbered request.

COVER PAGE - Provide the following information in the order requested:

Name of the Organization: New Jersey Blueberry Industry Advisory Council in Partnership with Rutgers Cooperative Extension
USDA AMS Agreement Number (14-SCBGP-NJ-0034)
Type of Report - Final Performance Report
Date of the Report – 12/15/17

PROJECT TITLE
Optimizing Management Strategies for Control of Invasive and Native Blueberry Insect Pests in Grower IPM Programs

PROJECT SUMMARY

1) Provide a background for the initial purpose of the project, which includes the specific issue, problem, or need that was addressed by this project.

New Jersey highbush blueberry growers must manage over a dozen different insect and disease pests. In 1996 the brown marmorated stink bug was found in Allentown, PA and quickly spread throughout the mid-Atlantic states. In 2008 spotted wing drosophila was found in California. It was found in NJ blueberries in 2011, and quickly became a major pest of concern in all U.S. blueberry growing regions. In 2013 we found the African fig fly in blackberries and wine grapes, and also thought to infest blueberries. These invasive pests have dramatically changed blueberry crop production, pest management, and pesticide use. There are few natural enemies for these invasive insects, their reproductive capacity is high, and the tolerance of infested fruit is “0”. In addition,

spotted wing drosophila (SWD) cannot be controlled with many of the reduced risk insecticides that were recently developed, and have been relied on for the bulk of blueberry pest management. Growers have had to return to the repeated use of broad spectrum insecticides that has increased pesticide use and production costs. After over 20 years of developing IPM programs so that pesticide use could be minimized, these invasive species have changed our recently developed programs and sent IPM backwards. Blueberry growers in other areas of the country have suffered massive losses from SWD alone. It is generally accepted that in 2012 the Georgia blueberry industry lost over $20 million because of this pest. One central purpose of this project was to educate growers about SWD and fold SWD into normal blueberry pest management practices, not over-do pesticide use, and have pest free fruit.

At the same time consumers are demanding more sustainably grown fresh fruits and vegetables. In 2010 the Environmental Working Group cited blueberries as being part of the "Dirty Dozen" list of fruits and vegetables with the most pesticide residues. While the scientific community generally agrees that this list is a somewhat contorted view of the facts, it remains a sensitive issue with consumers and therefore reflects in the marketing of the fruit. In 2013 blueberries narrowly escaped listing on the Dirty Dozen and came in number 13 on the list out of 48 fruits and vegetables (Environmental Working Group, 2013).

2) Describe the importance and timeliness of the project.

New Jersey blueberry growers need to reinvent their IPM systems, allowing for the management of both native pests, and newly emerged invasive species. Pest management for fruit crops was already a complicated matter before SWD and African fig fly. The NJ Rutgers/NJAES Commercial Pest Control Recommendations for Blueberries lists 36 insecticides in 16 chemical classes. Each product has its own properties, effective pest spectrum, reentry times and preharvest interval. Since the new invasive pests are only controlled with some of these products, comparatively little is known about their biology, and their damage potential is so great, growers need help in assembling new IPM strategies. Fruit may be infested shortly after fruit set and as it starts to color, but predicting the start of fruit fly activity has been difficult. Since both fruit fly species have short life cycles, and growers must use intensive insecticide programs, the likelihood of these insects developing resistance to the commonly used insecticides is high. If this occurs then use rates may increase, and the chances that fruit remain insect free are reduced. Therefore, a resistance management strategy is required. Given increased pesticide use, growers must be careful not to use too much of any one product, thereby creating illegal or high residues on fruit. Public perception about pesticides, combined with a lack of knowledge about blueberry pests, has led to market restrictions that have impacted pest management and marketing practices. Since the start of the project, this has been most apparent in European and Asian export markets.

3) If the project built on a previously funded project with the SCBGP or SCBGP-FB describe how this project complemented and enhanced previously completed work.

A previously funded project, SCBG 12-25-B-0803 (2010-2011), helped form the foundation for the present project. The previous project helped educate growers about IPM practices and the native pests associated with the crop at that time. It helped growers reduce pesticide use and production costs for blueberry maggot and several other key pests. The invasive pests referred to in the present project were not present in NJ at that time. However, since blueberry growers were already familiar with IPM practices, they were able to successfully adapt their practices to the new challenges outlined in the present project.

PROJECT APPROACH

Briefly summarize activities and tasks performed during the entire grant period. Whenever possible, describe the work accomplished in both quantitative and qualitative terms. Specifically, discuss the tasks provided in the ***Work Plan*** of the approved project proposal. Include the significant results, accomplishments, conclusions and recommendations. Include favorable or unusual developments.

A full delivery IPM program was completed in collaboration with the NJ Blueberry Industry Advisory Council (NJBIAC). NJBIAC functioned as an advisory to the blueberry industry and to the grant partner, Rutgers Cooperative Extension Fruit IPM Program. The delivery IPM program worked directly with 37-40 farming businesses during 2015-16. Direct participants in the program volunteered their farms for the collection of survey data, which was used to benefit all NJ blueberry growers for advice of timely pest management practices (Table 1). Direct participant data was leveraged to impact additional growers through newsletters, web blogs, twilight update meetings, and 4 annual meetings. Therefore, the direct participant section of the program impacted 63% of NJ blueberry acreage, but enabled a total program impact on 100% of NJ blueberry acreage. During the duration of the project, program staff made 2,810 farm visits that included survey work and data collection. Weekly pest management recommendations were made in person, by phone, email, newsletters, blog posts and twilight meetings for a 19-week period from April through August.

Table 1. Metric summary for blueberry IPM delivery with direct participants 2015-1016.

Year	**Growers**	**Acreage**	**% of State Acreage**	**Leaf Tissue Samples**	**Soil Fertility Samples**	**Nematode Samples**	**SWD Survey Scope**
2015	40	5322	63%	167	180	80	67
2016	37	5340	63%	196	194	73	80
Column headings: Number of growers/farms; Total acreage under direct participation; Direct participation expressed as a % of total state blueberry acreage; Number leaf tissue fertility samples in surveys; Number of soil fertility samples in surveys; Number of plant parasitic nematode samples in survey; Number of spotted wing drosophila traps in blueberry IPM network/survey.							

Program efforts that focused on the invasive pest, spotted wing drosophila, demonstrated a successful monitoring program that enabled growers to control pests while minimizing pesticide use. Monitoring methods, survey results and recommendations were transferred across the entire industry, resulting in pest-free fruit, “0” market rejects, and refined monitoring strategies.

1) If the overall scope of the project benefitted commodities other than specialty crops, indicate how project staff ensured that funds were used to solely enhance the competitiveness of specialty crops.

The project directly benefitted the NJ blueberry industry, and to a minor extent, NJ growers of other specialty crops who were concerned with the same invasive pest (SWD on cherry, cranberry, and peach).

2) Present the significant contributions and role of project partners in the project.

The overall program was administered by the NJ Blueberry Industry Advisory Council (NJBIAC), the members who also provided feedback and suggestions to Rutgers Cooperative Extension (RCE) about the needs of blueberry producers, and what to include in program delivery. NJBIAC directly funded the program for their growers through invoicing from the RCE Fruit IPM Program. NJBIAC directors assisted in communicating findings and recommendations to member growers. The RCE Fruit IPM program hired and trained staff, scouted and collected survey data, made recommendations, wrote reports and newsletter/blog articles, communicated with individual growers, and made recommendations.

GOALS AND OUTCOMES ACHIEVED

1) Describe the activities that were completed in order to achieve the performance goals and measurable outcomes identified in the approved project proposal or subsequent amendments. (By Objective)

Objective 1. Refining trap types and baits to time SWD programs: During March through April of each year seasonal staff were hired for survey work during the ensuing growing season. Insect traps and monitoring was started during April of each year by RCE staff. This was done in 3 parts: 1) A program wide survey for SWD populations on all grower sites, and 2) Plot work with trap location treatments to focus on optimal trap placement. 3) Monitoring grower fruit quality to verify pest management effectiveness. Survey work was able to identify first SWD activity through program wide monitoring. With our trap positioning work, we found that traps placed on the woods edge produced SWD captures 1 week earlier than if placed on field edges. We found that growers who followed recommended insecticide programs had 100% clean fruit with no SWD infestation.

Objective 2. Evaluating spray application technology: Plot work completed in 2015 indicated that aerial and ground applications yielded similar results, but specific pesticides impacted the longevity of control. Grower fruit quality surveys showed that growers who stretched spray intervals longer that 7-10 days between applications were more likely to have infested fruit, compared to growers who did not stretch spray intervals.

Objective 3. Establishing on-farm evaluation methods for insect free fruit: Growers were instructed on the methods to perform SWD salt extraction tests to test for fruit quality. RCE IPM program staff also completed 202 tests to verify grower tests and fruit quality. Fruit sampling verified that 100% clean fruit was maintained on commercial farms using conventional insecticides on 7-10 day schedules. However, fruit produced under organic methods had low infestation levels. Infested fruit was also found from commercial farms when insecticide applications were applied more than 2 weeks apart.

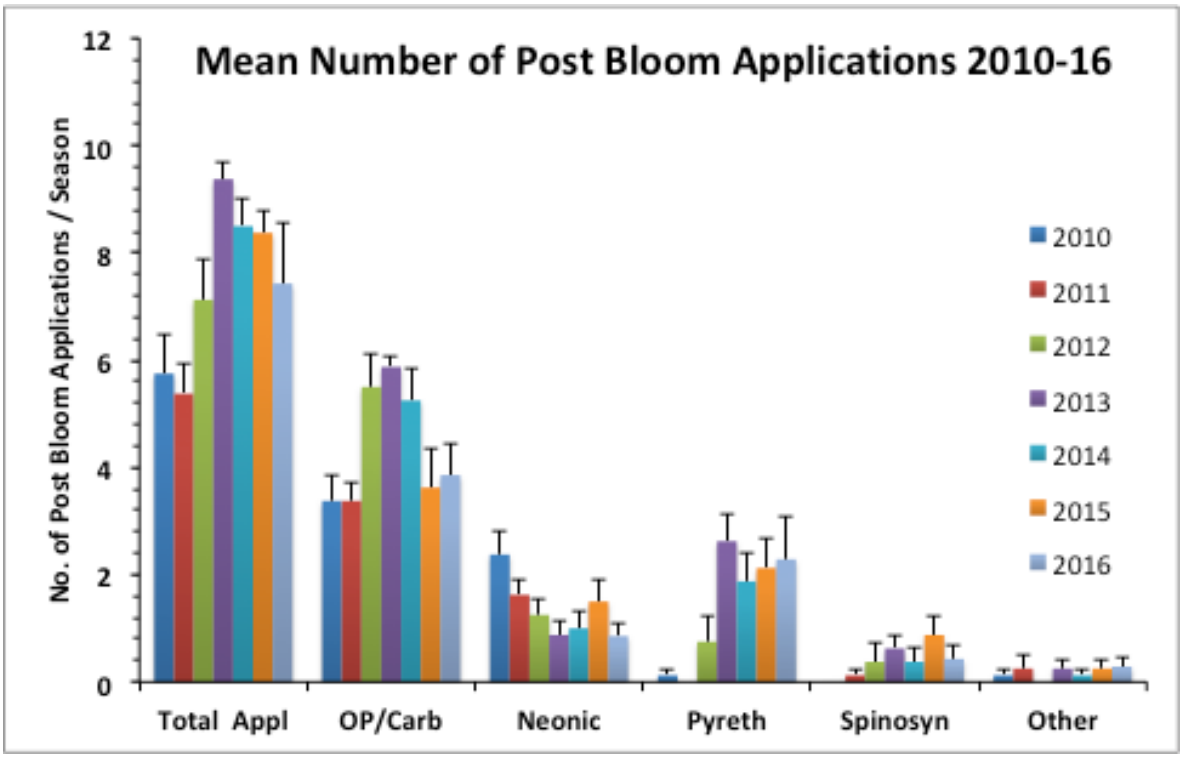
Objective 4. Educating producers about resistance management programs: Pest management recommendations were made through 860 individual consultations, combined with grower meetings and newsletter/blogs, phone and email. Separate research work done at the PE Marucci Blueberry and Cranberry Research Center, did not show any insecticide resistance during those years. This is verified by actual grower practices, in that recommended programs have been successful.

Objective 5: Consumer education: An updated consumer education card was published and distributed to selected farm stands.

2) If outcome measures were long term, summarize the progress that has been made towards achievement.

Growers are now aware of IPM practices needed to manage a full spectrum of pests, including the spotted wing drosophila. While grower adjustment of insecticide use initially increased when SWD was first found in 2012-‘13, (Figure 1), the number of insecticide applications has shown a decreasing trend since 2013, except for pyrethroid use, which is now stable.

Figure 1. Number of post-bloom insecticide applications compared to before SWD (pre-2012), initial SWD years (2012-'13), and declining use as growers become accustomed to SWD management.



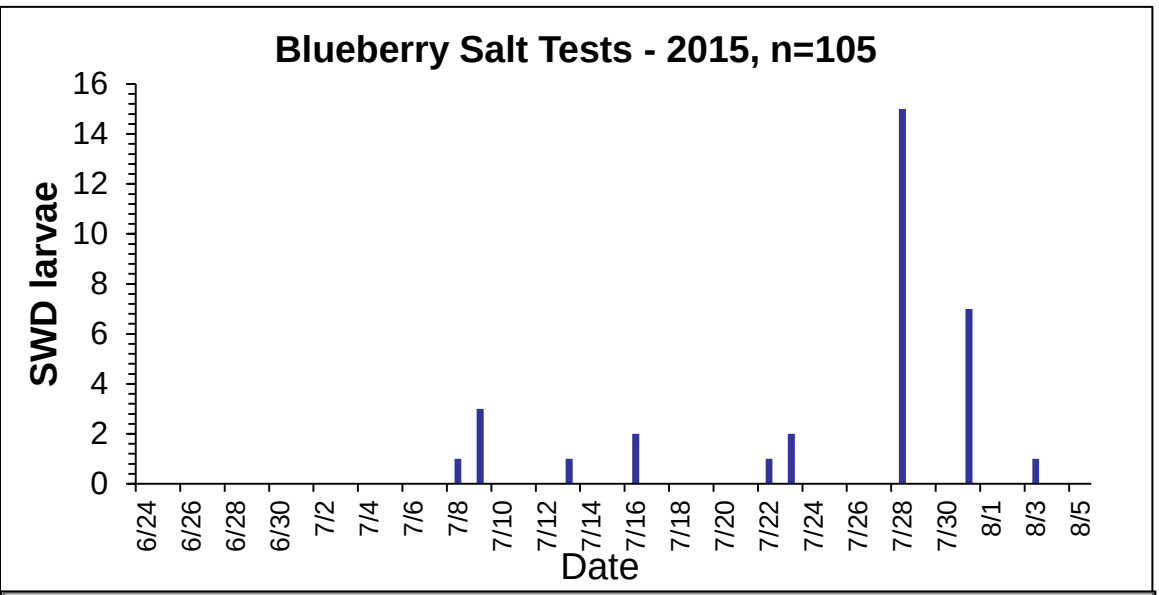
3) Provide a comparison of actual accomplishments with the goals established for the reporting period.

