South Carolina
DEPARTMENT OF AGRICULTURE
Hugh E. Weathers, Commissioner

Final Report

Specialty Crop Block Grant Program
Agreement 14-SCBGP-SC-0045

State Contact
Elizabeth "Betsy" Dorton
Grants Coordinator
bdorton@scda.sc.gov
803-734-2210

Clint Leach
Assistant Commissioner
jcleach@scda.sc.gov
803-734-2191

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South Carolina Department of Agriculture, PO Box 11280, Columbia, SC 29201

Project Title: A Rebranding and Re-Launch Initiative for the SC Fruit, Vegetable and Specialty Crop Growers Association

Partner: SC Fruit, Vegetable and Specialty Crop Growers Association

Project Summary

The South Carolina Fruit, Vegetable and Specialty Crop Association (the Association) is the state's only comprehensive representative body for all produce farmers. The Association is currently invested in reestablishing its suite of grower services. Phase one of this new effort involved rebranding and relaunching the group, giving them a more effective collective means to grow awareness of themselves and their products. Membership expansion is also required to begin the process of offering more necessary programs to help increase fruit and vegetable production and to also improve the overall quality of product grown in the state. The Association's public appearance – in name, logo and media presence – has also needed redesign to more visibly and clearly represent its purpose and mission while appealing to a new crop of potential members. This project was not built on a previously funded project with the SCBGP.

Project Purpose

The Association strives to provide programs and services to South Carolina's produce growers through providing educational opportunities, monitoring legislation, promoting new markets, supporting applied research and encouraging new and beginning farmers. According to the 2012 USDA Agricultural Census, South Carolina has 3,077 fruit, vegetable, and other specialty crop growers cultivating 54,512 acres. When the state's 25 larger growers and their acreage are removed from these figures, what remains is the majority of the state's specialty crop producers, which are primarily smaller operations of ten acres or less. Smaller growers need a strong marketing association that offers services beyond just a quarterly newsletter and annual meeting.

This project will make the specialty crop industry in South Carolina stronger and more visible by promoting all of the state's specialty crop growers and their products. This must begin with a revitalization of the Association itself, beginning with a new branding campaign to help farmers market themselves, not just their products. With a new branding campaign in place, the Association can begin a membership drive that will expand beyond agriculture and incorporate corporate and consumer buy-in. Additionally, with enhanced visibility, South Carolina specialty crop growers will have greater capacity to sell their produce. Finally, with additional members, the Association can begin to build a monetary fund to establish the first-of-its-kind South Carolina matching grants program that will give producers the ability to grow their farming operations through infrastructure enhancement and equipment upgrades.

Project Activities

The SC Fruit, Vegetable and Specialty Crop Growers Association (the Association) has been in a state of transition for a number of years. As South Carolina's only comprehensive body of representation for all specialty crop producers, this organization could potentially have more than 500 members, but at the time of this project's approval, less than 100 members were involved. That number has decreased significantly over the project period. To exacerbate this situation, the leadership of this Association has turned over four times in the last five years, which created considerable challenges to the progress of this project. As reported in the first performance report, a new Small Farms Marketing Specialist was hired in November 2014 by the South Carolina Department of Agriculture (SCDA), becoming the third Executive Director of the Association in as many years. However, she resigned in September 2017 and her successor was hired in November 2017.

Another factor that affected specialty crop growers and indirectly, the outcomes of this project, was the historic flooding in October 2015. Despite these challenges, during this project period, the following activities have occurred to re-energize and re-brand the SC Fruit, Vegetable and Specialty Crop Growers Association:

- A public relations firm was contracted to assist with rebranding; the new name "SC Specialty Crop Growers Association" (SCSCGA) was selected, a new logo was designed (included below), and both were approved by the SCSCGA Board of Directors.
- A new SCSCGA website (www.scspecialtycrop.com) was initially designed by SCDA graphic design staff in 2015, and then re-designed again in 2016 to the current site by the public relations firm. Since the most recent launch in July 2016, the website has had 832 sessions from 681 users. Development of fully populated website functions is still in process.
- SCSCGA has been using social media, including Facebook and Twitter, to varying degrees with intentions to rebuild their image, reach more stakeholders, build a larger audience, and promote membership. The effectiveness of this is unknown as changes in personnel resulted in lapses in monitoring. However, visibility has been maintained as the Association is actively promoted through the SC Department of Agriculture's other social media outlets as well.
- With the rebranding process taking place, and the approval of the new logo, the Board of Directors opted to wait a year to implement a new promotional plan, to include offering signage packages with the new name and logo to meet the needs of grower members.

Goals and Outcomes Achieved

The primary outcome of this project was the successful rebranding efforts of the Association. The Specialty Crop Block Grant Program allowed the SCSCGA to put a new name and logo in place to lay a foundation for future impact. While goals to double membership, increase participation at industry meetings, and create greater interaction between the Association and its members have not yet been fully realized, the current Board of Directors and members are now in a better position to accomplish these objectives.

To increase membership of the South Carolina Specialty Crop Growers Association a new website was created. A board member generously donated his services and created the website for free. We then used the funds that were going to be used for the website to purchase educational materials that were provided to members and potential members as incentives to join. The books purchased were "Wholesale Success: A Farmers' Guide to Food Safety, Selling, Postharvest Handling, and Packing Produce" by Atina Diffley and Jim Slama and "Direct Market Success" by Atina Diffley, Jim Slama, and Bob Benenson. Both books were vetted by the South Carolina Department of Agriculture's Consumer Protection Division and Food Safety Team.

A monthly newsletter has been created filled with events and opportunities for members to promote the re-launch initiative for the South Carolina Specialty Crop Association. The new website has a calendar of events that is updated as soon as events are announced. These are example of strategies to increase membership and provide resources for members. By managing the calendar of events, the website traffic has increased.

While many of the goals set out by the original author were not achieved, they were many factors involved. The Executive Director position changed hands twice since the rebranding and relaunching efforts which led to some stalled progress. The association is now in the hands of a new Executive

Director and since December of 2017 when membership was at 0, as of February 2018 there are now 30 members with membership increasing weekly. We are on track to have 100 members by the end of the year. The new Executive Director monitors the website and adds resources and events daily which increases traffic.

Beneficiaries

The 3,077 specialty crop growers and producers of South Carolina are the initial beneficiaries of this project since greater visibility and support most often leads to greater profitability. However, ultimately all South Carolinians benefit as specialty crops become more bountiful and accessible to them locally. Through the increased efforts of visibility of the association mentioned in this report, membership and interest is on the rise. The rebranding and relaunching not only benefits the members through increased education and relationship building but affects the consumers. They are purchasing locally grown fruits and vegetables from South Carolina farmers who have been provided with educational materials on food safety. All of this has been provided through the South Carolina Specialty Crop Association rebranding and relaunch initiative.

Lessons Learned

The greatest lesson learned during this project is the need for leadership stability. The changes in staffing at SCDA led to changes in the Executive Director of the SCSCGA which not only created many stops and starts in the project, but also affected momentum within the Association.

Building on the rebranding that has taken place during this project period, the Association will now turn its focus to promoting and growing membership, providing regional workshops for members, and offering mini-grant opportunities as well as scholarships for regional conferences.

Contact Person

LauraKate Anderson
Marketing Specialist
landerson@scda.sc.gov
803-734-2210

SOUTH CAROLINA

SPECIALTY

Crop Growers

ASSOCIATION

Project Title: Increasing Specialty Crop Consumption through Mobile Markets
Partner: Hub City Farmers Market

Project Summary
The "Increasing Specialty Crop Consumption through Mobile Markets" project seeks to increase the availability of fruits and vegetables to Spartanburg County residents through a Mobile Market program. The Mobile Market purchases food from the Hub City Farmers' Market (HCFM) Urban Farm and vendors throughout the County and surrounding counties at wholesale price and then resells that food through approximately 20 stops each week across Spartanburg County. The HCFM Mobile Market was the first of its kind when it began in 2010. This project was not built on a previously funded project with the SCBGP.

Project Approach
The purpose of this project is to increase the consumption of fruits and vegetables in Spartanburg County to increase business for farmers in the Upstate and access to healthy, local food for Spartanburg County residents. Spartanburg County includes 23 USDA-designated food deserts and falls in the worst 2% of counties nationwide for food insecurity. By taking healthy, local food to people where they live, work, and play the Mobile Market both increases sales for local farmers and meets the growing need for food security throughout the County.

In 2015 the Mobile Market made around 400 stops throughout the County at community centers, businesses, schools, and more. However, at the end of October 2015 the Mobile Market vehicle died. As a result, the Mobile Market did not run until funds could be raised for a new Mobile Market vehicle. We received the final piece of funding needed to purchase a new Mobile Market vehicle in May of 2017 and the Mobile Market began running again in July 2017. From July 10-September 29 the Mobile Market made 190 stops, had 1,442 customers, and distributed approximately 6,000 pounds of produce.

The Hub City Farmers' Market (HCFM) was the project partner for "Increasing Specialty Crop Growth through Mobile Markets." HCFM worked to increase the consumption of local fruits and vegetables through a Mobile Market program which purchased produce from local farmers and then resold them at stops throughout Spartanburg County. The stops included businesses, community centers, schools, and more. From October 2014- October 2015 and July-September2017 the HCFM Mobile Market made approximately 575 stops. From July- September 2017, 1,422 people shopped at the Mobile Market, purchasing $10,331.58 dollars in local food.

The following activities were accomplished during the project period:

- **Marketing** - We chose to market primarily through social media and flyers and did not end up utilizing billboard displays as originally intended.
- **Procurement** - Over the course of the grant-period we worked with over 15 farmers to develop crop plans and purchase produce from the Mobile Market.
- **Mobile Market Stops -** From October 2014-2015 and July-September 2017 the Mobile Market made around 575 stops throughout Spartanburg County. Approximately 50% of these stops were made in food deserts. Choosing stops based on foot traffic was a trial and error process which resulted in the decision to only schedule stops for 8-week time periods, giving HCFM the flexibility to cancel stops after 8 weeks if they were not productive. Demand for Mobile Market stops was much greater than what the Mobile Market was able to accomplish both because there was not enough time to stop at all locations requested and because many of the organizations who requested stops could not supply adequate foot traffic to justify a stop.

- **Grower Communications -** Communication occurred on an informal basis as our Mobile Market Associate reached out to our local farmers via phone and email or was contacted by local farmers to discuss plans for the season for the Mobile Market and how their crop plans would be affected by plans for the Mobile Market. For 2018, several farmers plan to expand their operations to meet the demands of the Mobile Market
- **Grower Meetings -** Group meetings were held in conjunction with the meetings for Farmers' Market vendors to discuss general activities and updates for the Hub City Farmers' Market (HCFM) organization including plans for both the Mobile Market and Urban Farm. Farmers were updated at these meetings or via general communication about progress with funding for a new vehicle and report on Mobile Market success.

Although specialty crops remained the focus of the Mobile Market project, the overall scope of this project also benefited local producers of eggs, cheese, and baked goods. Of those who contributed product to the mobile market, 66% were local farmers producing specialty crops. Through trial and error and shopper feedback it was concluded that adding these goods to the Mobile Market resulted in increased foot traffic which multiplied the sale of specialty crops. Roughly 27% of the Mobile Market project was funded by the SCBGP grant so all costs associated with the sale of non-specialty crop goods were funded by other sources.