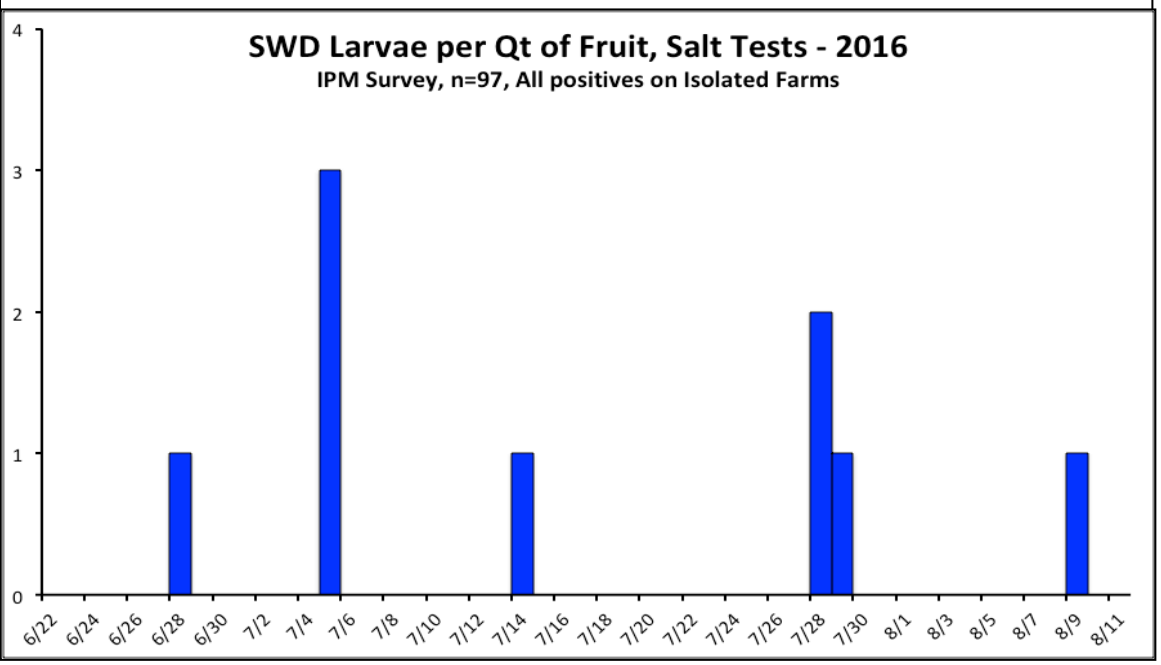
Measurable outcomes and goals:

A. No to minimal economic and physical crop loss due to pests, measured by grower pest management practices, trap counts and fruit quality surveys.

No fruit was rejected during either year of the program, and no infested fruit was found from commercial farms (non-organic) during the harvest period. Infested fruit was found after commercial fresh harvest, and from organic growers. These findings help prove that when growers executed program recommendations, the result was clean fruit, but that we have further to go in order to address organic practices (Figure 2).

Figure 2. Number of samples during a 2-year period with SWD larvae in fruit. Of the 202 qts. examined, or approximately 71,000 berries, 15 samples were infested with a total of 41 larvae. Almost all positive samples were post fresh market picking, no longer being treated or organic.





B. Establishing a pesticide resistance management program.

Growers were encouraged to rotate insecticide chemistries, use no more than 2 consecutive applications of any one material, and delay the start of applications until adults were found in traps, and apply treatments at 7-day intervals. These practices formed the core of the resistance management program. Analyses of grower pesticide use records showed that when growers adhered to these practices, it resulted in successful production of maggot free fruit.

C. Public understanding about integrated pest management will be increased.

The distribution of 2,000 IPM informational cards to farm stands was completed. These cards, and/or additional information needs to be followed up with actual consumer surveys relative to their knowledge and attitudes concerning grower's pest challenges and pest management options.

4) Clearly convey completion of achieving outcomes by illustrating baseline data that has been

gathered to date and showing the progress toward achieving set targets.

Outlined in previous sections.

5) Highlight the major successful outcomes of the project in quantifiable terms.

Major outcomes:

All conventional fresh fruit was packed maggot free. End of season, late machine harvest fruit had some larvae present but were mechanically removed on the packing line as per program recommendations.

D. How information was made available to the public/clientele for long term access.

Monitoring and scouting methods were made available through:

Annual and twilight meetings:

2017 Rutgers Cooperative Extension Meetings

01/31/17 "Resistance Management Programs for Spotted Wing Drosophila in Blueberries," Mid-Atlantic Fruit and Vegetable Convention, Hershey, PA. 135 growers.

2016 Rutgers Cooperative Extension Fruit Growers Update Meetings

03/28/16 Spotted Wing Drosophila Control by Ground vs Aerial Spraying in 2015 and Recommendations for 2016. Atlantic/Burlington County Blueberry Twilight Meeting. 78 growers.

05/24/16 Post Pollination Blueberry Pest Management. Atlantic/Burlington County Blueberry Twilight Meeting. Hammonton, NJ. 96 blueberry growers.

07/13/16 Isolating Spotted Wing Drosophila Larvae in Brambles and Blueberries. Cape may Small Fruits Twilight Meeting. Cape May, NJ 33 growers.

2015 Rutgers Cooperative Extension Fruit Growers Update Meetings

03/26/15 Early Season IPM and Scouting in Blueberries, 71 growers. Atlantic/Burlington County Blueberry Twilight Meeting

04/23/15 Bee Loss 2014 & What are We Doing, 78 growers. Atlantic/Burlington County Blueberry Twilight Meeting

04/23/15 Scouting Update from the Blueberry Fields, 78 growers. Amy Raudenbush, Program Associate under supervision, Atlantic/Burlington County Blueberry Twilight Meeting.

05/21/15 Insect update for Blueberries, 86 growers. Atlantic/Burlington County Blueberry Twilight Meeting

02/04/15 Update on Spotted Wing Drosophila Research and Monitoring Practices, w/ Amy Raudenbush and Cesar Rodriguez-Saona, NJ Agricultural Convention, Blueberry Session, Atlantic City, NJ. 85 growers.

03/05/15 "Making Sense out of Spotted Wing Drosophila Programs," Blueberry Open House, Hammonton, NJ. 98 growers.

03/05/15 "Changes and Plans for Blueberry IPM Programming in 2015," Amy Raudenbush, Program Associate under supervision. Blueberry Open House, Hammonton, NJ. 98 growers.

Total clientele outreach in meetings: 752.

Articles and Publications
Web based:
"Plant and Pest Advisory-Fruit Edition," - http://plant-pest-advisory.rutgers.edu/
"The Blueberry Bulletin," - https://njaes.rutgers.edu/blueberry-bulletin/

Refereed Articles
Rodriguez-Saona C., Vincent C, Polk D, Drummond F. 2015. A review of the blueberry maggot fly (Diptera: Tephritidae). J. Integ. Pest Mgmt. 15(1):11.

Rodriguez-Saona C, Polk D, Oudemans PV, Holdcraft R, Zaman FU, Isaacs R, Cariveau D. 2018. Landscape features determining the occurrence of Rhagoletis mendax (Diptera: Tephritidae) flies in blueberries. Agri. Ecosystems and Env. 258:113-120.

Highlighted Outcomes

Goal: No to minimal economic and physical crop loss.
This is summarized in Figure 2 above, which shows that no economic damage was sustained from spotted wing drosophila or other internal pests.

Goal: A pesticide resistance program will be established that results in maintaining control of existing pests at current use rates.
The resistance management program was covered in newsletters (above) and grower meetings (above), and in the Commercial Blueberry Pest Control Recommendations for NJ: http://pemaruccicenter.rutgers.edu/assets/PDF/Blueberry/17-blueberryRecommendations2017.pdf Use of these recommendations resulted in no marketable damage as seen in figure 2. A resistance management program uses multiple modes of action, with pesticides from various IRAC groups. This was demonstrated by collecting pesticide use records, and showed a continued use of materials with different modes of action (Figure 1.) during the years that this grant covered.

Goal: Public understanding about integrated pest and crop management will be increased.
During 2015 500 IPM information cards were distributed to farm markets. The plan to distribute these cards to 2 supermarkets in 2016 was changed to maintain distribution in farm markets, based on the requests from grower clientele, and the fact that this method seemed more effective to reach interested consumers. In total, 2,000 information cards were distributed, reaching at least 2,000 consumers, but likely much more, since most shoppers represent the consumption of multiple family members. Consumer education resulted in 8 farm markets requesting additional IPM information for display in the markets. This was supplied in poster form.

BENEFICIARIES

1) Provide a description of the groups and other operations that benefited from the completion of this project's accomplishments.

The beneficiaries are all of the NJ commercial blueberry growers, who produce fruit on 8,500 acres, primarily in Burlington and Atlantic Counties. The NJ Blueberry Industry Advisory Council listed 102 grower members at the start of this project. The growers consisted of 40 direct participants in 2016, with all other NJ blueberry growers functioning as indirect participants, who gained from

the project by getting information from newsletters, state recommendations, meetings, and secondarily from the agricultural chemical industry (2 major companies with 12 staff in NJ), who where also beneficiaries from this project.

2) Clearly state the number of beneficiaries affected by the project's accomplishments and/or the potential economic impact of the project.

See above.

LESSONS LEARNED

1) Offer insights into the lessons learned by the project staff as a result of completing this project. This section is meant to illustrate the positive and negative results and conclusions for the project.

NJ commercial blueberry growers have learned to control all pests normally found in blueberries, including the newly invasive, spotted wing drosophila (SWD). While the number of pesticide applications for SWD has decreased over the last 3 years, the total insecticide amount required for successful control is still greater than pre SWD arrival. In addition, knowledge gaps and few tools exist for successful management by organic blueberry growers. While consumers and marketing demands continue to require 100% clean fruit, consumers also want only minimum amounts of pesticides used on their fruit. This scenario is an ongoing problem, which requires a quantum step in IPM research.

2) Describe unexpected outcomes or results that were an effect of implementing this project.

Good control of blueberry pests, and especially spotted wing drosophila results from a combination of frequent insecticide use, using the correct products, adequate coverage during application, and rotating insecticides to prevent the occurrence of resistant pest strains. Before this project it was assumed that aerial pesticide applications, because of their low volume gave inferior control. However, it was found that both the frequency of application and the materials used are more important. Consequently, frequent aerial applications of the correct materials gave equal control as that obtained with frequent ground applied materials.

3) If goals or outcome measures were not achieved, identify and share the lessons learned to help others expedite problem-solving.

Additional work is needed to address organic production methods, so that organically produced fruit quality is improved. Our early warning system designed to initiate SWD management sprays is dependent on first adult trap capture. Both traps and the trap baits need to be improved.

4) Lessons learned should draw on positive experiences (i.e., good ideas that improve project efficiency or save money) and negative experiences (i.e., lessons learned about what did not go well and what needs to be changed). See #2 and 3 above.

ADDITIONAL INFORMATION

Provide additional information available (i.e. publications, websites, photographs) that is not applicable to any of the prior sections.

Fruit IPM blog in the Rutgers Plant & Pest Advisory:
http://plant-pest-advisory.rutgers.edu/category/fruit/blueberry/

The Blueberry Bulletin:

https://njaes.rutgers.edu/pubs/blueberrybulletin/

Commercial Blueberry Pest Control Recommendations for NJ:
http://pemaruccicenter.rutgers.edu/assets/PDF/Blueberry/17-blueberryRecommendations2017.pdf

CONTACT PERSON

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Telephone Number:	609-902-1134
Email Address:	polk@aesop.rutgers.edu

New Jersey Department of Agriculture
Specialty Crop Block Grant Agreement # 14-SCBGP-NJ-0034
FINAL PERFORMANCE REPORT
December 28, 2017
(Revised May 4, 2018)

Project Title; "Project to maximize the effectiveness of the Jersey Fresh advertising program in 2015 and beyond."

Project Summary;
The purpose of this project was to increase the overall effectiveness of the marketing of all specialty crops in New Jersey through the continuation of the proven successful efforts of the Jersey Fresh program. This was accomplished using print, television, radio, point of sale and outdoor advertising.

Why was this project important and timely?
Due to continuing market pressures New Jersey continues to be at risk of losing some of the last few economies of scale making the production and distribution of specialty crops economically feasible in the state of New Jersey.

Due to the steady decrease in the number of farms, land utilized in farming and average farm size it is more important than ever to find ways to maximize the effectiveness of the production of specialty crops in the State of New Jersey.

Year	# of Farms		Land in Farming (1,000 acres)		Average Farm Size in Acres	
	New Jersey	U.S.	New Jersey	U.S.	New Jersey	U.S.
1960	15,800	3,962,530	1,460	1,175,646	92	297
1970	8,600	2,949,170	1,060	1,102,371	123	374
1980	9,400	2,439,560	1,020	1,038,885	109	426
1990	8,100	2,145,820	870	986,850	107	460
2000	9,700	2,166,780	830	945,080	86	436
2010	10,300	2,200930	730	918,840	71	419
2011	10,300	2,181,000	730	916,700	71	420

In the past fifty years New Jersey has lost one half of its farmland and about a third of its farmers and has created a situation where the average farm size in New Jersey is only 71 acres. Adding to the economic pressure of making a living on smaller and smaller farms is the fact that New Jersey farmers have the highest land costs in the country. New Jersey's farm land values, including land and buildings, averaged $12,200 per acre as of January 1, 2012.

The objective of this project was to have the broadest possible impact across all commodities and varieties of fruits and vegetables produced in the State of New Jersey with a goal toward increasing the overall effectiveness of the marketing of all specialty crops in New Jersey.

Past accomplishments of previous projects;
Working with the following independent consumer research firms the Gallop Organization and Mapes and Ross, Inc. the Jersey Fresh program commissioned consumer tracking studies from 1984 to 2002. Follow-up tracking studies were conducted by Bruno and Ridgeway Research Associates,

Inc. in December 2012 to track the 2012 growing season and in September 2013 to track the 2017 season.

Consumer research has identified quantifiable long-term results from the Jersey Fresh advertising and promotional program.

- Consumer inclination to purchase fruits and vegetables if they are advertised as Jersey Fresh, has stayed very high, starting at 62% in 1984 to 65% in 2002 and 66% in 2012 and 70% in 2013.

- From 1984 to 2012 consumer awareness of the promotion of New Jersey Farm products rose from 8% in 1984 to 41% in 2002 and 78% in 2012 and 78% in 2013. Combined with a 66% inclination to purchase produce if advertised as Jersey Fresh this is a significant increase in consumer awareness. Consumer awareness of the Jersey Fresh program was 79% in 2014, 76% in 2015, 76% in 2016 and 77% in 2017.

- The percentage of consumers who are "likely" or "very likely" to ask for New Jersey produce if it is NOT identified rose from 33% in 1984 to 40% in 2002 and 51% in 2012 and 46% in 2013, 50% in 2014, 47% in 2015, 53% in 2016 and 64% in 2017.

- Positive perceptions of the quality of New Jersey fruits and vegetables in comparison to out of state competition has also improved from 1984 to 2012.

"Compared to out of state products is the following New Jersey product better."

	1984	2002	2012	2013	2014	2015	2016	2017
Tomatoes	64%	71%	76%	78%	76%	74%	75%	79%
Sweet Corn	55%	58%	71%	72%	71%	69%	70%	76%
Blueberries	28%	43%	62%	62%	63%	61%	59%	67%

The above consumer research documents increased consumer demand for products identified as Jersey Fresh, increased consumer awareness of Jersey Fresh products and an increase in the positive perception of New Jersey fruits and vegetables as compared to out of state competition. All the consumer research indicates that this program increase demand for New Jersey specialty crops. Increased demand for specialty crops is a proven method to increase the value of specialty crops.

Direct Results of Past Projects;

In 2004, a USDA funded Federal-State Marketing Improvement Program study documented the return on investment for the Jersey Fresh branding program. The study which drew upon the then twenty-year history of the Jersey Fresh program documented that every dollar spent on the Jersey Fresh program, increased fruit and vegetable sector sales by $31.54. According to the 2004 study, increased sales in agricultural products created additional economic activity. The increased economic activity impacted other parts of the economy, namely agricultural suppliers and service providers. In fact, each dollar spent on Jersey Fresh promotion resulted in an additional $22.95 of sales in agricultural support industries and other related industries. Therefore, the total additional economic activity to be created by every dollar spent on the Jersey fresh promotional program created $54.49 in additional economic activity for New Jersey's agricultural economy. ("Returns to the Jersey Fresh Promotional Program, the Impacts of Promotional Expenditures on Farm Cash Receipts in New Jersey," Ramu Godvindasmy, Rutgers the State University, March 2004.)

Therefore, the potential impact of the proposed $343,331 of SCBG funds to be utilized for the support of the Jersey Fresh advertising and promotional program can be expected to yield $18.7 million in additional economic activity for New Jersey's agricultural economy.

PROJECT APPROACH

Activities Performed;

The following activities were conducted in 2016;

Print Advertising

Print Advertising was placed in the following publications; Produce Business, Grocery Business, Grocery Headquarters, The Packer and the Produce News.

Television Advertising

A comprehensive television advertising program was conducted in 2017 on broadcast television focusing on "Today in NY," "The Today Show," "News at NY@12N," "The Tonight Show," and other early evening rotations for shows such as the "Wheel of Fortune."

Radio Advertising

Approximately 150 radio ads and sponsored messages were aired on 4 radio stations reaching Northern New Jersey and the New York City area and the Philadelphia and Southern New Jersey areas. The radio ads placed in 2016 represents about 33% of the available radio advertising budget.

In 2017 approximately 541 spots were placed with the following stations; WKXW, WSJO, WJLK, WOBM, WCHR and Pandora.

Point of Sale Advertising

The Inventory of the available Jersey Fresh Point of Purchase materials was conducted to determine the specific needs for 2017. After a detailed inventory of the existing point of sale materials it was decided in 2017 to move the point of purchase advertising budget to support print media.

Outdoor Advertising

A twelve-week program was conducted during the 2017 growing season beginning on June 26, 2017. The program consisted of advertising on NJ Transit buses. The project included 65 "King" sized Jersey Fresh bus wraps and 10 "Junior" sized Jersey fresh bus wraps. In addition, a digital Jersey fresh billboard ran for eight weeks.

Consumer Awareness Study

The NJDA was presented with a detailed study of the current consumer perceptions of the Jersey Fresh program in November 2015.

Only specialty crops benefited from these advertising efforts because of the Jersey Fresh program being limited to the promotion of fruits and vegetables.

Work Plan Contributions;

Thomas Beaver, NJDA, Director of the Division of Marketing & Development, provided leadership, planning and administration of all the Jersey Fresh advertising efforts.

Joe Atchison, NJDA, provided planning and administrative support for the project's promotion of the Jersey Fresh program. Mr. Atchison was the primary contact with Princeton Partners the advertising agency contracted by the New Jersey State Treasury for the Jersey Fresh Program.

Princeton Partners, Inc. is responsible for activities that relate to media development and placement and other advertising services
Jeff Cheseman
President
Princeton Forrestal Village
205 Rockingham Row
Princeton, NJ 08540
Tel; 609 452-8500

GOALS AND OUTCOMES ACHIEVED

To achieve the performance goals of this project efforts were undertaken to conduct Print Advertising, Television Advertising, Radio Advertising, Outdoor Advertising and the conduct of a detailed consumer awareness study of the Jersey Fresh program.

Consumer research has identified quantifiable long-term results from the Jersey Fresh advertising and promotional program.

- Consumer inclination to purchase fruits and vegetables if they are advertised as Jersey Fresh, has stayed very high, starting at 62% in 1984 to 65% in 2002 and 66% in 2012 and 70% in 2013.

- From 1984 to 2012 consumer awareness of the promotion of New Jersey Farm products rose from 8% in 1984 to 41% in 2002 and 78% in 2012 and 78% in 2013. Combined with a 66% inclination to purchase produce if advertised as Jersey Fresh this is a significant increase in consumer awareness. Consumer awareness of the Jersey Fresh program was 79% in 2014, 76% in 2015, 76% in 2016 and 77% in 2017.

The target for 2015 was 70%. This target was exceeded in 2015, 2016 and 2017.

- The percentage of consumers who are "likely" or "very likely" to ask for New Jersey produce if it is NOT identified rose from 33% in 1984 to 40% in 2002 and 51% in 2012 and 46% in 2013, 50% in 2014, 47% in 2015, 53% in 2016 and 64% in 2017.
  The target for 2015 was 55%. The results achieved in 2015 were 47%, in 2016 53% and in 2017 it was 64%.

- Positive perceptions of the quality of New Jersey fruits and vegetables in comparison to out of state competition has also improved from 1984 to 2012.

"Compared to out of state products is the following New Jersey product better."

	1984	2002	2012	2013	2014	2015	2016	2017
Tomatoes	64%	71%	76%	78%	76%	74%	75%	79%
Sweet Corn	55%	58%	71%	72%	71%	69%	70%	76%
Blueberries	28%	43%	62%	62%	63%	61%	59%	67%

The 2015 Target;
Tomatoes 78%

Sweet Corn	75%
Blueberries	65%

With a continuously declining budget for the Jersey Fresh program the strength of consumer preferences for Jersey Fresh products remains at a very high level for any consumer product.

According to the November 2017 consumer study of the "Total awareness for specific brands" Jersey Fresh compared very favorably with some other national brands with much higher marketing and promotional budgets.

Total Consumer Brand Awareness;

Chiquita	98%
Dole	99%
Jersey Fresh	77%
Foxy	70%
Ready-Pac	62%
Bonita	40%

BENEFICIARIES

This project benefited about $500 million of fruits and vegetables, nursery and greenhouse horticultural products in New Jersey.

Based on the most recent data available from NASS, we estimate the total number of Specialty Crop producers in New Jersey, and correspondingly the beneficiaries of this proposal, to be 3,681 growers.

The impact of Jersey Fresh advertising and promotional efforts has been documented as $31.54* in new revenues for every dollar spent on the Jersey Fresh program. Therefore, the potential impact of this project is expected to be about $11.7 million. (*"Returns to the Jersey Fresh Promotional Program, the Impacts of Promotional expenditures on Farm Cash Receipts in New Jersey" Ramu Godvindasmy, Rutgers, The State University, March 2004.)

LESSONS LEARNED

1) The Jersey Fresh advertising and promotional campaigns continue to be both effective and popular with growers and the consuming public.
2) Although recently declining funding is starting to erode consumer awareness and preferences for the brand the core brand remains extremely strong.
3) The Jersey Fresh brand identity continues to be strong both with growers and consumers. The years of investment in the program, combined with more than a century NJDA staff time, has made an effective combination to create and sustain this powerful program.
4) Future Jersey Fresh projects will benefit from some of the results of this project's consumer awareness study conducted in November 2015. One interesting and valuable lesson in the consumer survey is the source of consumer's news and current events. The consumers who participated indicated that they regularly use television (40%) and the internet (38%) for news and current events. The effectiveness and relative cost advantages of social media advertising (over television or other traditional media) will mostly likely inform future budgets for the Jersey Fresh program.

ADDITIONAL INFORMATION

Can be provided upon request

CONTACT PERSON

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FINAL PERFORMANCE REPORT
USDA AMS Agreement Number 14-SCBGP-NJ-0034)
New Jersey Farm Bureau
Submitted; 12/28/2017
(Revised 5/1/2018)

Project Title: "Training for controlled environment systems to advance the production and sale of fresh produce in urban areas"

Project Summary: The New Jersey Farm Bureau, in collaboration with technical assistance from Rutgers Cooperative Extension, provided materials and training at three urban sites to build season extension high tunnels and to retrofit an existing greenhouse structure. NJ Farm Bureau used the grant to facilitate the trainings with Rutgers Cooperative Extension Controlled Environment Agricultural specialists who visited each site, consulted on materials and process and provided assistance throughout the process of each build or retrofit and training.

Project Approach: The original idea for the grant came about through a collaboration with the New Jersey Farm Bureau and a non-profit that is no longer in existence called Ag in the City. This statewide non-profit had previously hosted two urban agriculture conferences in the state, bringing together growers located in many of New Jersey's most urban centers. The urban growers were most often housed within non-profits in each of the cities and the produce they grew was either sold to area residents or utilized in some capacity as charitable donations to area pantries or soup kitchens.
The goal of the original grant, before adjustments were made, was to enable each of these sites to expand the number of area residents educated to grow food in their community and to bring CEA expertise from Rutgers to these sites to provide season extension through high tunnels and improved greenhouse structures. A number of issues arose during the course of this process, which required us to change the focus away from training and to utilize the funds for mainly materials.

Three cities were chosen as sites for training and technical assistance based on knowledge of urban agriculture activities already in place. They varied in size, mission, economic viability and infrastructure.

In East Orange, the East Orange YMCA and the City of East Orange joined us for a hoop house training and build. This site had been designated to become a community garden through both organizations and East Orange municipal workers provided in-kind materials and prepared the site, which was situated across from a high school, located adjacent to a residential neighborhood. The hoop house is being used for starter plants and season extension. Rutgers Cooperative Extension agents, AJ Both and Tom Wilkinson, instructed and assisted the Rutgers Cooperative Extension Essex County Vets program attendees to build the hoop house starting in Fall 2015. Funds for this part of the grant covered the materials for the build, the actual hoop house framing, door, foundation, cover, grow tables and supplies. Beth Feehan, a former board member of Ag in the City and Meredith Taylor, another board member of Ag in the City, coordinated this project with the City of East Orange and Rutgers Cooperative Extension instructors.

In New Brunswick, Rutgers Cooperative Extension again was involved and AJ Both provided technical assistance and training to Elijah's Promise employees and volunteers to retrofit an existing hoop house structure located on Rutgers New Brunswick campus at the School of Environmental and Biological Sciences Campus. Elijah's Promise is a New Brunswick-based non-profit that coordinates a soup kitchen, food pantry and community garden program. The hoop house was retrofitted so that it could be used to grow food for the food pantry, to create a farmer’s market and to be used in the local community to grow plant starts for community gardeners. Meredith Taylor, formerly a board member of Ag in the City, coordinated this effort through her new role at Rutgers Office of Agriculture and Urban Programs. The body of work at this site took place in 2016-17.

In Camden, AJ Both again consulted with a non-profit, the Camden Center for Environmental Transformation (CFET), to retrofit an existing greenhouse and to provide a training for urban growers and area non-profits in Camden. The existing greenhouse structure was in need of new growing tables,

lighting, materials and infrastructure to improve its ability to grow product for two community gardens in the area that CFET maintains. Teresa Niedda, the Executive Director of CFET and Beth Feehan, former Ag in the City board member, coordinated the purchase of materials for the retrofit and organized the training which took place in Winter 2017.

Goals and Outcomes Achieved:

The following original goals were adapted and adjusted accordingly:

Promote and support NJ urban agricultural producers to establish 10 additional vegetable and small fruit controlled environment agriculture (CEA) systems (including greenhouses and high tunnels) for food production within a two-year period, adding approximately $200,000 in revenue from new urban farming food production systems in aggregate to those growing operations.