Goals and Outcomes Achieved

In terms of Expected Measurable Outcomes from the approved project proposal, the project resulted in the following outcomes:

- **Local Farmers Will Grow/Sell Increase Specialty Crops Production by 10**
  The farmers that we worked with increased their specialty crop production by 5-10% as a result of the project, depending on the size of their operations. Some of this increase was interrupted when the Mobile Market vehicle died and until a new one was purchased (November 2015-June 2017). This meant that farmers in 2016 did not take the Mobile Market into account for crop planning and were leery of doing so again in case the situation repeated. However, we have had several farmers inquire about the Mobile Market's plans for 2018 in the past months with the intention of growing their plans in 2018 to meet Mobile Market needs.
- **SNAP Sales Will Top $1000 on the Mobile Market, with at Least 50 Unique Customers:**
  We were able to hit this goal over the course of the grant, however much work still remains in making SNAP a reliable source of food for our SNAP customers, who must develop a trust in the Mobile Market and its products before they decide to make it a source of regular goods. This requires slow, relationship-building work that the Mobile Market plans to continue with. While SNAP sales on the Mobile Market did not rise significantly during the project period, sales did rise at our stationary Saturday Market by several thousand dollars each year. We believe this is due to several factors including the willingness of the sites hosting the stops to advertise our SNAP program and the opportunity for SNAP clientele to be seen by their coworkers/friends at the location using their EBT cards at the Mobile Market. As a result, we have begun choosing more partners who are willing to advertise our SNAP program and distributing flyers ourselves in low-income neighborhoods close to mobile market stops.
- **Mobile Market Stops Will Increase to 180+ This Year**
  The Mobile Market made 400 stops from October 2014-October 2015 and another 250 stops from July 2017-December 2017. The Mobile Market increased the number of stops it

made exponentially over the course of this grant, going from 62 stops in 2013 to 400 stops in 2015 and, 190 stops in only a two-and-a-half-month period from July 10 to September 28, 2017 (at this rate, the Mobile Market would have made over 700 stops in 2017 if it ran for a full year).

Beneficiaries
Local farmers and the public all benefit from the HCFM Mobile Market program.

In 2015 the USDA designated 23 census tracts in Spartanburg County as food deserts. Additionally, 66% of adults and 41% of 5th-graders in Spartanburg County are overweight or obese. By taking healthy, local food to people where they live, work, and play the HCFM Mobile Market helps to make the healthy choice the easy choice. By accepting and doubling SNAP, we help to ensure that financial means are not a barrier to eating healthy for low-income families.

Local farmers benefit from the Mobile Market because it gives them another outlet from which to sell their produce, encouraging them to grow their businesses without additional time input to market and sell their products themselves. The HCFM Mobile Market purchases an average of 500 pounds per week from local farmers.

Over the course of this grant we purchased $51,000 in local specialty crops and goods from local farmers and producers. Approximately 75% of goods purchased were specialty crops representing around $38,250 of the total $51,000 in spending on products to sell on the Mobile Market. This benefited 21 different farms and businesses in and around Spartanburg County. Moreover, the program benefited over 4,000 individuals by supplying them with healthy, local food and helping to create a healthier Spartanburg County. The ultimate goal of the Mobile Market being increased support for local farmers and consumption of healthy fruits and vegetables to result in increased health outcomes in Spartanburg County, the sale of specialty crops was always our first and foremost goal. However, as previously stated, feedback from the community recommended the addition of non-specialty crop goods which resulted in increased foot traffic and ultimately increased sale of specialty crops.

Lessons Learned
The importance of a dependable vehicle and funding to keep up with maintenance issues cannot be overstated. The old Mobile Market vehicle, which died at the end of 2015, was an old ice cream truck which had been refurbished. The truck was purchased for around $10,000, a very low price due to the high mileage and wear on the vehicle. Although the purchase of this vehicle was easily funded by a small grant, it experienced problems throughout its operation and, as a result, many stops had to be canceled at the last minute, leading to difficulties in building a steady customer base. When that Mobile Market vehicle died in 2015 no funds had been set aside for its replacement, so the entire program had to be paused until funds for a new vehicle could be raised. Even after the purchase of a new truck with less than 80,000 miles on it the new truck still had to be off the road for a week when a part had to be replaced. Through this process we learned that money should be set aside each year for the eventual replacement of a vehicle and budgeted to rent a truck for days when the car is in the shop due to emergency maintenance.

Another lesson learned was related to promotion. We experienced some difficulty with marketing the Mobile Market project through semi-permanent marketing like flyers and billboards due to: 1) the amount of information needed to be conveyed (including multiple stop addresses and times) and 2) the constant change in locations where the mobile market stopped due to multiple factors including

response at the locations, lack of an adequate number of shoppers, and weather. There were negative effects to using print media because we could not change it once it was presented. As a result, in 2018 we are moving to more digital marketing including a greater use of social media and text subscription alerts.

Additionally, even with the success of the Mobile Market, profit from the program is negligible. To run a program like the HCFM Mobile Market successfully funds to pay for a Mobile Market Manager's salary and marketing must be secured from other sources such as grants and sponsorships.

Finally, there are several farmers that the Mobile Market would like to purchase from who are unwilling or unable to deliver their produce to our offices. Unfortunately, the time and gas needed for an HCFM employee to pick these products up from the farmers, some of whom come from as far away as one-hour drive, makes it unfeasible for us to make those trips. If better delivery options or an aggregate food hub could be created the Mobile Market could boast a greater diversity of products and support more farmers.

Contact Person
Caroline Sexton
HCFM Executive Director
(864)585-0905
csexton@hubcityfm.org

Project Title: GrowFood Carolina: SC's Specialty Crop Food Hub
Partner: SC Coastal Conservation League, dba GrowFood Carolina

Project Summary
GrowFood Carolina, a project of the SC Coastal Conservation League's Food and Agriculture Program, is South Carolina's first local food hub. Its mission is to help the local food market reach its full potential, thus securing the future of a regional food supply and ensuring that rural lands remain in agricultural use. The objective is to increase the competitiveness of small-scale specialty crop production to help create a stronger rural economy, spurring job creation, and building capacity in rural communities by connecting rural farm business to the thriving local food movement. GrowFood Carolina aggregates specialty crops within 120 miles of Charleston and distributes them in a wholesale model to local restaurants, retailers and institutions.

South Carolina consumers spend at least $11 billion per year on food. However, less than 10% of it comes from in-state farms. Within the 30-mile radius of GrowFood Carolina, residents consume more than 96 million pounds of fresh fruits and vegetables, 90% of which are imported from out-of-state sources. Simultaneously, SC exports more than 269 million pounds of fresh produce. The disparity is due in large part to a well-developed infrastructure system that benefits large scale agriculture. Produce distributors, packing sheds, and warehouses offer significant advantages to large farmers, particularly in the export arena. Similar opportunities are not available for small and mid-sized farms serving local markets. Small-scale local operators are relegated to roadside stands, unreliable pickup trucks, unknown buyers and markets, and unpredictable and uncontrollable prices. Similarly, restaurants, grocery stores, families, and other buyers struggle to find quality local produce in predictable quantities. Through aggregation, GrowFood Carolina is able to meet this concern.

Specifically, the financial assistance from Specialty Crop Block Grant Program Agreement 14-SCBGP-SC-0045 was used to support the general operations and activities to manage GrowFood Carolina funding the Federal FY14. Grant funding was used to support daily operations that assist in 1) improved management of the increased volume of specialty crops being distributed through the facility, and 2) management of the greater number of farmers participating in the food hub.

Project Approach
On August 31, 2015, GrowFood Carolina's annual gross sales to date totaled $700,503.00, with $560,400.00 revenue paid to our partner farmers. Throughout the grant period, the GrowFood team worked toward this goal through the following activities and other proposed operational efforts from the 2014 SCBGP Project Work Plan.

1. Grower communications – GrowFood staff has conducted new grower outreach, new grower visits, existing grower stewardship visits, crop planning, and educating growers about new variety and/or crop demands
2. Warehousing and aggregation – GrowFood staff has overseen GHP SOPs, the maintenance of warehouse equipment/vehicles, daily grower communications about availability, produce receiving, produce quality inspections, sales fulfillment, and inventory creation and management
3. Sales, marketing and distribution- GrowFood staff oversees outreach efforts for new retail and restaurant customers on a daily basis, as well as weekly availability, restaurant sales, retail sales, retail point of purchase signage, retail merchandising visits and all other marketing activities

Goals and Outcomes Achieved

- NEW GROWER OUTREACH AND NEW GROWER VISITS – during the grant period, largely through the work of the Farm Coordinator, GrowFood developed 15 new partnerships with specialty crop growers. Recognizing the limitations on the General Manager's schedule and capacity couple with the Farm Coordinator's strengths and abilities, these two worked together to add to his responsibilities and increase farm coordination efforts beginning in January 2015. In conjunction with these new partnerships as well as EXISTING GROWER STEWARDSHIP VISITS, GrowFood was able to increase the cultivated acreage of specialty crops by 70 acres during the grant period.
- OUTREACH FOR NEW RESTAURANT CUSTOMERS – during the grant period, GrowFood added 75 new restaurant customers.
- OUTREACH FOR NEW RETAIL AND INSTITUTIONAL CUSTOMERS – After more than three years of relationship building, GrowFood obtained approved vendor status for FreshPoint in October 2014 and Aramark in July 2015. FreshPoint is one of North America's largest wholly owned produce distributors, and Aramark is a large, national food services provider. GrowFood continues to focus on building the customer base within our 25-mile distribution radius, but we also rely on regional partners in order to continue to build demand and provide markets for our partner farmers. We seek to gain regional customers in order to achieve wider distribution without duplicating existing distribution infrastructure.

  As a regional distributor, FreshPoint allows GrowFood to both serve a wider base and maintain single source identification. Aramark is critically important to GrowFood's ability to develop connections to institutional markets. Currently, our relationship with Aramark enables GrowFood to provide fresh produce to the College of Charleston's dining services. Due to supply constraints, we are currently unable to meet the demand of more than one large institutional customer, but the relationship with College of Charleston opens the door for partnerships with many other regional institutions. We will continue efforts to build supply to meet the demand as institutional customers are critical to the success of both GrowFood and our partner farmers.
- PROGRAM CREATION WITH REGIONAL RETAIL BUYERS – Throughout the grant period, GrowFood continued to work directly with Harris Teeter to create seasonal programs for organic blueberries and grape tomatoes. Through these programs, our marketing efforts, and good relationships with the regional produce buyers, we were able to double blueberry sales this past season. Unfortunately, the past season was a difficult one for grape tomatoes, so sales did not increase due to lack of supply. We will continue to create new seasonal programs for products as needed.
- RESTAURANT SALES- totaled $581,459 during the grant period, a 49% increase over the same period last year.
- RETAIL SALES- totaled $317,195 during the grant period, a 24.5% increase over the same period last year.
- MARKETING, ADVERTISING and EVENTS – GrowFood's marketing goal is to ensure that our customers know our farmers. Marketing continues to be tailored to each farmer, specialty crop, and retail location. Merchandising at the retail level is where we spend the majority of our staff time and marketing budget – it is one of the most important things we can do from a marketing perspective to grow specialty crop sales. This marketing also enables and highlights the sale of single-source identified specialty crops which are in high consumer demand currently.