- The issue addressed by the project was the need to boost the abilities for food production among aspiring individual growers or associations of food advocates in the urban core areas of New Jersey. Among these food advocates, there is normally a desire to be a food producer but also a lack of knowledge, experience and training. This project brought knowledge and training to these individuals, facilitated by the state's largest association of farmers - New Jersey Farm Bureau.

- The non-profit Ag in the City began in 2011. Since receiving the SCBG, Ag in the City as a non-profit was dissolved; however, some principals from the Board of Trustees remained involved with this grant to facilitate its completion.

- Our original goal to create revenue of$200,000 in new farming food production systems, although well-intentioned, was premature in these sites that are not set up yet to be commercially viable and need extra assistance to set up markets and systems to sell to the public. Our original assessment was adjusted to change the grant to strictly provide education and materials that would benefit the growing of food in the urban core. *Vie* ended up working to either build or retrofit 3 functioning vegetable and small fruit controlled environment agriculture (CEA) systems (including greenhouses and high tunnels) for food production within the two-year period of the grant. The Project started in January 2015 and ended in September 2017.

Forty potential urban farm producers will be sought to attend the classes provided by the grant, There is additional potential to educate even more specialty crop growers (urban and non-urban0 by taking video of the training classes and making it available for viewing online under the tutoring of Rutgers Cooperative Extension-Bioenvironmental Engineering.

- We ended up training 30 farm producers instead of 40. There were 10 in East Orange, 10 in New Brunswick, and 10in Camden.

- We ended up working to either build or retrofit-3 functioning vegetable and small fruit controlled environment agriculture (CEA) systems (including greenhouses and high tunnels) for food production within the two year period of the grant. The Project started in January 2015 and ended in September 2017.

Soil Test results for potentially toxic trace metal elements using USDA NRCS XRF that currently presents urban food safety., security and marketing risks will be made available to project participants.

- Soil tests were not conducted. All soil used within hoop house and greenhouse structures is in raised beds and was brought into the site.

Urban Ag Market Gardeners will be instructed how best to obtain marketable yields from small urban greenhouses and high tunnels versus mixed gardens.

- This goal was not met except during the training at Camden where AJ Both provided a presentation on uses of different CEA technology and the types of produce that could be grown in each system.

These systems will produce high quality products within large potential markets., will realize a 5:1 return ratio from annual sales based on $40.,000 of project support costs., and use sustainable crop production practices in urban settings.

- The issue addressed by the project was the need to boost the abilities for food production among aspiring individual growers or associations of food advocates in the urban core areas of New Jersey. Among these food advocates, there is normally a desire to be a food producer but also a lack of knowledge, experience and training. This project brought knowledge and training to these individuals, facilitated by the state's largest association of farmers - New Jersey Farm Bureau.

- We overestimated the financial impact that these trainings would bring to bear on the organizations that participated. We had to simplify the goals and provide materials and training with less focus on the revenue production based on on-the-ground realities.

The non-profit Ag in the City began in 2011. Since receiving the SCBG, Ag in the City as a non-profit was dissolved; however, some principals from the Board of Trustees remained involved with this grant to facilitate its completion.

Due to conflicts about land use in Newark at a site owned by the NJ School Development Authority, plans to build a hoop house at the Hawthorne Avenue School in Newark in collaboration with Greater Newark Conservancy fell through in the first year of this grant.

We were then introduced to the East Orange YMCA, where plans were being made to build a community garden situated across the street from the Cecily Tyson School of Performing Arts on Wynan Street at a lot owned by the City of East Orange. We made arrangements for trainees from Rutgers Cooperative Extension Essex County Veterans Ag Program to attend the training and assist with the build. The lot had been cleared prior to the build through the efforts of the East Orange Department of Public Works.

In East Orange, multiple visits by Rutgers CEA specialists were followed up with several work days that included training involving a total of ten Urban Ag Vets. The site has since been used to grow produce for sale at a new farmers market that opened in East Orange in the summer of 2017 near the city center and to utilize the garden for community garden plots and teaching with local schools. A video of the East Orange training and hoop house build was made and is available to all stakeholders here: htt ps:/ / vimeo.com / 23468 7986.

In New Brunswick, an existing hoop house structure was retrofitted by the Office of Agriculture and Urban Programs, based at Rutgers School of Environmental and Biological Sciences Campus and utilized in collaboration with Elijah's Promise, a New Brunswick community-based non-profit that houses a soup kitchen and culinary school. Elijah's Promise is a founding member of the New Brunswick Food Alliance, which addresses hunger-related issues in the City of New Brunswick and plans are still being made for the use of the high tunnel to grow food for distribution within the city to those in need. http://agriurban.rutgers.edu/

In Camden, SCBG funds were utilized to retrofit an existing greenhouse structure owned by the Camden Center for Environmental Transformation (CFET), a community-based non-profit that has several urban spaces that grow fruits and vegetables in Camden. Purchases for the retrofit included work bench tables for growing seeds, irrigation materials and shade cloth. *A* training for urban growers in collaboration with NRCS staff in the fall of 2017 covered information on soils, financial assistance opportunities to urban growers and an overview of hoop house structures with Rutgers Cooperative Extension CEA specialists.

CFET will continue to use the greenhouse to start seeds in the spring which are then shared with community gardens in the area. CFET hosts a weekly farmers market run by interns enrolled in their EcoInterns initiative http://www.cfet.org/programs/eco-interns/.

All in all, these three sites greatly benefited from the funds spent on materials. *A* request was made and approved to modify the grant budget in the middle of the grant to spend most of the grant dollars on materials and not salaries or transportation. The anticipated line item for personnel in the original budget is being adjusted to account for the pro bono work done by Dr. Both and another controlled ag specialist. We asked for a budget adjustment to utilize the "Personnel", "Fringe" and "Contractual" budget line items toward "Supplies" (PVC, hoop house materials, ground cover, grow tables, venting etc. for all three locations).
Travel costs anticipated for training participants were over stated. We requested that the majority of the "Travel" budgeted be moved to "Supplies" as well, in the revised budget.

Before and after photos are available upon request for all three sites.

Beneficiaries: Three of New Jersey's most urban economically impacted communities, that currently host a number of urban agriculture programs, have been the beneficiaries of these trainings, technical assistance and materials. They include East Orange, Camden and New Brunswick Participant population for each site was as follows:

- East Orange-I0
- Camden-IO
- New Brunswick 10
- This trial helped to build an awareness in agricultural production.
- The economic benefits of training a cohort of urban area agricultural producers are significant. In the words of the EPA's "Basic Information on Brownfields" turning brownfields and vacant lots into safe community gardens and urban farms benefits the property and neighborhood ... growing vegetables, fruits, flowers, herbs and spices can connect cultures and encourage healthy eating habits while teaching useful skills."
- Urban agriculture can improve access to fresh food ... where low-income people sometimes pay higher prices for lower-quality food when supermarkets are unavailable.

Lessons learned: Our assumptions about how many participants would avail themselves of these trainings was incorrect although those who did participate in all three sites benefitted from the technical assistance and the materials that were purchased through the grant. Each urban setting has a variety of stakeholders willing to push for more urban agriculture opportunities that can change both the built environment and the quality of life in the areas where food is grown. It is worth continuing to find ways to connect our traditional agricultural producers and educators with this new group of growers who live in areas confined by population density and lack of access to fresh fruits and vegetables. We would like to see a follow up effort be made to bring this type of assistance through grant funding to connect our rural and urban communities even more in the future.

Additional Information: All in all, these three sites greatly benefited from the funds spent on materials. A request was made and approved to modify the grant budget in the middle of the grant to spend most of the grant dollars on materials and not salaries or transportation. The anticipated line item for personnel in the original budget is being adjusted to account for the pro bono work done by Dr. Both and another controlled ag specialist. We asked for a budget adjustment to utilize the "Personnel", "Fringe" and "Contractual" budget line items toward "Supplies" (PVC, hoop house materials, ground cover, grow tables, venting etc for all three locations). Travel costs anticipated for training participants were over stated. We requested that the majority of the "Travel" budgeted be moved to "Supplies" as well, in the revised budget.

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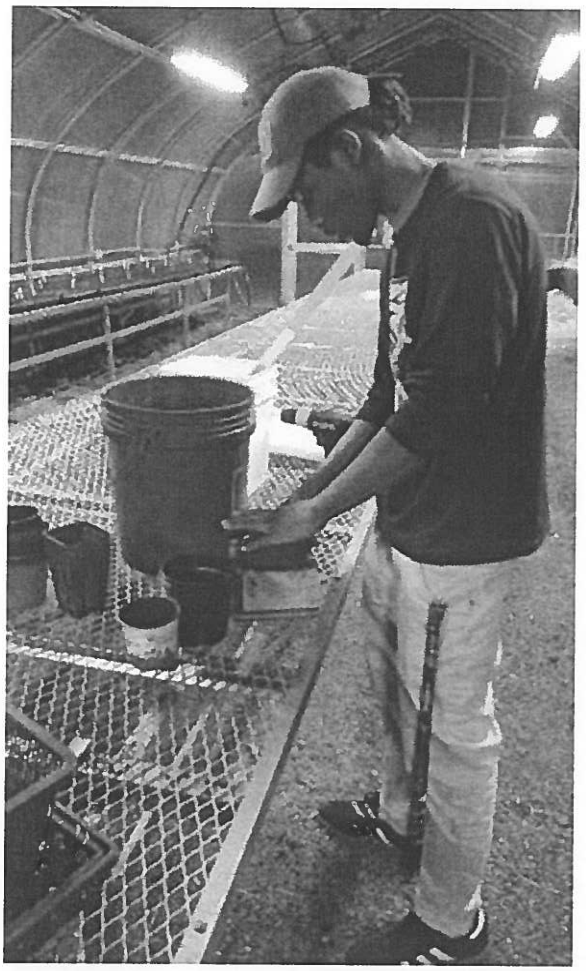
The Center for Environmental Transformation NJ Farm Bureau Report - May 2017

The Center for Environmental Transformation (CFET) was established in 2007 by a group from Sacred Heart Church united in a common concern for the well-being of the community. CFET manages approximately one acre of garden (across various locations) including a greenhouse and orchard in the Waterfront South neighborhood of Camden, NJ, an area plagued by economic and environmental injustice. To address these issues, CFET uses a multi-pronged approach and has developed an innovative youth program that uses urban agriculture, job training, and entrepreneurship to develop young people's leadership skills. CFET's youth and urban gardening program nourishes local residents by providing fresh, healthy, chemical free produce at affordable prices. CFET also hosts environmental and food justice focused retreats for groups throughout the region at its 24-bed retreat center. Garden SEEDS (Service, Eating, Education, Diversity, & Silliness) is a year-round program for children from Pre-K through 8th Grade, focused on the hands-on exploration of food and its origins. CFET's SEEDS program is conducted by a FoodCorps Service Member at three Camden schools where we have started school gardens and implemented programs on gardening, nutrition, and healthy eating.

CFET's greenhouse is the foundation of our farming efforts that we utilize in all our programing and serves as the nursery where we start the seeds for the majority of our vegetable crops.
Horticultural benches were purchased and used to outfit our propagation greenhouse with tabletop space. In acquiring these tables, we increased the surface area for growing seedlings, thus allowing us to grow more plants for use in our gardens and helping us increase productivity at our garden sites as well as seedlings started by CFET's FoodCorps Service Member. We will also be able to grow more seedlings for distributing to members of the public through sale or donation. Seedling distribution is a great way of encouraging residents to grow their own food and to share in the joy or providing for themselves, their family and their community.

The row cover and the steel wire hoops will be used for the purposes of season extension in CFET' s gardens. These supplies will be used

collectively to cover our growing beds with temporary "caterpillar tunnels" which will be used during the shoulder season in early spring and late fall to protect crops from threatening frosts. These low-lying caterpillar tunnels will also give us the ability to overwinter hardy crops, such as spinach, lettuce and carrots, directly in the field for mid-winter harvesting. By extending our growing season through the use of these materials, CFET will be able to increase our produce yields, which ultimately, allows us to grow more food for the community. CFET will also use these materials to teach our youth, as well as Camden resident gardeners, how they can extend their growing season and grow more food through the use of



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FINAL PERFORMANCE REPORT
USDA AMS Agreement Number 14-SCBGP-NJ-0034
Submitted: December 29, 2017
(Revised; May 1, 2018)

Project Title; "Increasing Sales of Plants and Flowers in New Jersey through the 'Plant Something' Marketing Program."

NEW JERSEY NURSERY & LANDSCAPE ASSOCIATION
December 15, 2017

PROJECT SUMMARY

The New Jersey Nursery and Landscape Association applied for grant funding to develop a Plant Something Campaign Marketing Project. Our aim with this project was to expose consumers in New Jersey to the successful Plant Something promotion being implemented around the country with a goal of increasing the sale and use of New Jersey grown landscape flowers, plants and trees. Previous projects awarded to other states have helped develop the basic tools, branding, and promotions making this a cost-effective marketing program utilizing previously created content. This project sought to develop marketing efforts within New Jersey to spread the Plant Something message. This campaign has had meaningful and measurable impact across the country, including national trade press attention, and is currently licensed by twenty-two states and one Canadian province (as compared to a total of twelve states when this project began). New Jersey was already a licensee of this program, and this grant award has allowed for full participation in the award-winning industry promotion.

PROJECT APPROACH

1. We developed & maintained a website specific to the Plant Something initiative that provides customers with information and serves as a resource to garden retailers. www.plantsomethingnj.org
2. We generated stories and online traffic through media placements in significant NJ outlets, including CBS – TV, NJ.com, News 12, FIOS1 news, WKXW radio and local print, radio, and television.
3. Launched both Twitter and Facebook account profiles to educate consumers about buying local plants and to amplify the other messages put forth through the plant something campaign. Both accounts are being actively maintained with information that will provide consumers with educational information and incentives to plant.
4. Put forth local events to engage the gardening public with the message 'Plant Something! and live a better life'.
5. Activities in 2017 included a continuation of activities initiated in 2015 and 2016: maintenance of website, online promotion of the Plant Something imitative & coordination of local events to engage the public on gardening activities, including electronic distribution of "Plant Something" promotional materials and assistance

with new retailers in procuring “Plant Something” promotional materials.

6. Initial retail survey was conducted that showed a and follow-up survey is scheduled for June, 2018. The results of these surveys have shown an overall increase in sales for all three years (2014, 2015 and 2016). The respondents of the survey showed the majority of businesses enjoyed an increase between 5 to 10 percent. There was less of an increase during 2016, which may be due to less activities being performed and/or the economic situation. The complete survey results are attached.
7. A previously-submitted Annual Performance Report, with photos, detailed much of the outreach efforts that had been performed in 2015. These outreach efforts were maintained in 2016 and 2017.
8. An exhibit booth at the 2017 Flower & Garden Show was very successful for promoting Plant

the public on gardening activities, including electronic distribution of “Plant Something” promotional materials and assistance with new retailers in procuring “Plant Something” promotional materials.

9. Initial retail survey was conducted that showed a and follow-up survey is scheduled for June 2018.
10. A previously-submitted Annual Performance Report, with photos, detailed much of the outreach efforts that had been performed in 2015. These outreach efforts were maintained in 2016 and 2017.
11. An exhibit booth at the 2017 Flower & Garden Show was very successful for promoting Plant Something. Promotional materials were well-received and comments included “best booth in the show”, “great giveaways”, “great idea”.
12. Advertising of the Plant Something website and engaging retailers to promote Plant Something took place in March thru June 2017. The timeline was selected to coincide with spring planting. A copy of the ad that was published in 2017 is available upon request.

13. <u>Goals and Outcomes Achieved</u>
    a. Based on the success of the activities that were achieved during the term of this grant, the goals that were set forth were accomplished and the foundation has been set for future success. The specific accomplishments that were outlined in the Project Approach collaboratively resulted in getting the message out of the monetary, health and environmental benefits of planting, therefore encouraging increased sales of these products.
    b. Distribution of 1000 seed packets with a “Pollinator mix” of seeds and 1000 seeded bracelets (for children) was accomplished in 2017, further promoting the idea of planting. Comments received at trade shows and events where the distribution took place indicated a very positive, enthusiastic response to this campaign.

14. <u>Beneficiaries</u>

By promoting the idea of “Planting Something” to the public, both at public events, in publications, social media and the website, the benefits are seen throughout the state

and the environment.
More specifically, the campaign would benefit New Jersey garden centers and growers of plants. A NASS survey, currently being completed, will further show the increase in sales of these specialty crops.

According to the most recent (May 2016) U.S. Bureau of Labor Statistics Division of Occupational Employment Statistics, section 37-3011 Landscaping and Grounds keeping Workers, there are 29,210 people in New Jersey who work in the industry, which will benefit from the increased sales generated by this campaign. New Jersey's nursery, greenhouse, and sod sector accounts for over $400 million in sales annually, according to the most recent National Agricultural Statistics Service Census of Horticulture.

15. Lessons Learned

Technology – keeping up-to-date and effective with promotions through technology is an ongoing process and one that needs to be consistently and constantly worked on. The Plant Something website is good – and enjoys a sufficient and encouraging amount of activity, but new content and features are needed to keep the traffic consistent.

Likewise, our social media campaigns have enjoyed a positive success and have engaged the public in a dialogue of what is good to plant, when to plant, and other practical informative issues, but engagement will decrease if not constantly updated. We currently have 801 page likes on Facebook and 287 followers on Twitter. Future promotional campaigns will strive to increase this engagement.

16. Additional Information

Available upon request are the two advertisements that were used during this promotion. Both have reached over 30,000 readers by being published in a New Jersey garden publication.

17. Contact Information

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ATTACHMENT
SURVEY RESULTS SPREADSHEET

Plant Something Survey Results 2014 to 2016										
Question	Possible Responses	2014 Responses	2014 Totals	2014%	2015 Responses	2015 Totals	2015%	2016 Responses	2016 Totals	2016%
member category	A. Nursery Grower	10	51	20%	7	23	30%	10	32	31%
member category	B. Greenhouse Grower	0	51	0%	0	23	0%	1	32	3%
member category	C. Landscape Professional	25	51	49%	15	23	65%	15	32	47%
member category	D. Retail Garden Center	16	51	31%	1	23	4%	6	32	19%
sales increase May	A. Yes	37	51	73%	20	23	87%	22	32	69%
sales increase May	B. No	14	51	27%	3	23	13%	10	32	31%
sales increase May %	A. 0%	7	51	14%	3	23	13%	9	32	28%
sales increase May %	B. 1%-3%	6	51	12%	2	23	9%	3	32	9%
sales increase May %	C. 3%-5%	4	51	8%	5	23	22%	5	32	16%
sales increase May %	D. 5%-7%	5	51	10%	5	23	22%	7	32	22%
sales increase May %	E. 7%-10%	10	51	20%	7	23	30%	4	32	13%
sales increase May %	F. 10%-15%	11	51	22%	1	23	4%	1	32	3%
sales increase May %	G. 15%-20%	5	51	10%	0	23	0%	2	32	6%
sales increase May %	H. More than 20%	3	51	6%	0	23	0%	1	32	3%
sales increase October	A. Yes	34	51	67%	21	23	91%	26	32	81%
sales increase October	B. No	17	51	33%	2	23	9%	6	32	19%
sales increase October %	A. 0%	9	51	18%	2	23	9%	6	32	19%
sales increase October %	B. 1%-3%	6	51	12%	2	23	9%	6	32	19%
sales increase October %	C. 3%-5%	12	51	24%	4	23	17%	7	32	22%
sales increase October %	D. 5%-7%	4	51	8%	7	23	30%	4	32	13%
sales increase October %	E. 8%-10%	3	51	6%	7	23	30%	5	32	16%
sales increase October %	F. 10%-15%	12	51	24%	1	23	4%	1	32	3%
sales increase October %	G. 15%-20%	4	51	8%	0	23	0%	2	32	6%
sales increase October %	H. More than 20%	1	51	2%	0	23	0%	1	32	3%

FINAL PERFORMANCE REPORT (Revised on May 2, 2018)
Name of the Organization New Jersey Peach Promotion Council
Specialty Crop Block Grant Program (SCBG) Agreement 0034
Type of Report - Final Performance Report
Date of the Report – May 2, 2018

PROJECT TITLE "Promote and Handle Jersey Fresh Peaches"
Project Approach and Activities Performed

Social Media Budget Approved $6,000. We spent $1,566.00 in this line the first year of the grant. The money spent was to retain a new web site designer. Many changes were also made to the web site. Since changing our web designer we have been unable to get more data for evaluation of impact. In 2016 we spent $2,200 hard to get more activity on our Facebook page in 2016 by being more diligent in adding pictures , videos and other fresh information more information from our volunteers, more information from our members and more postings on the retail activities of the council and our members. The results were promising: 1) In 2014 our total reach was 15,012 during the same time period in 2016 our total reach was 30,590. That represents a 104% increase. July was a very heavy traffic month but August and early September were also heavy. This corresponds to most of our marketing season. In 2014 we 347 likes during the year, In 2015 we averaged 447 likes and in 2016 we were up to 544. This represents 22% in one year and a 59 % increase from 2014. We also had 1245 people that were engaged in using the Facebook page in 2014 but for the same period in 2016 we had 1946 engaged in using Facebook. This represented a 57% increase. We also had 578 people visiting pages linked to the site.

We spent more time on Twitter using more pictures and providing more links and information particularly late in the season. We have less than 500 followers as of this date.

In the final year of the grant we spent $2,234 mostly on Facebook improvements. We paid for $1,250 part of the Facebook development and maintained to Advanced Media which also developed our Instagram page. We had not further development of our Twitter account. In 2017 we raised our likes on Facebook from 544 to 881. We increased our visits from 578 to 1320 in 2017. The number of people engaged has increased from 1946 to 9426. Our total outreach was 425,746 up from 30,590 in 2016. We felt great success with the help of the Advanced Media Company.

Consumer Advertising Approved Budget was $20,000. Spent $10,800 in the first year of the grant for the cost of consumer advertising costs were: ad development, space and placement in the following publications:

South Jersey Times (NJ Peach Festival Edition) $475.00;
Edible NJ magazine Food Edition $1,640.00;
The Packet Newspapers $513.00 ("Time Off" insert: Princeton; West Windsor; Plainsboro; Montgomery; Rock Hill; Hopewell, Pennington; Lambertville; Delaware Twp.; West Amwell; New Hope; Stockton; Solebury; S. Brunswick; Hillsborough; Manville; Robbinsville, Upper Freehold, Roosevelt, Allentown, Plumsted, Millstone; Windsor Heights; East Windsor, Hightstown; Cranbury; Cranbury, Jamesburg, Monroe; Bordentown; Florence; Springfield; Chesterfield; Mansfield; New Hanover; N. Hanover, Fieldsboro;

Recorder Pub Paper $957.00 (Bernardsville, Hunterdon County, Randolph, Mt Olive, Roxbury, Madison, Florham Park, Chatham, Hanover);

Greater Media Papers $1,257.18 (News Transcript-Colts Neck, Englishtown, Freehold, Manalapan, Marlboro, E. Brunswick Sentinel-W. Brunswick, Helmetta, Jamesburg, Milltown, Monroe, S. River, Spotswood, Independent-Aberdeen, Holmdel, Hazler, Keyport, Matawan, Middletown.

Phila Inquirer $2,500.00 for one ad.]

Radio spots were handled by Townsquare Radio $2,950.00 (1.5 million listeners a week) WKXW FM, WSJO, WJLK, WOBM AM/FM, WFPG, WPUR, WCHR, WXKW/101.5, WENJ, WADB);

During the second year of the g rant 2016 only $1906 was spent for consumer advertising. We cut back on our advertising in late August and September because by that time we could tell that peach prices were strong and peach moment was good. In fact, by Labor Day many growers were out of peaches to promote. We spent an additional 1,898 on Consumer advertising in the magazine Edible Jersey. E**dible Jersey is a quality magazine** tells the story of food, from source to table. It is published bi-monthly (we advertised in the June issue) The magazine spotlight the growers, producers, retailers, artisans, chefs, home cooks, and others who energize our community with authentic, regionally-based food choices. With engaging stories and enticing photography, **Edible Jersey** magazine and website hope to transform the way New Jersey residents shop for, cook, eat, and enjoy food. The also did an article on New Jersey peaches that complemented our paid advertising for which we provided pictures. Edible Jersey is part of **Edible Communities**, a national network of regional publications, **Edible Jersey** offers advertisers an extremely valuable audience. Edible readers nationwide are identified as consumers that recognize and support local businesses. Monthly circulation is approximately 40,000 subscribers. They distribute to 260 3 sites with an additional 100,000 issues.

In 2017 the balance of this budget line $7,294 was spent on radio advertising with Beasley Media Group, Townspeople Media Group (see explanation above) which ran and Edible Jersey and South Jersey newspapers similar exposure contracted in 2015 and 2016 (see previous explanation). Additionally, $1,666.66 spent on the contractor Advanced Media for developing a consumer advertising program. The following are some of our initial results.

Facebook Consumer Advertising: See report attached

Per our contract with Advanced Media our Facebook/Instagram ads cost $5,000 and ran from July 23 through September 16. Ads targeted six counties, Essex, Bergen, Hudson, Camden (county, not city), Morris, Bucks County, PA. Report is divided into 2 sections: Facebook & Instagram. Although ads were served less frequently on Instagram (see impressions), Facebook overall performed far better than Instagram with click and links to our website. Advance Media included its insights in the report, but the following explanation should help with your final evaluations: Impressions: Number of times the ad was served (popped up) to our target audience. Post Comments: Number of times viewers interacted from ads (liked, shared, used emojis, wrote comments). Clicks: number of times viewers clicked on our Facebook/Instagram pages: Click through: number of times viewers clicked through Facebook to ppc webpages: Post reactions: number of times those who viewed the ad interacted with it; meaning liked it, shared it, used the emojis to show

comment or wrote in the comment box. Overall, according to my discussions with Julie William, our Facebook/Instagram performed better than average, with high click-through rates. CT rates are on-average 1%. Any CTs above that 1% is considered very good. PPC's CT rates on Facebook averaged 2.66% for the run of the campaign. Instagram were .63%. The insights on each report provide more explanations.

Data on normal Facebook operation as a result of this advertising are listed under social media budget line explanation above

Trade Advertising Budget Approved 6,000. Spent $5,725 in first year of grant; for two ads; one in Produce News and one in Produce Business including the cost of revising 2015 ads and placement including the cost of space. These are two very important publication reaching all of the major peach buyers in our northeastern markets including also many merchandisers and other involved in the marketing and distribution of peaches. Total circulation is over $50,000 combined.

The balance of the Funding ($275) was spent this year as part of the cost of advertising in Produce News which has a circulation of 12,898 readers. This publication gives us great editorial support that can be read in last year's report.

Media Relationships and Press Releases Budget Approved S4,000. Spent $1,225.00 in the first year of the grant. Nineteen press releases were written for print, broadcast media and social media. They covered retail peach promotions, an events calendar, peach pie contest, new tree plantings, new board members, new video, early, midseason and late peach seasons, tree plantings, Peach Buyers Guide and NJ Peach Festival and Peach Queens; peach month. Follow up phone conversations or additional information was made by consultants. In five instance additional pictures were provided to the media. Two radio interviews were done with a station in Cape May County and on NJ 101.1. Two article interviews were also done with Produce Business and Produce News for the peach trade.

The impact of this was media coverage were 54 mentions on newspapers, magazines, television (3) and radio (4)**.** Our marketing consultant also prepares a Peach Clip Report with details details): This expense helps us reach between 8 and ten million people in the North East and Mid Atlantic area

In the second year $1747.00 was spent. Our consultants wrote 11 press release on peach related information that was distributed print, broadcast, social media outlets. According to our media coverage analysis we read or tracked it to publication on 5 TV stations, 5 radio stations, 80 print publications. This was an increase of over 54 media tracking's in 2015. Based listening and viewing audience and readership circulation figures we estimate 8-10 million people from best available figures. $1,028.00 was spent in the final year of the grant. Press release were written on some of the same issue with emphasis on have a great crop but maturing earlier. The consultants worked writing press releases on the new Facebook promotions and a calendar written as a substitute for the peach buyers guide. We also wrote release on our health brochure. This time we have a clip report but have no details on people reached for 2017.