Our marketing efforts continue to enhance the existing Certified SC Grown program by promoting local specialty crops, but also taking those efforts a step further by promoting and creating a brand for individual farmers, their farms, and their specialty crops.

Beneficiaries
More than fifty small specialty crop growers located around the rural areas of Charleston, SC.

Lessons Learned
In addition to the above mentioned activities, GrowFood staff assisted farmers with packaging recommendations for wholesale and retail requirements. Most new partners have not packed for wholesale, so it is necessary to educate growers about appropriate packaging and pack style for each specialty crop. Often, GrowFood encourages growing some unique items that do not fit in standard wholesale boxes, and we help the growers find the most suitable style to maintain the best quality. For example, we helped develop a baby squash, zucchini, and patty pan squash program with Murdaugh Farms. Due to their delicate nature, we advised the grower to pack the squash in quart clamshells instead of loose in ½ bushel boxes. This adjustment increases shelf life and enables retail distribution.

Despite meeting the goals for this project, barriers and challenges continue to exist. Adequate post-harvest handling and GAP certification continue to be our biggest challenge to meeting and exceeding goals. In many instances, GrowFood is limited to selling growers' products through only one channel – restaurants- due to the lack of post-harvest handling knowledge and practices. While GAP certification is voluntary and not required by all customers, GrowFood does anticipate that certification will be a requirement in the near future. Increasingly, retailers, institutional customers and food service buyers require GAP certification as a condition of purchase. For example, Aramark and FreshPoint will only purchase products from farmers with GAP certifications, and Harris Teeter will likely require GAP certification very soon.

When this project proposal was submitted in 2014, only five GrowFood farmers were GAP certified. Throughout the grant period, we've focused on facilitating GAP certifications. We contracted with a consultant, a former SC Department of Agriculture employee, to assist farmers in preparing for the GAP audit. This year our efforts have led to the certification of three partner farmers. We will remain focused on this effort throughout the coming year with the goal of ten new certifications.

Contact Person
Sara Clow, Operations Manager
Grow Food Carolina
843-727-0091
sara@growfoodcarolina.com

Project Title: Growing Farmers and Local Food
Partner: Lowcountry Local First

Project Summary
From use of these project funds, Lowcountry Local First commenced a strategic marketing campaign in order to increase the number of consumers eating specialty crops, as well as increase the number of specialty crop growers producing these crops locally.

This was achieved by promoting our Growing New Farmers program, which is focused on apprenticeship, incubation and land linking services for new farmers. Lowcountry Local First had great success with the program with nearly 80 applicants each year with many coming from outside the state. For 2015, 25 apprentices were accepted into the program. We wanted to target emerging specialty crop producers in the state who were more likely to continue to farm in South Carolina and help spur the development of additional apprentice programs.

Additionally, we knew that the economic, environmental and health benefits of eating locally are numerous. According to the *Small Farms Mean Big Business Study,* $11 Billion is spent on food by residents of South Carolina, yet 90% of what consumers eat is sourced outside the state. We wanted to build upon our current 'Eat Local Challenge' marketing campaign to build greater awareness of why and how to eat locally.

It is imperative to the growth of agriculture in South Carolina to 1) increase the number of specialty crop producers and 2) to increase demand of locally grown specialty crops by consumers. The marketing efforts of Lowcountry Local First are highly regarded in the Lowcountry and we knew that with additional support we could elevate specialty crop producers to an even greater extent.

Growing Farmers and Local Food project met the following objectives:

- Increased the number of in state applicants in the Growing New Farmers Program
- Increased awareness of what specialty crops are local and in season in SC
- Increased the number of consumers requesting locally grown fruits and vegetables
- Increased the number of individuals taking the 'Eat Local Challenge' in the spring
- Increase the amount of money being spent on specialty crops in the tri-county area

This project built on past support from the Specialty Crop Block Grant Program (SCBGP) in that it allowed us to build additional awareness of our Growing New Farmers Program as well as the Dirt Works Farm. This program was launched in large part due to the assistance from SCBGP funds and to date has graduated over 107 apprentices (with an additional 25 current participants) through the program. All participants reported increasing their competency in production, harvesting, packing, and farm business practices. Of the full-time program participants from 2010- 2012, 90% are still currently working in agriculture industry; several of which run farming operations. Four specialty crop producers and their six specialty crop apprentices are now at the Dirt Works Incubator Farm and are selling to restaurants, farmers markets, wholesalers, and directly to consumers. As a program launched with SCBGP funding, marketing the program has supported its continued success and generated additional interest from within the state. We also believe it has encouraged other communities to replicate the program which would support many of the objectives of the *Small Farms Mean Big Business* report.

Project Approach

Date	Project Activity		Achieved Outcome
October 2014	Developed ads for appropriate media outlets that targeted apprentices for the Growing New Farmers Program		Targeted Facebook ads were created for applicants to the Growing New Farmers Program. 44% of participants indicated the program information was found via social media.
October 2014	Developed questionnaire for applicants that would include interest in being a specialty crop producer, where the applicant is located and how they found out about the program		Questionnaire included specific production & crop focused questions (size of acreage, organic, conventional) allowing for placement of apprentices with relevant specialty crop mentors. Based on results, apprentices lived in the low country area with a few exceptions of apprentices moving to South Carolina specifically for the Growing New Farmers Program
November / December 2014	Placed ads for Growing New Farmers Program		Targeted Facebook ads were created for applicants to the Growing New Farmers Program. 44% of participants indicated the program information was found via social media. Total applicants at 40.

January 2015	Developed a year-round radio, print and social media campaign on eating local specialty crops		Revamped LLF's Eat Local "rack card" featuring Growing New Farmers Program, Dirt Work's specialty crop farmers, and a need to update the "ripe chart" became apparent
February / March 2015	Developed 'Eat Local Challenge' webpage, survey, ads, social media campaign and blog posts		The 'Eat Local Challenge' was featured in Charleston Magazine, The Post & Courier, Charleston City Paper, The Bridge 105.5, Facebook, Twitter, and Instagram. Blog post targeted farmers markets featuring specialty crop producers, in season specialty crops, restaurants offering specialty crop dishes made specifically for the ELC, and specialty crop farmers with CSAs. Webpage: lowcountrylocalfirst.org/eat-local-challenge
March 2015	Launched the 'Eat Local Challenge' (ELC)		Through the advertising outlets above, the 'Eat Local Challenge' saw an increase of 312% participation from 2014 to 2015 (625 participants)
May 2015	Gathered data from surveys from the ELC		Survey results of the 625 participants: $123,000 shifted to local specialty crop farmers with 35% of participants spending over $75 a week on specialty crop food

May 2015	Created press releases, eblasts, social media and farmer information on the number of ELC participants and amount of money shifted to local		Above data results of the ELC featured on social media, ELC webpage, LLF e-blast, Charleston City Paper, and The Post & Courier
May 2015	Redevelopment and reprint seasonal specialty crop "ripe chart"		Ripe Chart highlights the seasonal availability of specialty crops and educates consumers on the importance of supporting our local specialty crop producers. These materials were distributed during the Eat Local Challenge awareness event at Dirt Works as well as at year-round farmers markets and events hosted across the region.
May 2015	Hosted 'Eat Local Challenge' Awareness Day to bring ELC participants to a specialty crop farm		ELC Awareness Day hosted 45 participants in the ELC. The event allowed LLF to garner further attention to the importance and availability of locally grown specialty crops. Staff also provided farm tours to introduce them to new and beginning specialty crop producers and to see firsthand the plantings and demonstrations of the incredible variety of specialty crops grown on the farm. LLF also announced the winners of ELC.
January 2016	Surveyed specialty crop producers including those at Dirt Works incubator farm and other tri-county farmers on sales for 2015		

Goals and Outcomes Achieved

Goal 1 - Increase the number of qualified applicants in our Growing New Farmers Program who want to be specialty crop producers – ACHIEVED

- Performance measure: Number of applicants will increase by 20
- Benchmark: In 2014 we had 20 applicants apply for the apprentice program. In 2015, 40 applied to the program, an increase of 100%.
- Recommendation / Conclusion: Based upon the data collected in the applicant survey (one applicant's data file was corrupted and not included), Social media ads were the best outlets for engaging applicants (44%) with Word of mouth coming in second (15%) and newspaper (13%). The survey also found that 100% of the 40 applicants were interested in specialty crops with

97% interested in organic production, 34% interested in Small-scale (3-10 acres) and 27% in Market Gardens (1-2 acres).

Goal 2 - Increase the number of people taking the 'Eat Local Challenge' in April 2015 – ACHIEVED

- Performance measure: 600 people signing up online to take the 'Eat Local Challenge'; $30,000 shifted to local food with 60% of participants completing the survey
- Benchmark: 200 people took the 'Eat Local Challenge' in 2014. 'Eat Local Challenge' 2015 had 625 participants exceeding our goal by 25. This is a 213% increase in participants with 40% of participants completing the survey. The results: $123,000 shifted food spending to local specialty crop producers, 35% of participants spent $75 or more on locally grown specialty crops, 100% of survey participants said they would continue to support specialty food crops beyond the 'Eat Local Challenge'!
- Recommendation / Conclusion: Surveyed participants responded that they heard of the 'Eat Local Challenge' through LLF's social media outlets, LLF's e-blast and word of mouth. To expand beyond LLF's reach, it is important to engage community partners in the 'Eat Local Challenge' so that we may continue to increase our reach.

Goal 3 - Specialty Crop Producers will see an increase in sales – ACHIEVED

- Performance measure: Dirt Works growers and other tri-county specialty crop producers will show an increase in sales from 2014.
- Benchmark: Sales for 2014 and Census data

Beneficiaries

Lowcountry Local First is currently impacting approximately 700,000 people through the Buy Local and Eat Local Initiatives. Through these initiatives, Lowcountry Local First provides program and networking support for local businesses and farmers while cultivating a community that values the importance and economic impact of buying local.

The 'Eat Local Challenge' has helped to educate and assist farmers, restaurants, and the local community on many key local food issues.

Those who benefitted from "Growing Farmers and Local Food" included existing specialty crop producers, consumers and emerging farmers. Additionally, support of this program benefited the health of the community at large, created jobs and generated economic activity. Our existing projects have connected us with over 150 restaurants, 80 farms, 107 apprentices, 3,000 CSA members, 130 farmers and food system leaders, with a potential reach of over 700,000 in the tri-county area.