Research Approved budget of $4,000 for 3 years. Spent $0 in the first year of the grant. The 2nd year we spent $ 3,955.00. None was available the third year except for $45. This money was spent doing two elements of our new product research. Our technical consultant used funds to pay mileage to evaluate 26 advanced selections on 5 different planting of peach and nectarines planted in 2013 and 2016. Samples of fruit were gathered from

plantings made in 2008 and 2013 of five selections approved for commercialization to take to the post-harvest facilities at the Rutgers Agricultural Research and Extension Center in Upper Deerfield Township in Cumberland County. In addition to the five selections from the 2013 plantings at five locations in Gloucester, Salem and Cumberland counties were evaluated include one midseason yellow fleshed sub acid nectarine; one very early season yellow–fleshed clingstone peach, one highly colored yellow-fleshed midseason peach; one yellow-fleshed flat nectarine; six white to cream-fleshed nectarines throughout the growing season and four attractive cream-white attractive sub acid peaches mostly mid to late season fleshed peaches.

This post-harvest research was contracted to the Rutgers New Jersey Agricultural Experiment Station to evaluate these new selection for possible commercialization. Additional research was contracted and conducting on the storage, handling and merchandising characteristics of new peach varieties from the Rutgers NJAES with emphasis on their susceptibility to wooliness, browning and inking is storage and transit. To date the first season results of the 2013 plantings have not been received. The impact of this research is the introduction and naming of the following varieties. :

NJN103 aka NJ K54-42 was named Silverglo (USPPAF). Trees available for sale 2018

NJN102 aka NJH21-44 was named Brigantine (USPPAF). Trees available for sale 2018

NJ 357 aka NJH7-47 – was named Evelyn (USPPAF). Trees available in 2018

NJ 358 aka NJ K64-197 was named Selana (USPPAF) Trees were planted in 2017 and will be available.

NJ 359 aka NJ K65-76 was named Tiana (USPPAF). Trees were planted in 2017 and will be available in 2018.

The addition of these new varieties fills' the need for an early seas white nectarine, and an early mid-season yellow fleshed nectarine and three yellow fleshed peaches one in early midseason with yellow sub acid flesh and two large traditional flavored peaches to extend the marketing season. Each of these fills a niche for NJ growers in the marketplace.

Goals and Outcomes Achieved:

Out peach industry continues to hold steady at about 5,000 to 5500 acres according to 2016 statistics. Production was up in 2017 although somewhat early maturing. Because we have so much in store pressure from other commodities including apples this earlier maturity helped us market our peach crop profitably. Producers and shippers from Georgia and South Carolina had approximately 15 percent of a crop in 2017. They are out major peach market competitors in eastern markets where we have been selling most of our peaches. Since 2017 was the final year of our grant it was wonderful for our industry to experience good fruit movement, strong prices and even with rising costs most growers and those involved in fruit movement were still able to have a profitable season

Year	Utilized Production (tons)	Season Average Price ($ per ton)	Value of Utilized Production ($1,000)
2010	34,000	$ 920	$ 31,280
2011	30,000	$ 1,220	$ 36,600
2012	30,000	$ 1,320	$ 39,600
2013	18,120	$ 1,501	$ 27,200

2014	21,000	$1,320	$ 27,891
2015	21,170	$1,310	$ 27,732
2016	20,000	$1,440	$ 28,800
2017	24,000	?	?

The final USDA-NASS and USDA-Market News Services Price Data was not available yet for 2017 and informal survey of our growers and UDSA Market News reports has helped us draw this conclusion in achieving our major goal of a viable industry viability.

We have members that sell both fruit on the wholesale and retail markets, Just having the New Jersey Peach Promotion Council and keeping our programs on promotion on going and visible enables us to had many inquiries from potential buyer on where they can buy peaches in New Jersey. Our buyer information we publish and the trade magazines in which we advertising keep our growers and shippers names

For all retail and wholes marketing the increase in in Facebook, Instagram and Twitter usages has helped increase our peach industry exposure. We continue to have effective press releases that are published and utilized to get our name in front of the public or more implanted Jersey Peaches and Jersey Fresh Peaches.

We did increase our retail promotions in all three years of the grant by trying to be more efficient and by training more volunteers to coordinate these promotions. We used the peach queen more in 2014 and 2015. We had more special peach market promotions called peach promotional parties and our Perfect Peach Pie Contest became more popular and garnered great publicity for the peach industry (see accomplishment data); We also started in 2015 and 2016 to work with supermarket dieticians to do demonstrations in supermarkets; (see accomplishments data);

BENEFICIARIES

1) The beneficiaries of this project are the 80 growers and their workers and staff encompassing 5,500 acres of peach trees (a decline of 900 acres since 2012). We continue to see slight increases in the wholesale price per pound of peaches as the volume of peaches produced remains sort of static between 56,000,000 and 60,000,000 pounds. A significant number of suppliers and laborers are dependent and employed in the infrastructure of the peach industry. Peaches from New Jersey could easily be consumed by the 25 million people within 250 miles of production, packing and storage areas. We continued to target this market. There is ample scientific evidence to support consumption of increasing amounts fruits and vegetables. NJ peach growers continue to use all methods available to differentiate local or NJ peaches from all other produce, and from peaches produced in other areas and shipped to suppliers and marketers in our target market, Our directors, members, volunteers and consultants believe that NJ peaches can be profitably sold in this market because they are fresher, taste better and the industry of tree growing and farming has many benefits.

LESSONS LEARNED

1a) We continue to learn it is very difficult to make long term plans because of the volatility of the Eastern peach market strongly influenced by the supply and demand. For example, the first year of this grant the supply of peaches exceeded the demand, the second year the demand was ok and the supply was a little lighter particularly in NJ. The last year of the

supply was light and the demand very strong. Thus, you have to have a consistent plant knowing that sometimes you plan will have little impact on the market if the demand is affected by supply.

2a) Peach consumption information data from trade journals and the National Peach Council has shown the per capitate consumption continues to decline particularly among your families. This age group is more inclined to get information and be impacted by social media. The purchase of Facebook advertising and the development of a program by Advanced Media was not only very cost effective by also very helpful in developing and Instagram and Facebook readership about NJ peaches and the NJ peach industry.

3a) Without conducting expensive surveys which our grant funding does not cover we have few impact measurements with quantitative data. Most of the federal and state agencies have cut funding Specialty Crop reports prepared by the National Agricultural Statistical Service and the New Jersey Agricultural Statistical Service. Our best source of information is our grower members and our allied members who give us feedback on peach prices and movement in addition what and when we get information form USDA Market News
4a Our best exposure for our peaches and peach programs are consumer advertising, trade advertising, and just getting the word out through our media release

CONTACT PERSON

Name the Contact Person for the Project Santo John Maccherone – Chair of NJPPC
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The New Jersey White Potato Association
Specialty crop Block Grant Agreement # 14-SCBGP-NJ-0034
Final Annual Performance Report
December 12, 2017
(Revised 4/24/2018)

Project Title:
"Know Your Farmer, Know Your Food:
Connecting Consumers with New Jersey Potato Growers"

Project Summary
The Jersey Fresh program is one of the longest standing and best known local produce marketing campaigns in the nation. While Jersey Fresh itself has great name recognition, most consumers do not identify potatoes as a readily available, local, and "Jersey Fresh" product. The goal of this project is to increase in the volume of Jersey Fresh branded potatoes sold by embracing the slogans "Know Your Farmer, Know Your Food" and "Locally Grown". Developing a connection between consumers and their local farmers will promote sales of local potatoes by helping people to feel safe and confident in the quality of the potatoes they are purchasing. Point of purchase materials that feature the eleven NJ potato farm families will be created to tell the story of the New Jersey potato farmer. These materials will be distributed to 750 targeted stores over 2 years with the goal of significantly increasing "Jersey Fresh" potato sales.

Project Approach
Drone footage was filmed during the planting, growing, irrigation and harvest of New Jersey potatoes. This was filmed at no cost. The footage was then edited and saved on DVD's and USB thumb drives. These were distributed to retailers for use on their Social media accounts and also to The N.J. Department of Agriculture for use on their social media accounts.

We used the photographs we had from last year and designed 7" x 11" Jersey Fresh Potato price cards. Each of the growers had their individual pictures on the price cards along with the city they farm in and year the farm was established. Retailers used these to display the price of our potatoes in their stores.

We also used the photographs we had on file to design 8" x 5" recipe cards. Each grower submitted a family recipe that we used for these. There were 25 "tear off" recipe cards in a pack with an adhesive backing. These were distributed to retailers who displayed them in front of our Jersey Fresh potatoes.

In 2017 we had Jersey Fresh corrugated potato bins designed to display potatoes in at the retail level. Each bin had a high graphic picture of the grower that grew these potatoes along with the location of his farm on the bin.


JERSEY FRESH
FROM THE GARDEN STATE
PREMIUM
RUSSET
POTATOES
JERSEY FRESH
As Fresh As Fresh Gets
POTATO

Goals and Outcomes Achieved

In 2017 there were 22,105 CWT of potatoes marketed in the Jersey Fresh brand bag. This was a 10% increase from the 12,029 CWT that was marketed in the Jersey fresh brand bag in 2016. There were 424,224 individual 5#,10# and 50# bags packaged under the Jersey Fresh brand in 2017. This was as increase of 8% compared to 2016.

Year	Packages	CWT	Increase
2015	244,180	12,029	
2016	392,420	20,005	66%
2017	424,224	22,105	10%

Our original goals of increasing sales by 7.5% in year 1 and increasing by 10% in year 2 were met. Our original plan was to increase sales to 43,500cwt, but this was not achieved. As we reported previously, Rabbit Hill Farms is no longer growing and packing potatoes. In addition, Jim Coombs Farm did not grow any potatoes in 2017. Both growers were large producers of Jersey fresh potatoes.

Lessons Learned

Our original plan of producing durable Gator Board grower displays was not as well received by the chain stores we were targeting. We listened to their recommendations and reacted accordingly. We had to change our original plan and design USB drives with our social media video and grower pictures, grower price cards, grower recipe cards and corrugated bins. Each of these were well received by the retail markets we targeted.

By implementing the corrugated bins with the grower pictures on them we were able to save on the cost of distributing the POS material. We did not spend any money for distribution. We were able to put the grower price cards and recipe cards in the bins that were distributed to the stores.

2015 was a very difficult year for New Jersey potato growers. Much of the potato seed that was planted was infected with Dickeya. This caused major crop failures and a major decrease in the 2015 production / marketable yields. We were able to rebound nicely in 2016 and 2017 with a 66% and 10% increase in volume respectively.

Overall we are very pleased with the success of our program. Having the funding to promote New Jersey potatoes allowed us to present a complete marketing program to the retailers we were targeting. This included Point of Sale along with social media marketing tools. All of the fresh market potato growers in New Jersey benefited from this program. A list of the New Jersey White Potato Industry Advisor Council and the New Jersey White Potato Association members is attached. All of the members have benefited from this project. In addition, all of New Jersey / Jersey Fresh Specialty Crop producers have benefited from this program with cross merchandising brand recognition.

Ron Budd
The New Jersey White Potato Association

NEW JERSEY WHITE POTATO INDUSTRY ADVISORY COUNCIL

JULY 1, 2017 - JUNE 30, 2018 **(two-year term)**

MEMBERS	REPRESENTS	TERM EXPIRES
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Tom Bishop Bishop Brothers Farm 39 Newkirk Station Road Elmer, NJ 08318	Central Jersey Growers	6/30/18

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Council Liaison

The New Jersey White Potato Association Member list
3/1/2018

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Funding Expended to Date

	Federal Funds	Non-Federal Funds	Total
Contractual Photographer (visits to 11 NJ potato farms and digital images) Photo editing	$ 4,500 (2,530 spent) $ 500		$ 5,000
Supplies POP display boards (durable Gator Board displays at $39 per board for 750 stores) Promotional "Jersey Fresh Potato" shopping totes	$29,250 (33,958.90 spent)	$ 1,000	$30,250
Other Distribution – postage for displays to 750 stores	$ 3,750		$ 3,750
TOTALS	**$ 38,000**	**$ 1,000**	**$ 39,000**

Outer Coastal Plain Vineyard Association (Anne Nielsen and Dean Polk at Rutgers University)
USDA AMS Agreement Number (14-SCBGP-NJ-0034)
Type of Report - Final Performance Report
Date of the Report: Dec. 13, 2017

PROJECT TITLE

Survey of vineyard pest insects in New Jersey

PROJECT SUMMARY

There is very little information on the species, abundance, distribution, and pressure of insect pests of wine grapes in the state of New Jersey. Insect pests can reduce the yield and quality of wines produced. Feeding by insects can cause vine decline or death either through direct injury or transmission of pathogens and thus pose a significant threat to this burgeoning specialty crop industry. As this specialty crop industry grows and the quality and demand continue to increase, we need to identify risk factors associated with growing wine grapes (*ie*. insect pests) that can be mitigated. The objective of our work is to conduct a survey of wine grape pests across the state of New Jersey to identify the distribution and severity of key insect pests. This information will be used to form a coherent IPM program for New Jersey wine grape growers. We will survey 8 vineyards throughout the state to identify the presence and severity of key emerging pests including: grape root borer, leafhopper vectors of vine diseases and viruses, brown marmorated stink bug, and red-blotch associated virus. For some of these insect species, NJ is at the northern distribution of their known range. The relative abundance of each pest in commercial vineyards will be assessed through visual sampling of transects in commercial vineyards or through trapping in vineyards. The survey will also include scouting for red-blotch virus, a newly identified viral disease of grapes identified in vineyards across the US starting in 2009.

PROJECT APPROACH

The objective of this project was to identify key pest issues facing NJ wine grape growers. In March 2015, Rutgers hosted a wine grape IPM school where experts of Eastern grape production, specifically entomology and pathology, were brought into discuss IPM strategies on key pests and was funded partially by this project. We used a “clicker survey” during the meeting to identify knowledge, practices, and needs of growers. The IPM school was attended by 50 growers and 87% of participants ranked the workshop as excellent or very good. The majority of the attendees had 6-10 acres of grapes and less than 4 years of experience growing grapes. The key pests identified were Japanese beetle, grape root borer, and stink bug. Interestingly 58% of growers identified stink bug as a key pest and 39% managed for it. Forty-two percent of attendees were not sure if they had red blotch virus and only 3% responded that they did. One of the objectives of this survey was to determine the interest and need for an IPM program in grapes and 47% of attendees responded that they would pay for a Rutgers IPM program.

The on-farm survey conducted in 2015 and 2016 was a collaboration between the Rutgers Fruit Entomology lab (Dr. Anne Nielsen), Rutgers Fruit IPM program (Mr. Dean Polk), and OCPVA

growers. In 2015 and 2016, eight farms were surveyed through visual inspection and/or pheromone baited traps weekly for grape berry moth, grape root borer, mealy bugs, and brown marmorated stink bug. In September, grape leaves and petioles were collected to detect red blotch virus. Initially up to 30 vines per plot, with two 1 acre plots per farm, were sampled. Vines with red blotch symptoms were selected. Leaves were photographed, labeled, and sent to Dr. Brad Hillman's laboratory for detection and sequencing of red blotch virus DNA. The geo-coordinates of each sample were also taken with a handheld GPS unit so that landscape analysis can be conducted to map infected vines. Project funds were used for labor, mileage, and supplies to conduct the survey and sample processing.

GOALS AND OUTCOMES ACHIEVED

1) The project started with two goals:
    a. Identify the distribution and severity of insect pests or vectors of wine grapes in NJ
    b. Identify the with-in vineyard distribution of grape root borer and soil characteristics that may mitigate populations

Upon completion of Obj 1, we identified population pressure and seasonality of grape berry moth eggs + larvae at 5% injury even under management. We identified grape root borer at 3 vineyards, most of which were below treatment threshold, and low levels of mealy bugs. Despite 39% of growers (above) managing for stink bug, we identified low levels of stink bugs, including brown marmorated stink bug, and only recommended management at one farm in one year. Incidence of the grape berry moth eggs + larvae were applied to multiple degree-day models to establish the model that best predicts timing for management of key life stages. Using a modified standard deviation model we compared biofix dates of January 1, March 1, and the date of 50% wild grape bloom (ie. plant phenology). The January 1 degree-day accumulation model best fit sampling data and was recommended for use to time insecticide treatments. In 2017, a small plot trial at RAREC investigate the effect of timing for grape berry moth management in Chardonnay. No significant difference was found between using January 1 and the plant phenology as a biofix to time treatments. Therefore, we will recommend the growers utilize the January 1 model going forward, which will simplify management approaches.

We found grape root borer at levels that were too low to effectively map (Obj 2). However, within Obj 1 was a survey for an emerging grape disease, red blotch associated virus (RBaV). As soon as the project began, we had a report from a vineyard of one acre of vines that were positive for red blotch associated virus (RBaV). An emergency twilight meeting was held and the growers urged us to include a significant survey for this disease. RBaV impacts berry quality and wine quality. There are currently no management tactics except for rogueing out infected vines and the virus is only detectable through molecular diagnostic tools. Beginning in 2015, we surveyed two 1-acre plots on 6 vineyards throughout the Outer Coastal Plain AVA for 313 leaf samples. The virus was detectable in 7% of samples but 5 out of the 6 vineyards sampled were positive - suggesting a low incidence of the virus but with a wider distribution than originally thought. The virus is transmitted through two routes. The first is through infested rootstock and

the second is plant-to-plant transmission from an insect treehopper vector. Objective 2 was adjusted to look at the incidence and spread of RBaV in NJ. We continued the survey on the same vines in 2016. After an adjustment in the protocol we have identified 49% of samples to be positive, with at least two plots having over 90% incidence. Only 213 samples have been analyzed to date from the 2016 samples but this documents both a significantly higher incidence and spread to new vines.

2) The three primary outcomes were a) Grape IPM workshop; b) revision of the grape berry moth model and management recommendations; c) identification of the incidence, distribution, and spread of red blotch associated virus in NJ.

3) The primary long-term goal is that we documented a need for a Rutgers IPM program in grapes.

4) Our accomplishments far outweigh the initial goals of this project. Although Obj 2 was not completed, it was replaced with a thorough survey of a new virus that significantly impacts NJ grape production. The survey for RBaV arose out of an expressed need by multiple growers.

5) Baseline data shows that we have identified knowledge gaps with the grape stakeholder community in terms of IPM.

6) The most significant outcome is that we documented is significant increase in the incidence of red blotch virus. The impact to the NJ wine grape industry is currently unknown but is expected to be high as grape quality and production declines significantly in infected vines.

BENEFICIARIES

2) The direct beneficiaries of this project are the wine grape growers in NJ, specifically the members of the OCPVA. The Outer Coastal Plain AVA accounts for 70% of NJ grape production with over 700 acres of grapes in 2007 (US Ag Census 2007)

3) The 56 members of the OCPVA will directly benefit from the project findings.

LESSONS LEARNED

1) This project positively identified methods for IPM monitoring in NJ wine grape and demonstrated a collaborative effort to disseminate knowledge and address challenges. The development of the IPM workshop was rated as very good or excellent by 87% of attendees and creates a delivery platform for educational programs. Through this project, we unexpectedly identified a widespread new virus that negatively impacts grape quality.

2) A significant project outcome is the identification of the widespread incidence of grapevine red blotch disease in NJ vineyards. Additionally, the virus has spread from impacting 7.5% of vines to 49%, with additional samples still to be processed. Additional funding was applied for to investigate the insect vector but it was not selected for funding by the NJ Department of Agriculture.

3) All goals were achieved.

ADDITIONAL INFORMATION

A factsheet on IPM for BMSB in vineyards was published through the NE IPM Center and is available in English and in Spanish. Funds from this project were not used to produce these materials. Electronic copies are available at http://www.stopbmsb.org/stopBMSB/assets/File/BMSB-in-Grapes-English.pdf

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Rutgers, The State University, New Jersey Agricultural Experiment Station (NJAES)
SCBG Agreement # 14-SCBGP-NJ-0034
Final Performance Report
Submitted; December 15, 2017
(REVISED May 2, 2018 revisions and questions answered)

Project Title

"Evaluating and Demonstrating the Use of Low-Tunnels in New Jersey to Extend the Production Season of New Rutgers Strawberry Cultivars and Specialty Greens"

Project Summary

Organic and conventional small farm businesses in the Northeast are looking to extend the growing season for specialty crops while reducing the costs and inputs of pesticides, fertilizers and irrigation. Extending the season for specialty crops such as strawberries, kale, collard, and mustard greens can help to increase profits and enhance customer satisfaction for small farm direct market operations and community supported agriculture. Rutgers University continues to develop, release and patent new strawberry cultivars adapted for the Northeast region of the U.S. Thanks to the assistance of previous SCBG funding, the Rutgers team was able to evaluate selections with on-farm testing. These new selections were developed to improve flavor and quality with comparable yields for direct market specialty crop growers in New Jersey and the Northeast. Another important research endeavor was to evaluate the impact of cultural methods on strawberry production by evaluating the use of low tunnels. In some circumstances, low tunnels have been shown to extend the production season and improve the quality of produce. Low and high tunnels are becoming more popular with established and beginner farmers. This timely research provides additional information for specialty crop growers to consider in their production strategies.

Project Approach

In the Fall of 2015, two separate low-tunnel observational trials were established for specialty greens and June-bearing strawberry selections at the E.A.R.T.H. Center in North Brunswick, NJ. The specialty greens low-tunnel trial consisted of '151 Unipack' spinach, 'Red Russian' kale, and 'Bright Lights' Swiss chard. Except for spinach, the greens were planted on raised beds covered with black plastic mulch and drip irrigation. Plants were planted in a staggered two row alignment. The spinach was planted in uncovered portions of the raised beds with trickle tape to minimize early bolting and allow for closer plant spacing. An alternate block design was utilized with four replications of each specialty green. Organic and conventional systems were compared. For the organic replicates, a slow-release blood meal fertilizer was used at recommended rates. For conventional replicates, was fertilized with a soluble 20-20-20 fertilizer (NJ Commercial Vegetable Production Recommendations, Rutgers NJAES 2015). An organic and a conventional block was covered with low tunnels in early November. Throughout the season, yield data was collected at peak harvest intervals. Soil surface temperatures within the trial were also recorded via the use of an Extech™ High Temperature IR Thermometer. Initial disease rating surveys conducted did not show any consistent differences which may be attributed to a dry season. The limited disease pressure was likely a result of reduced moisture levels on plant leaves.

During the Fall of 2015, a June-bearing strawberry trial was also established consisting of four varieties, two new Rutgers NJAES research selections and two were commercially available varieties ('Chandler' and 'Earliglow') commonly grown in New Jersey. The strawberry trial also consisted of raised beds with black plastic and drip irrigation with plants on double staggered rows. For each selection, there was an organic and conventional treatment with one set under low tunnels and one set uncovered. The June-bearing strawberry trial was protected with row covers in November to prevent winter damage. Low tunnels were placed over the field in the Spring of 2016 after existing row covers were removed.

In the Spring of 2016, a second low tunnel trial was created that included both specialty greens and day-neutral strawberries. The crops selected were 'Bierra' Kale, 'Bright Lights' Swiss Chard, and 'Evie 2' day-neutral strawberries. There were eight replications of each crop, four covered with low tunnels and four uncovered. Yield data and disease ratings were conducted on these trials. Data compiled for these trials revealed slightly higher yields at the start of the harvest season for low tunnel greens compared with control plots. The differences were only noted during initial harvests and yields quickly leveled out with higher outdoor temperatures which would be expected. Environmental extremes noted during the 2015 and 2016 growing seasons introduced unexpected variability that may have influenced the results.

A final project video was completed and posted to educate growers on how to set up and utilize a low tunnel system. The video is posted on the NJAES project website, and YouTube. The video can be found at https://www.youtube.com/watch?v=MjJaz3ZFzww *and at* http://rubeginnerfarmer.rutgers.edu/ listed under educational videos. Growers were made aware of the project during various meetings as per detail in Goal 4 of the "Goals and Outcomes" section.

Goals and Outcomes Achieved

GOAL 1: Determine the effect of low-tunnel production systems on crop earliness and overall marketable yield for specialty crops throughout small farms in New Jersey.

Question 1 from USDA -

Our research revealed there was over a 50% increase in strawberry yields of covered vs. control plants. Statistical analysis of total marketable yield using analysis of variance (ANOVA) with P=0.0295 showed a significant difference between the covered (mean of 438.50 grams) and control (mean 164.35 grams) plants.

After having conducted three separate field trials, we noted a slight increase in early yield data for specialty greens. After the initial harvest, yields were not consistently different (Fig. 1 and 2). This could have resulted from a late frost in 2016 and early protection provided by the low tunnels.

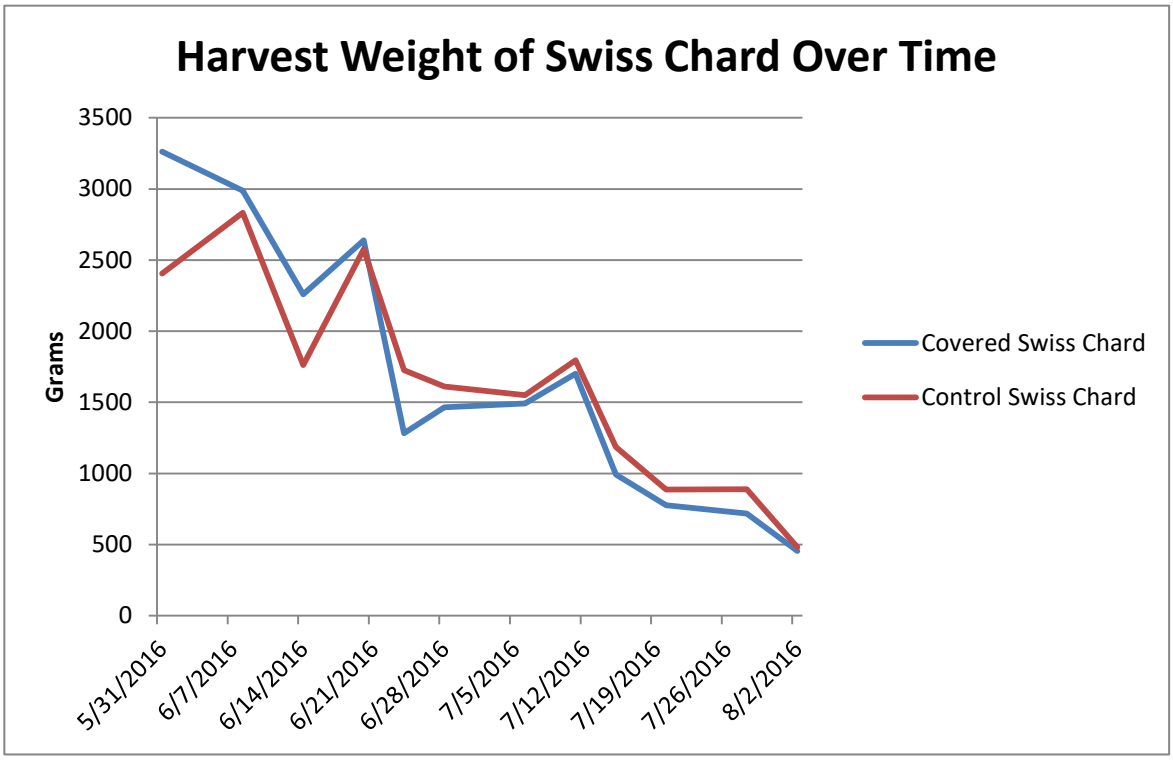
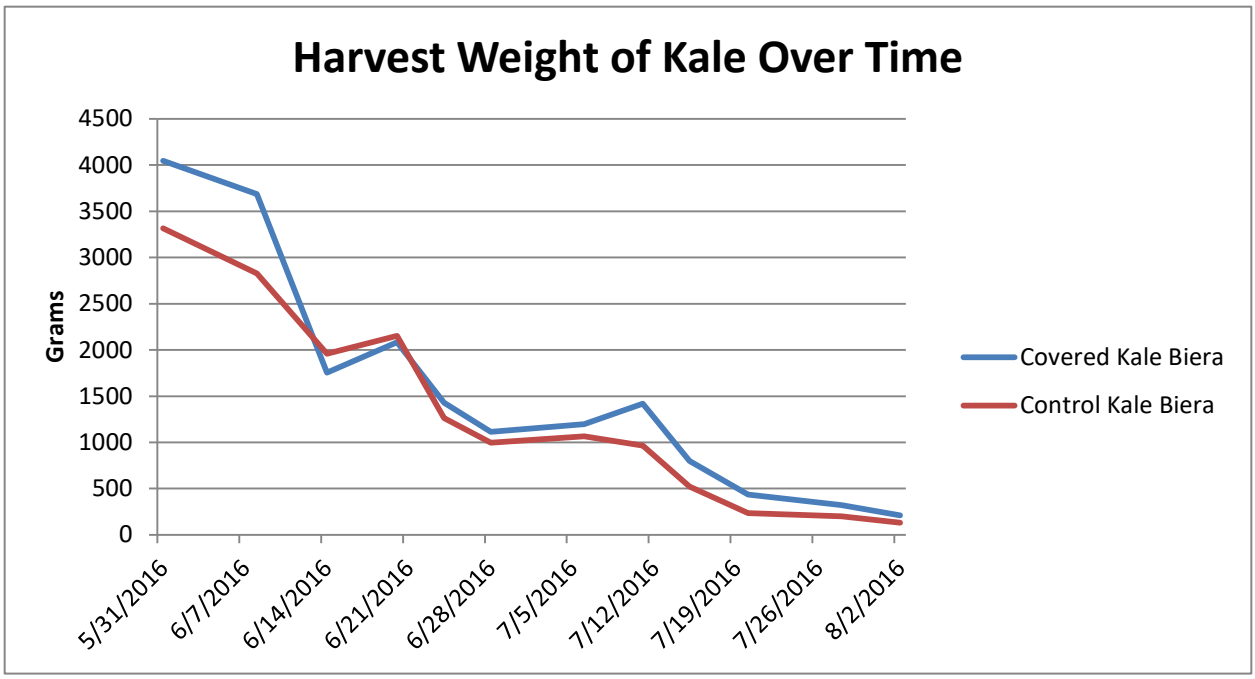