Specialty Crop producers benefited by seeing an increase in demand of their product through CSA customers, restaurant sales, farmers markets and grocery store sales during the 'Eat Local Challenge'. Emerging specialty crop producers benefited by learning about our Growing New Farmers Program, which offers apprenticeship and incubation. The program includes collaboration with the College of Charleston's Continuing and Professional Education program to tailor the certificate to fit both the needs of the participants as well as the requirements of an accredited program. Designed for individuals with varying degrees of education levels, socioeconomic status, and learning styles, the program creates opportunities for both collegiate and non-degree seeking individuals to secure a highly marketable accredited certificate. Utilizing best practices from national models, the Sustainable Agriculture Certificate creates opportunities for anyone interested in employment in specialty crop farming or food system employment to gain competency in production, business, and marketing through classroom and

field training at the Dirt Works Incubator Farm. This program will not only create jobs directly related to specialty crops but also provide a program for participants interested in the broader context of the local food system in supporting specialty crop jobs such as extension services, food distribution, policy, and technology to ensure access to healthy local food for everyone in the community.

This past April with the marketing of the 'Eat Local Challenge', 625 people participated. Of the 40% survey responses, most people shifted $75 or more a week to locally grown specialty crops. If everyone in the tri-county shifted just $10 per week for one month to locally grown specialty crops, we would create an economic impact of $25,240,000. Also of note, 100% of survey respondents say YES, they would continue to incorporate local food beyond the challenge, so multiply those numbers for one year, and you get more than $1,476,000 shifted to local food annually from just those 625 individuals.

Additionally, with an increase in new specialty crop farmers and supporting the viability of existing ones we have had the opportunity to move the needle closer toward plugging that economic leak and capturing a larger share of that $11 billion spent on food each year.

Lessons Learned

Goal 1 - Increase the number of qualified applicants in our Growing New Farmers Program who want to be specialty crop producers

- Lessons Learned: Participants are increasingly discovering the program online but alternatively, many of our rural applicants are hearing about us from word of mouth so it is important to have both a digital presence and a personal presence by sending folks out into more rural communities to conduct outreach.
- Participants are highly interested in small-scale production of specialty crops with a focus on using organic production methods.

Goal 2 - Increase the number of people taking the 'Eat Local Challenge' in April 2015

- In order to engage more participants in 2015, we challenged businesses to create teams to compete against each other. This was very successful in engagement, but the tracking was tedious for team leaders and could be more automated in the future.
- During the months leading up to the 'Eat Local Challenge', we realized our print material resources were very low for participants and the need for an updated "Ripe Chart" became apparent. After receiving many ads in kind, we were able to allocate funds to the revamping and printing of a "Ripe Chart." The chart is very simple to read and clearly states which specialty crops are in season allowing for ease of knowledge and buying power for ELC participants.
- With an increase in ELC participants and knowing they were already engaged in shifting money towards specialty crops, we wanted to get them in front of specialty crop farmers. This was achieved by the 'Eat Local Challenge' Awareness Day.

Contact Person

Jamee Kelley
843-740-5444
jamee@lowcountrylocalfirst.org

Project Title: Pee Dee Region Food Hub Development
Partner: Palmetto Agribusiness Council, Marion County

Project Summary
The Pee Dee Food Hub (the Hub) opened its doors and began distributing produce in May 2016. This was after a year of redeveloping marketing strategies and redesigning a facility to accommodate the needs for activities including the marketing, sales, aggregation and distribution of locally grown produce. The mission of the Pee Dee Food Hub is "to connect quality safe food from local farmers to local markets". The four market categories are Farm to: Workplace, Restaurants, Grocery and Institutions. In the first eight months of business more than $87,000 of fresh produce was distributed to 10 businesses and organizations representing over 230 families (CSA memberships), a grocery store chain and six key restaurants.

The Pee Dee Food Hub is in the beginning stages of helping growers strengthen and preserve a diverse, healthy, regional food supply in the northeastern section of South Carolina. The Hub has established grower and warehouse guidelines to ensure food safety and traceability. Currently, we are working with 30 specialty crop growers from 8 counties around the Pee Dee Region. The hub is utilizing about 8000 square feet within a 25,000 square-foot building with the opportunity to expand in many directions as the markets expand.

The purpose of this project was to help local specialty crop growers strengthen their ability to satisfy wholesale, retail and institutional market demand, thereby increasing annual sales for the grower. The Hub is achieving this goal by extending services to the growers that include sales, marketing, aggregation and product delivery. These project activities are starting to have an impact on the regional growers. In the first few months of business the Hub helped local growers generate over $50,000 of new farm gate revenue with plans to grow and expand every quarter.

There is an expectation for this project to have a long-term strong economic impact on the Pee Dee Region of South Carolina. We see this starting with small to medium sized specialty crop farmers and expanding with medium to larger specialty crop farmers as our packing facility expands. Many new and beginning farmers who are looking for niche markets with specialty crops are able to expand as a result of the efforts the Hub has put into food safety and traceability practices. Additionally, growth is anticipated as commodity growers are beginning to diversify their operations to include growing a variety of specialty crops. This shift is primarily a result of commodity prices being very low for the past several years.

Project Approach
Sales and Marketing are the catalysts of the Pee Dee Food Hub. The sales team has called/visited with over 100 businesses and organizations regarding the services provided to specialty crop growers. At the time of this report, thirty (30) growers from eight counties around the Pee Dee region of SC are making sales through the Hub.

Pee Dee Food Hub sales started slower than expected due to many situations that are shared in this report. However, due to re-evaluation and adjustments, it is expected that the Hub will reach a breakeven point sooner than expected.

Additional activities include:

- Renovation of 12,500 square feet of the warehouse facility
- Development of a specialty crop farmer advisory board has been organized and is establishing bylaws, policies, and procedures to assist in creating a stable and successful future for the Hub

- Staff has become well versed and trained in SC procurement laws, specialty crop planning, food safety needs, traceability, and quality standards for fruits and vegetables
- More than sixty on-farm visits with specialty crop growers have taken place
- Vegetable field day was attended (Hosted by Clemson Extension)
- Local outreach meetings were held in Marion (11/16/16), Lake City (11/19/16), and Lydia (11/20/16). More than thirty growers attended these meetings
- Grower Guidelines were established
    - Condensed to one page (expectations from the grower and Hub deliverables)
    - Includes a full breakdown about food safety and delivery specifications
    - Conferred with insurance agencies in its development
    - Currently working to get all growers to participate in special food safety, handling and traceability trainings
- Crop Planning
    - Product breakdown for each biweekly delivery for 2017 farm share is completed
    - Established a database of specialty crops produced and/or growers with previous specialty crop histories entered for each farm
    - Held meetings with 45 specialty crop growers and setting up acreage to be grown for Spring 2017
- Food Safety Certifications
    - HACCP – Working with Clemson University on an individual pilot program dealing directly with the Hub warehouse
    - Attended two GAP audits to learn firsthand what growers must go through to achieve certification
    - Worked directly with one farmer in Marion County to get his sweet potatoes GAP certified within the first year of operation

Goals and Outcomes Achieved

Goals from Project Proposal	*Actual Accomplishments*
50 Growers (10 new, 20 diversified, 20 existing)	30 Growers (1 new, 3 diversified, 26 existing)
50 Restaurants services	6 Restaurants, 1 grocery store, 230 CSA shares
$250,000 Gross Sales first 12 months	12-month delay in opening; $87,000 sales in first 8 months of operation

The initial plan was to have the building completed for use in August 2015. We were to work with 50 specialty crop producers to supply 25 restaurants in the Myrtle Beach area. It was reported that there are 1200+ restaurants in the Myrtle Beach area. While this is true, we soon found that only about 40 or so would be our real target customers. They only require a limited amount of volume and are spread over a 50 mile stretch of the coastline of Horry and Georgetown Counties.

A meeting was arranged with our partners to help them understand the plans and projections. We discussed the timelines and the need to make some timely adjustments. At the time there were several concerns about the original timing and goals of the Pee Dee Agriporium project. We reviewed, reevaluated and directed the facility and marketing changed in a way it would successfully benefit the project.

Their concerns over the original plans, prior to the Director being hired, were simply due to the lack of agricultural knowledge in the initial planning process. The current Pee Dee Food Hub staff has more than 50+ years of combined agricultural knowledge in specialty crop production and business backgrounds. A new approach was taken to look at some reasonable adjustments and the need to do

more research on ways to create a successful future for the Pee Dee Food Hub. In the interim, we had planned to work with 10 key farmers to service a few restaurants in Fall of 2015, however, the statewide flood terminated these efforts. The facility was redesigned to best fit the present and long-term needs of the Pee Dee Food Hub after a long debate and battle with the architect and design team. A compromise was made, and construction started in late January of 2016 and was completed in May of 2016.

The bottom line is that corrections have been made and the Pee Dee Food Hub has started slower than expected due to many situations as explained above, however, because of our reevaluation and adjustments we expect to expand and grow faster than was first projected. This should allow us to reach a breakpoint sooner than expected. This assessment is derived from lots of research as well as the 50+ years of combined agricultural, specialty crop and agribusiness background of the Food Hub staff. We are working with new growers, and the goal is to grow the income to $500K+ in 2017 as we move to be self-sustaining over the next two years. Achieving this target will be possible by having 1200+ CSA partners, 18+ restaurants, 10+ grocery stores and 5+ institutions.

Beneficiaries

We are currently working with 30 specialty crop growers and will expand significantly as we increase demand in 2017. These current and future specialty crop growers will generate new and additional markets for the produce they produce. Some of the new growers will be able to establish new operations with a base of the business being developed around the success of the Pee Dee Food Hub's efforts. In 2016 the farm gate income looks to be well over $50,000 and will grow substantially in 2017. This also has a tremendous impact on the rural economy around the Pee Dee area as you calculate the multiplier effect.

We are seeing some outstanding qualitative results as well. Everyone is very excited about what is happening with the Pee Dee Food Hub. All of the customers are very supportive and complimentary about the delivery of local produce being brought directly to them. They are excited about supporting the local specialty crop farmers. The local and regional media have been very supportive as we have been featured in/on: SCDA Market Bulletin, VIP Magazine, Playlist Publication, SCNow, Florence Morning News, The Produce News, TV 13, TV 15, Southern Farm Network, SC Living Magazine and many others. Most of these are feature stories that report on the positive impact with local specialty crop producers.

Lessons Learned

- Do your research and understand how it will relate to your specific location and conditions
- Get some good help in putting together some good numbers and formation to create a good performance and business plan
- Build good collaborations with other agricultural peers
- Work closely with Clemson PSA and others on good crop planning
- Get grower buy in with quality, quantity, food safety and traceability
- Evaluate your business model and know where your margins need to be to create success
- Logistics is imperative

Contact Person

Jody Martin, Director
843-431-6001
843-250-7900
jody@PeeDeeFoodHub.com

Project Title: Improving Control of Southern Blight and Minimizing Losses in Tomato Crops with Use of Effective Fungicides

Partner: Clemson University, Dr. Anthony Keinath, Primary Investigator

Project Summary

Southern blight, caused by the soilborne fungus named *Athelia rolfsii* (formerly *Sclerotium rolfsii*), is a persistent disease affecting tomato throughout South Carolina. The fungus survives in soil in the form of sclerotia (hardened nuggets). Several fungicides were tested in laboratory and field experiments to find out which ones were the most effective. In the laboratory, Priaxor fungicide sprayed directly onto fungal sclerotia or onto tomato stems inoculated with sclerotia reduced germination and fungus growth. The fungicide Fontelis applied to tomato stems also reduced germination and growth. In field experiments in 2015 and 2016, the fungicides Cabrio, Fontelis, and Priaxor were applied twice after transplanting and Blocker was applied once at transplanting. Priaxor and Blocker reduced the number of tomato plants affected by southern blight compared to the nonsprayed control in both years, whereas efficacy of Cabrio and Fontelis varied. Blocker, however, stunted 43 to 75% of the plants. Although fruit number and weight did not differ among treatments in either year, Priaxor and Fontelis followed by Cabrio increased fruit weight by 56% and 29%, respectively, relative to the nonsprayed control in 2016. Priaxor applied alone or Fontelis followed by Cabrio can be applied to control southern blight on tomato.

This was a completely new project identified based on direct concerns about southern blight from tomato growers in SC. It was not related to any previously funded project.

Project Purpose

Southern blight, a disease caused by the soilborne fungus named *Athelia rolfsii* (formerly *Sclerotium rolfsii*) is a well-known problem of tomato, pepper, eggplant, bean, and other specialty crops. The disease is called "blight," because it looks like a wilting and yellowing of the entire plant. The disease is called "southern" blight because the fungus cannot survive the winter north of the Mason-Dixon Line. A girdling stem lesion just above the soil line destroys the tissues in the stem that move water and nutrients up and down inside the plant. The fungus usually produces characteristic signs when growing on a plant: coarse, white, thread-like growth and dark reddish brown sclerotia (survival structures) that are about the size of cabbage seeds. The sclerotia allow the fungus to carry over in the soil for many years.

Fungicides registered against southern blight fall into four different FRAC Groups (7, 11, 14 and 44), so one obvious question is whether the FRAC Groups differ in effectiveness. If more than one active ingredient is effective, then they could be combined into a spray program that takes into account rotations between the different FRAC Groups.

Most of the fungicide labels direct growers to apply the fungicide at transplanting; however, southern blight does not show up in South Carolina until mid-May when soil temperatures warm to 80°F. Is it better to apply fungicides very early in the season, or to wait several weeks after transplanting and apply them closer to the time the fungus is active? This is one of the most important questions that need to be answered by the experiments proposed in this project.

The objectives of this project are:

- to compare fungicides currently labeled to control Southern blight on tomato;
- to find out when fungicides must be applied to work the best; and

- to develop one or more spray programs for Southern blight which follow the label requirements for rotation of active ingredients in the same FRAC Group.

Since tomato growers in South Carolina switched from using methyl bromide to other fumigants, growers of both fresh market and processing tomatoes have reported increased losses to the disease Southern blight. One grower reported losses as high as 10-15% in a "bad" year, and as many as 70% of the plants on a small farm had southern blight in summer 2015. Because many of the new fumigants have safety precautions and restrictions that make them more time-consuming, labor-intensive, and expensive to apply, growers are looking for alternatives to soil fumigation to control soilborne disease problems like southern blight.

Project Activities

Fourteen laboratory experiments, six more than planned, were done in which sclerotia were treated with fungicides and germination of sclerotia and fungal growth were measured. Nine experiments were done on filter paper in petri dishes, and five experiments were done on tomato stems in petri dishes. Two greenhouse experiments were done, but very little southern blight developed (see Lessons Learned section). Three field experiments, one more than planned were done. Two experiments were conducted as planned in artificially infested soil at the Clemson Coastal research station, and one additional experiment was done in a naturally infested field on John's Island, Charleston County, with a cooperating socially disadvantaged grower.

In the field experiments, any more plants were diseased with southern blight in 2016 than in 2015 or in the grower field (Table 2). Overall "disease pressure" influenced which fungicides were effective. With low pressure in 2015, Fontelis and Cabrio, both applied alone, were effective, but these two fungicides were ineffective with higher pressure in 2016. However, Priaxor was effective in both 2015 and 2016 at CREC. In addition, Fontelis plus Cabrio was effective at high disease pressure in 2016.

In the field, both FRAC Group 7 (Fontelis, Priaxor) and FRAC Group 11 (Cabrio, Priaxor) fungicides were effective against southern blight, but in the laboratory experiments, FRAC Group 7 fungicides were more effective than fungicides in FRAC Groups 11, 14, and 44. However, the FRAC Group 7 fungicide Endura (active ingredient boscalid) was less effective than two other FRAC Group 7 fungicides, Sercadis and Fontelis, so Endura was not tested in the field. Interestingly, Priaxor was more effective in the laboratory than either Cabrio or Sercadis, the two fungicides that make up Priaxor.

This project involved and benefitted only specialty crops.

Goals and Outcomes Achieved

The Expected Measurable Outcomes were a 75% reduction in the number of plants with southern blight and a 25% increase in fruit produced on plants grown in infested fields. (The original Expected Measurable Outcome of 50% was modified based on the results of the 2015 experiment.) In 2015, when disease was lower, 4 fungicides, Blocker, Fontelis, Priaxor, and Cabrio reduced disease by at least 75% (Table 2). In 2016, only the fungicide Blocker met the goal for reduction in diseased plants. However, Blocker stunted plants in both years. A few plants still yielded fruit, but the mean weight from Blocker-stunted plants was 81% lower than the nontreated control in 2016. The combination treatment of Fontelis followed by Cabrio met the original goal of a 50% yield increase compared to the nontreated tomatoes, and Priaxor met the adjusted goal of a 25% yield increase.

Table 2. Results from the and 2015 and 2016 field experiments with Southern blight of tomato

Treatment	Year	Location	Percentage Diseased Plants*	Percentage Control**	Marketable Fruit Weight per Plot (pounds)	Percentage Yield Increase***
None	2015	CREC	17.6 a	0%	2471	NA
Blocker	2015	CREC	0.0 b	100%	2384	NA
Fontelis	2015	CREC	4.0 b	77%	2552	NA
Priaxor	2015	CREC	2.1 b	88%	2120	NA
Cabrio	2015	CREC	2.6 b	85%	1827	NA
Aprovia Top	2015	CREC	11.7 a	34%	1778	NA
Serenade Soil	2015	CREC	20.9 a	-19%	1432	NA
None	2016	CREC	76.2 A	0%	1715	0%
Blocker	2016	CREC	1.9 C	98%	320	-81%
Cabrio	2016	CREC	47.0 AB	38%	1276	-26%
Fontelis	2016	CREC	61.2 AB	20%	1908	11%
Priaxor	2016	CREC	34.6 B	55%	2220	29%
Fontelis, then Cabrio	2016	CREC	37.9 B	50%	2669	56%
None	2016	Grower	14.8 Z	0%	Not done	Not done
Fontelis	2016	Grower	26.6 Z	-80%	Not done	Not done
Priaxor	2016	Grower	8.4 Z	43%	Not done	Not done

*Means with different letters differ significantly at a high probability level of 0.01 (equivalent to 99% confidence).
**Calculated as 1- (% diseased in treated)/ (% diseased in none).
***Calculated as (weight of treated – weight of none)/ (weight of none). NA = not applicable, since there were no differences between fungicides and nonsprayed.

The overall conclusions from this project are that Priaxor applied alone or Fontelis followed by Cabrio can be used to control southern blight on tomato.

Beneficiaries

Approximately 243 beneficiaries, primarily tomato growers and some Extension personnel, received information. All four groups of beneficiaries targeted by the SCDA Specialty Crop Block Grant Program were reached: beginning farmers, socially disadvantaged farmers, USDA certified organic farmers, and Certified SC Grown members. Each communication included information on how to diagnose southern blight in the field, how the pathogen survives between crops, and how to prevent and manage southern blight with effective fungicides. Information on the costs of the two effective fungicide programs also was provided to beneficiaries. Two applications of Priaxor cost $72/acre while the four applications of Fontelis and Cabrio (two applications of each fungicide) cost $152/acre so that growers could estimate the input costs required.

The average yield loss to southern blight in 2016 in the non-sprayed plots, relative to the Priaxor and Fontelis plus Cabrio treatments, was 30%. In 2016, the South Carolina tomato harvest was worth $29.6 million. The estimated loss to southern blight on large, commercial farms is 4.5% (Graham Sanders, Seaside Farm, April 4, 2014), so controlling southern blight would have a potential economic impact between $1.3 million (at a 4.5 % loss) and $8.9 million (at a 30% loss), based on 2016 prices and value.

Project accomplishments were distributed in four ways: by media releases, broadcast media, written publications, and oral presentations.

*Two media releases were written by Clemson CAFLS/PSA media personnel.

- Melvin, J. 2016. Clemson scientist takes the fight to Southern blight on tomatoes. Clemson Media Release, April 28, 2016. http://newsstand.clemson.edu/mediarelations/clemson-scientist-takes-the-fight-to-southern-blight-on-tomatoes/

- Attaway, D. 2017. Clemson Extension makes new fungicide recommendations for Southern blight. Clemson Media Release, August 2, 2017. http://newsstand.clemson.edu/mediarelations/clemson-extension-makes-new-fungicide-recommendations-for-southern-blight/

*The PI, A. P. Keinath, was interviewed about southern blight on RFD-TV on May 12, 2016.

*Eight oral presentations were made to beneficiaries to communicate results of this project; seven talks were for vegetable growers and one to Clemson Extension agents.

- 2016 Update on Vegetable Diseases. Pre-Plant Growers Meeting, Charleston, SC, Feb. 10, 2016. 45 vegetable growers.

- Update on Fungicides to Manage Southern Blight. Midlands Vegetable Production Meeting, Pelion, SC, February 16, 2016. 45 vegetable growers.

- Update on Fungicides to Manage Southern Blight. Pee Dee Vegetable Meeting, Turbeville, SC, March 3, 2016. 60 vegetable growers.

- 2017 Fungicide Recommendations for Vegetable Diseases. SC Ag Expo, Florence, SC, January 12, 2017. 44 vegetable growers.

- Fungicides for Southern Blight: Results of 3 Years Testing. Pre-Plant Growers Meeting, Charleston, SC, Feb. 1, 2017. 59 vegetable growers.

- 2017 Fungicide Recommendations for Vegetable Diseases. Upstate Commercial Vegetable Meeting, Greenville, SC, March 28, 2017. 30 vegetable growers.

- Disease and Insect Management for Organic Vegetable Production. Columbia, SC, Aug. 15, 2017. Approximately 50 organic vegetable growers.

- Updates from CREC Vegetable Pathology Research and Extension. Clemson Extension Commercial Horticulture Team meeting, Charleston, SC, Sep. 28, 2017. 10 Extension agents and others.

*Three publications were produced as part of this project: a progress report of the 2015 field experiment for Plant Management Network, an Extension fact sheet available online, and an article in the scientific journal Crop Protection (currently available online, to be published in the Nov. 2017 issue of the hard-copy journal). See Additional Information section.

Lessons Learned

In the 2016 field experiment, sclerotia of the fungus were added to the soil in the spring before the raised beds were formed, instead of adding them the previous fall, as was done in fall 2014 prior to the 2015 field experiment. This change greatly increased the level of Southern blight from a maximum of 20% in 2015 to over 75% in 2016, probably because sclerotia did not die out over winter before the experiment began.

We could not adequately reproduce southern blight on tomato in the greenhouse. Two greenhouse experiments were attempted in which sclerotia were placed directly on the bases of the tomato stems. Despite providing humidity, supplemental heating, and a germination stimulus, only 2 of 36 plants became infected.