Fig. 1 - 2016 Harvest data for Swiss chard reveals slight increases during the initial harvest period with low tunnel covered plots. Yields quickly level off as temperatures become moderate.



The day-neutral strawberry trial revealed an increased yield throughout the season using low

Fig. 2 - 2016 Harvest data for Kale also reveals slight increases during the initial harvest period with low tunnel covered plots.

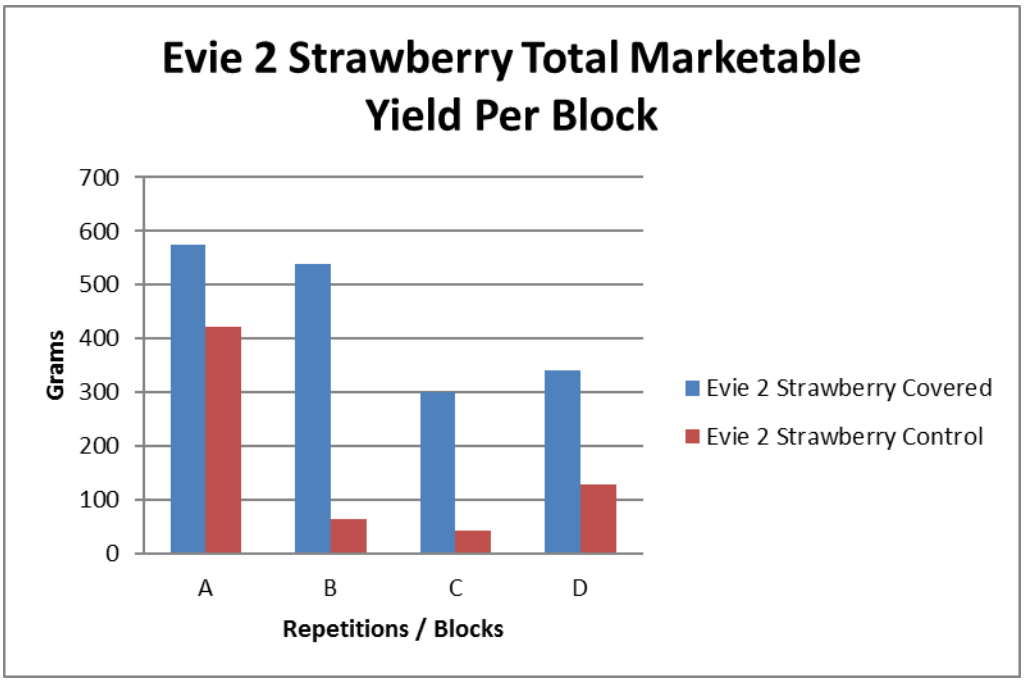


Fig. 3 – Harvest data for 'Evie 2' day-neutral strawberry showing yield differences between covered and uncovered blocks. Strawberries under low tunnel production produced higher marketable yields.

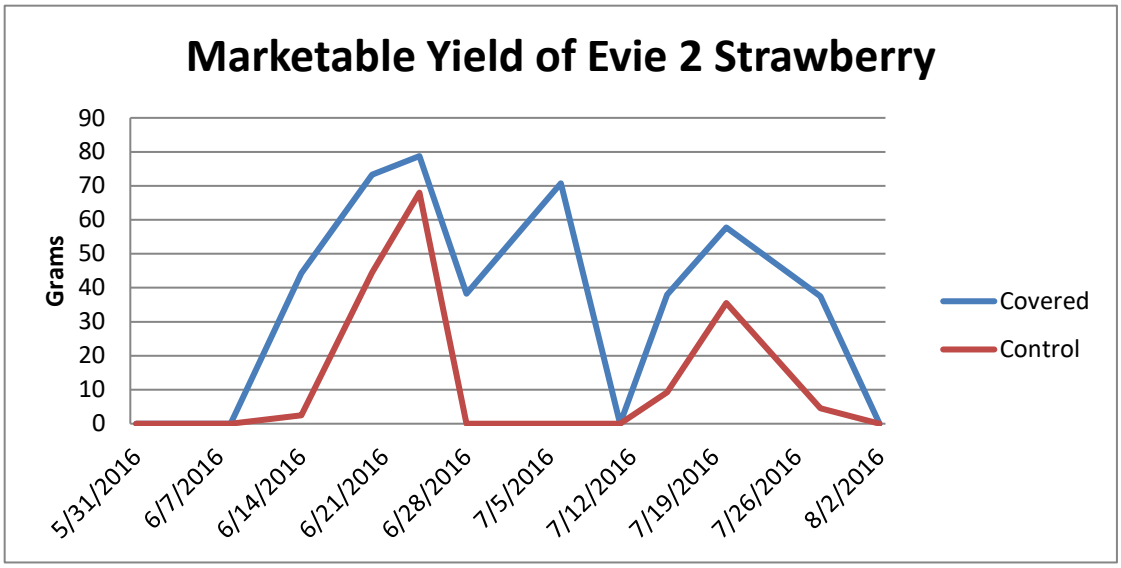


Fig.5- Shows a consistently higher yield throughout the harvest season for low tunnel covered strawberries.

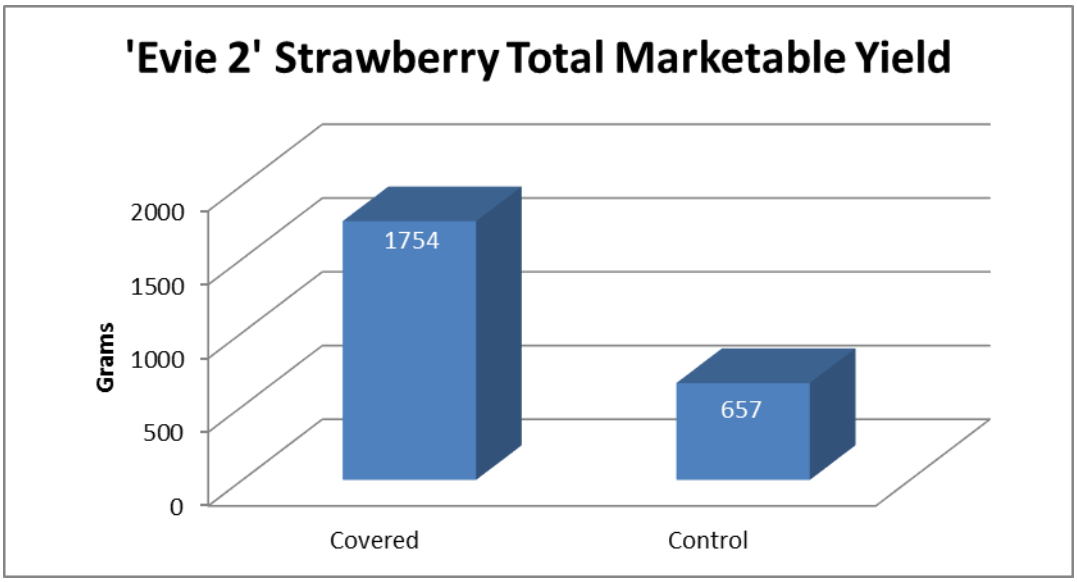


Fig. 4 – Reveals a 267% higher marketable yield for day-neutral strawberries under a low tunnel growing system. This is based on micro plot data results. Realistically, we would estimate at least a 50% yield increase. Part of the difference was also due to poor weather conditions impacting overall yield.

GOAL 2: Provide farmers with a cost/benefit analysis of low-tunnel use within conventional and organic field production systems.

Question 2 USDA

The strawberry yield portion of the low tunnel research demonstrated the largest difference in profits among the crops grown. Both the retail and wholesale values shown below are based on low end averages of yield and price/lb:

Wholesale 10,000 lbs/ acre x $1.50/lb = $15,000 (Control)
$15,000 + 50% increase ($7,500) = $22,500 (Low Tunnel)
Retail 10,000 lbs/acre x $2.85/lb = $28,500 (Control)
$28,500 + 50% increase ($14,225) = $42,925 (Low Tunnel)

There were no consistent yield differences between conventional and organic field production systems. This could have been attributed to the highly productive soils that were used in this experiment. Costs for low tunnel systems were approximately $0.67/ft^2 ~~$1.13 per square feet tunnels can range from $0.33 to over $1.13 per square foot.~~ for the Tunnel Flex Garden Kit from Dubois Agrinovation Inc. Growers can reduce costs by bending their own pipe supports.

Commercial Low Tunnel System= $0.67/ft^2
Do-It-Yourself System= approx. $0.33/ft^2 due to current material pricing

As per our goal, during the second year of production, metal supports can be reused and plastic costs would total approximately $627.00/acre. With a 50% or more increase in production, the conservative estimate of $7,500 increased profit per acre would be well worth the investment for low tunnel production of strawberries.

Maintenance and labor costs to establish and maintain the low tunnel system by raising and lowering the tunnels would add an additional two to four hours of labor per acre depending on the experience of the labor force. Organic input costs were approximately 15 to 20% higher than conventional fertilizer costs. Tunnel costs and durability were discussed with farmers and students during Extension educational meetings in the field to over 80 farmers. In addition, establishment and costs were discussed on the YouTube video that was viewed by over 3,700 people.

GOAL 3: Determine the effectiveness of low-tunnel systems on disease resistance of foliar and fruit diseases.

Based on disease rating surveys conducted by P.I. we did not witness any significant differences between control and low tunnel covered sections for disease resistance of foliar and fruit diseases. Disease pressure was minimal due to unseasonably dry weather for 2015. In 2016, a late frost impacted yields on both greens and strawberries in both low tunnels and control blocks. Disease ratings for low tunnels averaged 1 or less on a scale of 1-10 scale, where 1 is the least damage and 10 is the most damage. The ratings without tunnels ranged from 16 to 21% diseased. As discussed under Goal 1, the marketable yield is 50% greater with tunnels vs. control (no tunnel),

GOAL 4: Increase the knowledge of low-tunnel growing systems throughout New Jersey.

The research team created an educational video on the construction and maintenance of the low tunnel systems used in our field trials which was posted to the project webpage on https://www.youtube.com/watch?v=MjJaz3ZFzww *and at* http://rubeginnerfarmer.rutgers.edu/. Growers were made aware of the project and its findings in the following meetings:

- In June of 2016, local growers were invited out to the EARTH Center demonstration trial to provide feedback on the flavor, fruit characteristics and plant attributes of the Rutgers strawberry lines in the test and demonstration plots.
- The project was discussed with over 20 local growers during monthly Middlesex County Board of Agriculture meetings.
- The project and results to date were discussed at the "RU Ready to Farm" training session to over 80 participants on October 22 and November 5, 2016. This program included beginner farmers interested in growing specialty crops. The hands-on training session on November 5, 2016 at Specca farms in Burlington County, NJ focused on best management practices for growing a myriad of specialty greens and small fruit crops. The low tunnel work on strawberries and greens was presented to program participants.
- Information was shared with 35 students in the "Sustainable Agriculture Class" and the "RU Ready to Farm" class in 2017.

Beneficiaries

The beneficiaries as listed under Goal 4 of "Goals and Outcomes" section included over 150 established and beginner farmers in New Jersey. In addition to conventional farmers, an underserved audience of women, minority and beginner farmers were present at the Extension training programs. The on-line educational video produced for the project was viewed by over 3,700 people on the YouTube site at https://www.youtube.com/watch?v=MjJaz3ZFzww.

Lessons Learned

The type of low tunnel used in this study provided minimal protection from extreme low temperatures. It may be wise to utilize row covers in addition to the low tunnels to provide additional protection of plants from frost damage. The addition of row covers may also increase soil temperatures to help promote extended harvests.

A slightly larger tunnel would allow for greater accessibility in order to add or remove row covers to supplement heat retention. It may be beneficial to utilize heavier plastic that does not have venting holes for future applications.

The use of a wireless soil temperature probe could have provided more accurate data on temperature fluctuations.

Some growers have the capacity to create their own hoops for low tunnels and build their own systems. A grower built low tunnel system could significantly lower the costs of tunnel construction and allow greater flexibility to adapt the design to best fit the specific needs of the grower.

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Additional Information