Contact Person

Anthony P. Keinath
tknth@clemson.ed
843-402-5390

Additional Information (Attachments)

Keinath, A. P., and DuBose, V. B. 2017. Management of southern blight on tomato with SDHI fungicides. Crop Protection 101:29-34. DOI:10.1016/j.cropro.2017.07.013

Keinath, A. P. 2017. Managing Southern Blight on Vegetable Crops. Clemson Univ. Extension HOR03. www.clemson.edu/extension/publications/files/horticulture/HOR03-Managing-Southern-Blight-on-Veg.pdf

Keinath, A. P., DuBose, V. B., Rushton, M. D., and Conrad, C. D. 2016. Comparison of fungicides and application intervals to manage Southern blight of tomato, 2015. Plant Dis. Manag. Rep. 10:V028. Online publication. doi: 10.1094/PDMR10.
http://www.plantmanagementnetwork.org/pub/trial/pdmr/volume10/abstracts/v028.asp

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Horticulture

CLEMSON COOPERATIVE EXTENSION

Managing Southern Blight on Vegetable Crops

Anthony P. Keinath

Southern blight is a disease of over 1,200 crops and weeds in the southern half of the United States. Among the vegetable crops affected are tomato, pepper, eggplant, snap bean, Jerusalem artichoke, and occasionally cantaloupe, watermelon, and pumpkin fruit. Grasses and grains are not attacked. In South Carolina, southern blight is most common on tomato and pepper.

Symptoms and Signs

The typical symptom of southern blight on tomato, pepper, eggplant, bean, and Jerusalem artichoke is a reddish-brown, dry canker on the stem at the soil line. As the stem rots, the entire plant wilts and turns yellow. Normally, the fungus is not active until the soil temperature reaches 80°F. However, stem and root rot sometimes start on young plants within a few weeks of transplanting. Cucurbit fruit start rotting on the underside when they are in contact with wet soil.

The characteristic signs of the southern blight fungus are a thick, coarse, white mold on stem cankers and small, round, brown sclerotia. Sclerotia are white at first and turn brown as they mature. On rotting fruit lying on the ground, the mold growth may extend up to an inch away from the fruit.

Southern Blight Fungus

The southern blight fungus (scientific name *Athelia rolfsii*) is widespread in many soil types throughout the southern states. It is well adapted to survive in soil. Sclerotia that form on diseased plants end up in the soil after tillage. Sclerotia are resistant to drought, heat and cold but not to prolonged freezing temperatures.

The fungus needs plenty of oxygen to grow, which is why symptoms usually are found at the soil level on stems rather than deeper in the soil on roots. Normally, the fungus does not produce spores.

Management Options

Cultural Practices

- Maintain soil pH at the level recommended for each crop. Southern blight is worse in low pH soils.
- Plant vegetable crops early so that fruit are set and harvest can start before southern blight appears.
- Turn the upper layer of soil by plowing. Burying sclerotia will deprive them of oxygen and kill them.
- In small plantings, remove diseased plants from the field.
- Wait 12 months before planting another susceptible crop in a field in which southern blight develops. Some of the sclerotia that form on diseased plants will die during winter.

Fungicides

- Fungicides must be applied before symptoms are seen.
- No organic-approved fungicides are effective.
- For fungicides that can be used on beans and Jerusalem artichoke, see the current edition of the Southeastern U.S. Vegetable Crop Handbook at www.thepacker.com/guides/Pest-production-guides.
- Eggplant is partially resistant to southern blight, and fungicides are not recommended.
- Cucurbit fruit rot usually does not reach economic thresholds for a fungicide treatment.

Fungicides Recommended for Tomato and Pepper

Fungicide Program*	Application Schedule (weeks after transplanting)	Rate	Est. Cost/ Acre
Priaxor	5 & 7 weeks	8 fl oz	$ 75
OR			
Fontelis followed by Cabrio	1 & 3 weeks and 5 & 7 weeks	16 fl oz 24 fl oz	$160

*Do not apply both Priaxor and Cabrio to the same field.

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Management of southern blight on tomato with SDHI fungicides

Anthony P. Keinath*, Virginia B. DuBose

Clemson University, Coastal Research and Education Center, 2700 Savannah Highway, Charleston, SC 29414-5329, USA

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Southern blight

ABSTRACT

Southern blight, caused by the soilborne basidiomycete fungus *Athelia rolfsii* (formerly *Sclerotium rolfsii*) is a persistent disease affecting tomato throughout the southern United States and other countries. Post-transplant applications of succinate-dehydrogenase inhibitor (SDHI) or quinone-outside inhibitor (QoI) fungicides may be effective alternatives to broad-spectrum fumigation to manage this disease. In vitro, fluxapyroxad + pyraclostrobin applied directly to dormant sclerotia or to tomato stems inoculated with nontreated sclerotia reduced sclerotial germination and colony diameter. Penthiopyrad applied to tomato stems also reduced sclerotial germination and colony diameter. In 2015 and 2016, pyraclostrobin, penthiopyrad, and fluxapyroxad + pyraclostrobin were applied twice post-transplanting and quintozene was applied once at transplanting to tomato in the field. Fluxapyroxad + pyraclostrobin and quintozene reduced southern blight compared to the nonsprayed control in both years, whereas efficacy of pyraclostrobin and penthiopyrad varied. Quintozene, however, stunted 43–75% of the plants. Fruit number and weight did not differ among treatments in either year. Fluxapyroxad + pyraclostrobin or penthiopyrad followed by pyraclostrobin can be applied to reduce incidence of southern blight on tomato.

1. Introduction

The disease southern blight, caused by the soilborne basidiomycete fungus *Athelia rolfsii* (Curzi) C. C. Tu & Kimbr. (formerly *Sclerotium rolfsii* Sacc.), affects over 1200 plants (Farr and Rossman, 2017). In the southern United States, southern blight regularly affects the solanaceous vegetables tomato (*Solanum lycopersicum*) and bell pepper (*Capsicum annuum*) (Bost et al., 2005, 2014; Louws et al., 2005; Walgenbach et al., 2006). On solanaceous vegetables, the characteristic reddish-brown, dry canker on the stem at the soil line leads to rapid wilting and chlorosis of the entire plant (Roberts et al., 2014). Sclerotia that form on the canker allow the pathogen to survive in soil over winter below the Mason-Dixon Line (Xu et al., 2008).

Tomato growers in South Carolina have observed varying levels of southern blight that range from 10 to 15% affected plants in intensively managed fields to 70% incidence in fields that were not treated with any fungicides or fumigants by limited resource growers (A. P. Keinath, unpublished). In place of methyl bromide, sequential applications of the fumigants chloropicrin and metam sodium to the same plots reduced the incidence of southern blight on tomato to ≤8% when the nontreated control treatment had 29% (Langston and Sanders, 2010). In that study, yields of tomato did not differ significantly between research plots with 0%–35% incidence of southern blight.

Until recently, the fungicide quintozene, mixed in water applied during transplanting, was the only fungicide registered to manage southern blight on tomato (Bost et al., 2014; Walgenbach et al., 2005). *A. rolfsii* also infects peanut (*Arachis hypogaea*), another crop widely grown in the southern United States. On peanut, the succinate dehydrogenase inhibitors (SDHI) penthiopyrad and benzovindiflupyr, as well as quinone-outside inhibitors (QoI), have been recommended to manage southern blight (Culbreath et al., 2009; Wiglesworth and Tally, 2015). Both SDHI (Fungicide Resistance Action Committee (FRAC) Group 7) and QoI (FRAC 11) fungicides inhibit fungal respiration, albeit at different target sites in the mitochondria (Avenot and Michailides, 2010; Bartlett et al., 2002). These fungicides also may be useful to manage southern blight on solanaceous vegetables. In a greenhouse experiment, drench applications of pyraclostrobin and penthiopyrad reduced colonization of tomato crowns by *A. rolfsii* by 90% and 68%, respectively (Roberts et al., 2012). Fungicides may provide an alternative to broad-spectrum soil fumigants for small growers who do not use fumigants or for growers using integrated pest management guidelines that call for pesticides with low environmental impacts. The objectives of this study were to evaluate

* Corresponding author.
E-mail address: tkeinath@clemson.edu (A.P. Keinath).

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TOMATO (*Solanum lycopersicum* 'BHN 602')
Southern blight; *Sclerotium rolfsii*

A.P. Keinath, V.B. DuBose, M.D. Rushton, and C.D. Conrad, Clemson Univ. Coastal REC, Charleston, SC 29414

Comparison of fungicides and application intervals to manage Southern blight of tomato, 2015.

The experiment was done at the Clemson University Coastal Research and Education Center in Charleston, SC. The soil type was Yonges loamy fine sand with a pH of 6.1. The field was cropped to watermelon in spring 2014 and 'Abruzzi' rye in fall 2014. To produce inoculum of *S. rolfsii*, ca. 150 zucchini fruit were placed into six plastic bins and inoculated with agar plugs of the pathogen placed on fruit. Before disking and seeding rye, fruit with mycelium and sclerotia were coarsely chopped and spread over the soil. On 8 Apr, tomato seedlings were transplanted into 3-ft-wide raised beds on 6-ft centers covered in black polyethylene mulch. Plots were arranged as a randomized complete block with five replications in 40-ft-long single rows with plants spaced 24 in. apart within rows. Each plot included 20 plants. Plots were separated within rows by 10 ft of non-planted area. Two unsprayed control treatments were included to account for variability associated with the distribution of *S. rolfsii* in soil. Treatments included six fungicides applied at one or two different times. Fungicides (other than Blocker, Serenade Soil, and Fontelis applied within 3 wk after transplanting) were applied in 38 gpa volume with a tractor-mounted hydraulic drop sprayer operated at 60 psi that was equipped with four nozzles spaced 11 in. apart on either side of the row and one nozzle over the top of the row. Nozzles had a D2 disk and a 23 core. Soil drench treatments of Blocker and Serenade Soil were applied at a rate of 6.1 fl oz per plant with a backpack sprayer operated at 60 psi with the nozzle removed. Fontelis at 1 and 3 wk after transplanting was applied as a whole plant and soil drench in 13.5 gpa volume with a CO_2-backpack sprayer equipped with one TeeJet TX 26 nozzle at 60 psi. Incidence of Southern blight was determined on 29 May; 9, 18, and 26 Jun; and 2 and 13 Jul by counting wilted, yellowed plants that also had a basal canker plus characteristic coarse, white mycelium of *S. rolfsii*; sclerotia were present on most symptomatic plants. Plants with symptoms of Pythium root rot (stunting and wilting) and bacterial wilt (complete wilt of entire plant without yellowing or basal stem canker) also were counted; these plants were removed from the dataset. Marketable pink and red fruit were harvested, sorted by size, counted, and weighed weekly from 23 Jun to 23 Jul. Size categories were small (7 x 7, <2 10/32 in.), medium (6 x 7, >2 10/32 in. and <2 18/32 in.), large (6 x 6, >2 18/32 in. and <2 26/32 in.) and extra-large (5 x 6, >2 26/32 in.). Rainfall was 3.43 in. in May, 6.28 in. in Jun and 3.18 in. in Jul.

Disease pressure was moderate; treatments differed from each other at the last three rating dates but not at the first three ratings (data not shown). At the end of the season, Blocker (a.i. PCNB) was the only treatment that reduced incidence of Southern blight compared to both nonsprayed control treatments. Blocker, Priaxor applied at 5 and 9 weeks after transplanting (application dates D and G), and Fontelis applied at 1 and 3 weeks after transplanting (application dates B and C) reduced AUDPC compared to both nonsprayed control treatments. Weight, number, and size of fruit harvested did not differ among treatments (P>0.10) (data not shown). Some stunted plants were observed with most treatments. Stunted plants did not recover, reach normal size, or produce fruit. While it is likely that some stunted plants were infected with *Pythium*, the percentage of stunted plants was significantly greater in the Aprovia Top and Blocker treatments than in the unsprayed control treatments. The Blocker label recommends application at transplanting; stunting might have been less if Blocker had been applied to the transplant holes before instead of after the transplants were set.

Treatment and rate/A (application dates)[z]	Incidence of Southern blight (%) 13 Jul[y]		AUDPC[x]		Stunted plants (%)[y]	
Blocker 4F, 7.5 pt (A)	0.0	c[w]	0	d[w]	42.7	a[v]
Priaxor 500SC, 8 fl oz (D,F)	3.6	abc	46	ab	1.1	de
Priaxor 500SC, 8 fl oz (D,G)	0.5	bc	2	cd	9.5	bcd
Fontelis 1.67SC, 24 fl oz (B,C)	0.3	bc	2	cd	6.7	bcde
Fontelis 1.67SC, 24 fl oz (D,G)	7.7	abc	69	ab	0.4	e
Cabrio 20EG, 16 oz (D,G)	2.6	abc	9	bcd	5.0	cde
Aprovia Top 1.62EC, 13.7 fl oz (D), 10.5 fl oz (G)	11.7	abc	33	abc	21.3	ab
Serenade Soil, 4 qt (A), 6 qt (C,E)	20.9	a	112	ab	14.7	bc
Unsprayed 2	12.7	ab	131	ab	5.9	bcde
Unsprayed 1	22.6	a	342	a	2.4	cde
Treatment P-value	0.0049		0.0009		0.0002	

[z]Application dates were A=8 Apr, B=22 Apr, C=28 Apr, D=13 May, E=20 May, F=27 May, and G=10 Jun.
[y]Percentage data were transformed with arcsine of the square root before analysis of variance. Means shown are back-transformed means.
[x]Area Under Disease Progress Curve. Data were transformed with base-ten logarithm before analysis of variance. Means shown are back-transformed means.
[w]Means within columns with the same letter are not significantly different, Fisher's Protected LSD, P=0.01.
[v]Means within columns with the same letter are not significantly different, Fisher's Protected LSD, P=0.05.

Project Title: Development of Strategies to Manage Fungicide Resistant *Alternaria alternata*

Partner Organization: Clemson University, Dr. Guido Schnabel, Primary Investigator

Project Summary

Alternaria fruit rot has caused up to 60% pre-harvest fruit losses in late season peach cultivars such as 'Sweet Dream' in South Carolina. Effective strategies for management of this disease are not in place and current strategies are obviously not working well. Field isolates of the causal agent, *Alternaria alternata,* were obtained from peach fruit. We characterized the isolates and investigated alternative management options as well as fitness parameters for this disease of peach. Isolates that were resistant to the fungicide boscalid were also resistant to pyraclostrobin and thiophanate-methyl. The two latter fungicides are commonly used to control plant diseases. Resistance to pyraclostrobin was due to the G143A mutation in the cytochrome b gene and resistance to thiophanate-methyl was due to the 167Y mutation in the β-tubulin gene. Representatives of the two most commonly-isolated genotypes were selected for fitness evaluations. Genotypes H277Y and H134R of succinate dehydrogenase B (SDHB) suffered no fitness penalties based on mycelial growth, spore production, osmotic sensitivity, oxidative sensitivity, germination ability, or the ability to cause disease on peach fruit. Hypersensitivity to oxidative stress and weak sporulation was observed only in genotype D123E of SDHB. No competitive advantage was detected for sensitive isolates over the course of five consecutive transfers on peach fruit when spores were mixed with genotypes H277Y or H134R. Results suggest that in the absence of fungicide pressure, *A. alternata* isolates resistant to fungicides may effectively compete with the boscalid-sensitive populations. We conclude that a change in chemical programs that considers resistance management, rather than omission of SDHIs, will be necessary to control this disease.

Outbreaks of Alternaria fruit rot have been increasing in some South Carolina peach orchards due to the emergence and selection of *A. alternata* strains resistant to succinate dehydrogenase inhibitor (SDHI) fungicides. Yield loss reached 60% in some late-season peach varieties. SDHI fungicides have been applied routinely in combination with quinone outside inhibitor (QoI) fungicides since the year 2000 mainly for the control of brown rot of peach, which is caused by *Monilinia fructicola*. Repeated annual applications appear to have unintentionally selected for resistance in this secondary plant pathogen. Resistance to SDHIs in *A. alternata* from peach was based on mutations in sdh gene sequences. Resistant isolates revealed H277Y/R/L mutations in the *sdh*B gene, H134R and G79R mutations in the *sdh*C gene, and D123E and D133R mutations in the *sdh*D gene.

Besides SDHI fungicides, methyl benzimidazole carbamates (MBC), demethylation inhibitor (DMI), and QoI fungicides have been used in rotation or mixture in peach orchards for summer disease control. To the best of our knowledge, *A. alternata* has reportedly been resistant to MBC fungicides, but the mechanism of resistance is unknown. Among single-site fungicides, only SDHIs and QoIs are registered and reported to be effective against *A. alternata* isolates. The rotation or mixture of the above chemical classes in southeast peach orchards has already resulted in the selection of resistance in *Monilinia fructicola*, the causal organism of brown rot of stone fruits and in *Colletotrichum siamense*, one of the causal organisms of peach anthracnose. For both pathogens an accumulation of resistance to two or more fungicides was observed. Whether resistance to multiple fungicides has developed in *A. alternata* isolates from peach is not known.

For effective resistance management, knowledge about the molecular mechanism and fitness of genotypes is essential. Fitness is defined as the survival and reproductive success of an allele, individual or group. If isolates carrying mutations in target genes have lower fitness than the boscalid-sensitive isolates, a decline in prevalence would be expected when removing the fungicide pressure. In contrast,

if fitness cost is absent in resistant isolates, the resistant subpopulation would be expected to persist in the field even without fungicide selection pressure. Fitness of boscalid-resistant *A. alternata* isolates form pistachios was assessed previously, but it is unknown what genotype or genotypes were included in the study. An in-depth analysis of prevalent SDHI-resistant genotypes is needed to assess their fitness and competitiveness.

The objectives of this study were to 1) determine whether *A. alternata* isolates resistant to SDHI fungicides have accumulated additional resistance to thiophanate-methyl and azoxystrobin, 2) investigate the molecular mechanisms of this resistance, and 3) conduct an in-depth analysis of key fitness components and competitiveness of resistant isolates.

Project Approach

We show the fungus had sufficiently diversified and generated genotypes with resistance to QoI and SDHI fungicides. This was the first report of resistance to QoI and SDHI fungicides in *A. alternata* of peach on the east coast, indicating that selection of resistance to both fungicides at a level of economic relevance took little more than 10 years. Under southeastern conditions, fungal pathogens thrive and *A. alternata* is now the third confirmed pathogen of peach in South Carolina to develop resistance to multiple fungicides.

The mechanism of resistance to azoxystrobin and thiophanate-methyl in our isolates was based on point mutation in target genes, including G143A in cytochrome b and F167Y in betatubulin. As opposed to quantitative resistance, which may be multigenic and which is characterized by a small decrease in population sensitivity over time, qualitative resistance is typically conferred by point mutations in genes encoding target enzymes and is characterized by an immediate and significant shift towards resistance. Our data also reflects qualitative resistance with EC_{50} values for both azoxystrobin and thiophanate methyl greater than 100 µg/ml.

Our genotypes resistant to three classes of fungicides only differed in their genetic basis of resistance to SDHI fungicides. The most common SDHI resistance genotypes H277Y and H134R were subjected to fitness analysis. Fitness was evaluated in terms of both 'predicted' fitness (measurement of several components in individual isolates) and 'realized' fitness (competition between sensitive and resistant isolates). Our investigation of fitness components revealed that genotypes H277Y and H134R didn't suffer obvious fitness penalties. For some parameters, including disease severity on peach and oxidative stress, genotype H277Y even showed greater fitness than the boscalid-sensitive isolates. This mutation also appears to be a common and resilient resistance determinant in other pathogens. In our study, hypersensitivity to oxidative stress and other fitness penalties were observed only for genotype D123E, suggesting that this mutation imposed a fitness cost. This may partially explain the lower prevalence of this genotype in the field compared to the H277Y and H134R genotypes.

Results of 'predicted' fitness in the study agree with 'realized' fitness. The competition analysis in the absence of fungicides indicated that genotypes H277Y and H134R successfully competed with boscalid-sensitive isolate strains. These results are consistent with a study that analyzed the boscalid-resistant H277Y equivalent genotype in Botrytis cinerea (Laleve, et al. 2014). Depending on the pathogen studied, however, the same mutation may or may not be associated with fitness penalties (Karaoglanidis, et al. 2011; Ma and Uddin 2009; Rallos, et al. 2014).

The results of this study suggest that mixing or alternating chemical classes of fungicides for resistance management is now selecting for multifungicide resistance in primary and secondary pathogens of peach. While these resistant populations are still rarely observed in the southeast, independent

emergence and movement from existing locations will eventually spread resistant genotypes under current management strategies. The lack of a penalty in fitness or competitive ability among the most prevalent, boscalid-resistant *A. alternata* genotypes implies these genotypes will likely remain in the population, even in the absence of selection pressure. This development justifies a review of current resistance management practices. Alternatives to sole reliance on single-site fungicides may become more important and may include the development and use of cultivars less susceptible to disease, the increased use of multi-site fungicides that do not select for resistance, stronger emphasis of cultural methods that decrease inoculum pressure, and further restriction of the number of applications of single-site fungicides per season.

Project partners were Dr. Mengjun Hu, Dr. Guido Schnabel, Cotton Hope Farm and Titan Farms. Dr. Hu conducted the research and wrote drafts of figures, tables, and text. Dr. Guido Schnabel managed the project and completed the Final Report; Titan Farms and Cotton Hope Farm provided the isolates studied.

Goals and Outcomes Achieved

The goal of this study was to provide South Carolina peach growers with tools to manage Alternaria fruit rot. The expected measurable outcome was that a change in spray recommendations would control the new strains that had mutated so that they would resist common disease management practices. Monitoring for Alternaria fruit rot disease of peach at the location of origin of the mutant strain in Ridge Spring and Monetta, as well as packinghouse data, suggested fewer preharvest and postharvest infections in 2015 and 2016. Disease incidence in some varieties declined from about 15% in 2014 to less than 1% in 2015. There were no unexpected delays or challenges. We shared our findings at the fruit and vegetable conference in Savannah, GA in January 2016 (about 120 participants) and at the professional fruit workers conference in Montgomery AL in 2015 (45 participants). All funds ($12,500) were spent. We also share our results with growers and county agents at production meetings in Gaffney and Edgefield in January 2016.

The information generated is available to growers through the smartphone app (MyIPM-SED) under Overview/Gallery/More, under ‘more’, ‘chemical control’ and ‘specific resistance’ issues. Both, Cotton Hope and Titan Farm indicated changes in their postharvest spray program to control summer diseases such as Alternaria and Anthracnose fruit rot. We have had no more major outbreaks of the disease and thus incidence was reduced from 60% to less than 5% over the last two years.

Beneficiaries

Cotton Hope Farm and Titan Farms directly benefitted. But the results will be useful for about 120 other peach growers in South Carolina and about 100 other growers in the southeastern US.

Lessons Learned

Orchards need to be monitored for changes in pathogen and pest behavior and sensitivity to management tools, including chemical, biological, and cultural tools. In addition, growers need to be continuously informed/educated about resistance management tools. This project in particular revealed that spray programs need to be reviewed for performance.

Contact Person

Guido Schnabel
864-656-6705
schnabe@clemson.edu

Project Title: Enabling Marker-Assisted Breeding for Fruit Size in Peach
Partner: Clemson University

Project Summary

Large fruit size is highly attractive to consumers and commands a premium in the fresh peach market. Peach producers desire that new varieties have increased size alongside other evolving consumer preference traits such as appearance and aroma and cultural traits like disease resistance. Unfortunately, assessing fruit size in conventional breeding programs is inefficient in time and resources which reduces the speed at which new germplasm can be developed, assessed, and placed into the hands of growers. New tools are needed for the breeder that will allow selection of trees early in the breeding pipeline which possess size characteristics that are sought by South Carolina growers. Therefore, we sought to identify variation in the genetic potential for fruit size at early developmental stages (immediately pre-bloom) and correlate this variation with existing genetic mapping data. Our goal was to enable development of cost effective, easy to use genetic markers for peach fruit size potential to allow rapid and efficient production of new varieties with increased fruit size that will enhance profitability, competitiveness and economic sustainability of peach producers in South Carolina.

This project was not related to a previously funded project with SCBGP.

Project Purpose

There is a strong demand by consumers for peaches with superior health and organoleptic characteristics as well as grower desires for cultivars with increased disease and environmental stress resistance. Breeding for any one trait in a new cultivar can be challenging, however the new demands to combine many traits into a single or few superior cultivars is a significant challenge for the breeder. This is particularly problematic when highly desired traits such as disease resistance are found in material with relatively poor fruit quality characteristics. Using a wide and diverse set of germplasm to accumulate many traits together into a single cultivar requires large sets of offspring be generated to identify the handful which may possess the combination of traits desired by the grower and consumer. Marker-assisted selection (MAS) can make this process significantly more efficient through the early culling of seedlings that do not have the desired trait(s).

Our project will also address the difficulty of evaluating new advanced selections for fruit size. Achieved fruit size is a character that is under strong environmental control and requires expensive and time-consuming treatments to evaluate under field conditions. Therefore, it is often difficult to evaluate a selection's true maximum size potential until late in the breeding process. However, differences between large and small fruited varieties are apparent even before bloom, with large fruited trees possessing large ovaries and small fruited trees smaller ovaries. We will use this developmental difference between large and small fruited trees to eliminate the environmental variation that plagues evaluation of fruit size potential in peach.

Recent and explosive increase in the molecular and genomic tools available for the peach breeder make real the possibility of using MAS in breeding program. The early selection against trees with undesirable characteristics will greatly reduce the time and expense of creating new advanced selections for the SC peach industry. Additionally, recent evidence from several row and fruit crop species has suggested that a relatively limited number of markers will be sufficient for the development of a genetic test for maximum fruit size potential.

The objectives of this project are:

1. Phenotype the ovary cell number and cell size from established mapping populations and breeding program parental material with variable fruit size.
2. Combine our new phenotypic data (Objective 1) with existing genotypic data from these genotypes to discover regions of the genome associated with fruit size and molecular markers that flank these regions.
3. Develop genetic markers for the rapid testing of seedling trees for fruit size phenotypes.
4. Validate the use of fruit size associated genetic markers in advanced breeding selections currently being evaluated in the SC peach breeding program.

Project Activities

1. Sampling of full bloom ovary tissues in an established mapping population

Full bloom ovary tissues were sampled in spring 2015 and spring 2016 from an established mapping population in Dr. Gasic's breeding collection which segregated for fruit size at harvest. This population was previously genotyped. Co-PD Gasic also provided several years of fruit size data of the Musser Fruit Farm germplasm collection. This data was used to select divergent, unrelated cultivars for histological analysis.

In total, developing ovaries were sampled from approximately 130 genotypes of peach at the Musser Fruit Research Center. These genotypes represent a genetic mapping population and a collection of unrelated cultivars which vary in fruit size at harvest. Ten (2016) ovaries from flowers at a similar balloon stage (prior to stigma protrusion) were sampled from each tree. Petals, sepals, and pistils were removed from the flower, and ovary tissues were placed in histology cassettes and submerged in fixative (FAA) for 24 hours. After 24 hours samples were transferred to 70% ethanol for storage prior to embedding and sectioning in paraffin at the Clemson University Histology Core Facility.

2. Histological preparation of ovaries

For 2015 collected ovary tissues a subset of varieties with extreme phenotypes (approx. 200 ovaries from 20 genotypes) were embedded in paraffin, sectioned at 10 micrometer thickness and stained to identify cell wall structures. Fixing, embedding, sectioning, and staining of ovaries was successful however embedding multiple ovaries in a single block of paraffin, while cost efficient, increased post embedding processing time to determine appropriate sectioning planes within a block for quantitative analysis.

For 2016 collected ovary tissues the same subset of genotypes with extreme phenotypes were selected for processing as in 2015. Ovary sampling was increased to approximately 10 ovaries per genotype since initial analysis of 2015 samples indicated sample to sample variation may be high. Approximately 200 ovaries have been embedded in paraffin, sectioned at 10 micrometer thickness and stained to identify cell wall structures. Fixing, embedding, sectioning, and staining of ovaries was successful.

We produced more than 1200 paraffin sectioned slides and have stained a subset of these slides which contain our target sectioning plane through the ovary for quantitative analysis.

3. Ovary cell phenotype analysis

PD Bielenberg and an undergraduate research student developed a protocol for identification of appropriate ovary sections for use in anatomical quantification. We also developed a protocol for the quantification of mesocarp tissue area and subsampling of regions of the mesocarp. Subsampled

mesocarp regions were analyzed for cell number and cell area to generate a mean cell size for the mesocarp tissue. Mean cell size and mesocarp tissue area are then used for quantification of total mesocarp cell number. We have quantified the ovary cell count and mesocarp size on the extreme range of our sampled populations.

More than two-fold variation in mean mesocarp cross-sectional area was observed between varieties. Differences in mean ovary mesocarp area were primarily the result of increased mesocarp cell number. The size of individual mesocarp cells was similar between varieties. Mesocarp cross-sectional area correlated poorly with final fruit mass and size when all varieties for which size data was available were compared in a regression analysis. Mesocarp cross-sectional area at pre-bloom explained a low percentage of the final fruit size variation ($R^2 = 0.13$). Significant variation in phenotypic characters is a prerequisite for the association of genetic variation with those characters. While we did observe variation in ovary cross sectional area, and the genetic source of this variation could likely be identified with sufficient sampling of the genetic diversity in elite peach cultivars, this variation was not associated with the trait of interest, final fruit size potential. Therefore, we are not pursing the identification of genetic markers for pre-bloom ovary size as initially envisioned by our proposal.

Goals and Outcomes Achieved

We successfully accomplished the goal of sampling and observing the variation in ovary anatomy at the pre-bloom stage in peach trees. We identified ovary (mesocarp) cell number as the primary cause of variation in mesocarp tissue cross-sectional area in these varieties.

Our hypothesized correlation between ovary size and final fruit size was not supported by the data collected as a result of our work. Previous published research had indicated potential for variation in pre-bloom ovary size existed between improved and unimproved varieties (Scorza et al., 1991. J. Amer. Soc. Hort. Sci. 116(5):861-864) and this variation correlated with final fruit size. However, this report only evaluated four varieties, two rootstocks and two elite varieties. Our expanded set of varieties does not show this pattern. It is possible that the original published report was an artefact of a low number of observed varieties with the most extreme final fruit size range. We demonstrated that within improved varieties (related and unrelated), no relationship existed between pre-bloom mesocarp cross-sectional area and observed fruit size at harvest

The finding that final fruit size variation in improved varieties is primarily determined by physiological and environmental events following bloom is a valuable finding for future efforts to identify molecular markers for accelerated breeding of trees for SC growers. Research efforts can now focus on the developmental time line of fruit size growth and expansion as sources of variation which can be manipulated by the CU breeding program.

Our work resulted in the null finding that there was not a relationship between pre-bloom mesocarp cross-sectional area and observed fruit size at harvest in the experimental populations on which we performed our initial tests. Due to this finding we terminated our plans to expand our efforts at phenotyping pre-bloom cross-sectional area in the advanced selections and varieties which are the primary interest of end use stakeholders in the industry. Therefore we did not collect data on the advanced selections and varieties which could be communicated to stakeholders through county agents and growers meetings for variety selection purposes by growers.

Beneficiaries

In the short-term, there were three (3) primary beneficiaries of this project. First was the Clemson University peach breeding program, which can now focus on the post bloom development of fruit as the source of varietal differences in final fruit size. Additionally, two undergraduate students who participated in the data collection and analysis received direct experience and training on a project of importance to the state of SC.

In the long term, this work will benefit the growers, workers, and marketers of SC peach products by improving our understanding of peach fruit size development and the developmental and molecular events that contribute to differences in fruit size potential between varieties.

Lessons Learned

Project Goals: Pre-bloom analysis of ovary size was hypothesized to be a method which had value for the identification of genetic markers for fruit size potential which were not sensitive to growing season environmental influences. We have disproved the hypothesis that variations in ovary size at the pre-bloom stage are valuable indicators of fruit size potential. This finding will allow the CU peach breeding program to focus on phenotyping post bloom cell division and growth as the source of varietal variation in fruit size potential.

Project administration: A significant hurdle faced during the administration of this project was the loss of a highly qualified histology technician from the Clemson University Histology Lab Core. The retirement of this individual and the subsequent reorganization of the facility considerably delayed the project timeline. The facility was no longer able to provide significant qualified labor, and as such, students had to be trained on the histology and data collection methods for completion of the project. Future projects should account for the project timeline and assess the likelihood of continuity of service provider capabilities over the course of the project timeline.

Contact Person

Douglas G. Bielenberg
155 Long Hall
Biological Sciences
Clemson University
Clemson, SC 29634-0314
Email: dbielen@clemson.edu
Phone: 8649733325

Project Title: **Research Projects, Educational Events and Field Days to Improve Grower Production Management Skills**

Partner: South Carolina Watermelon Association (SCWA)

Project Summary

The South Carolina Watermelon Association (SCWA) conducted this project to 1) sponsor specialty crop research and generate unbiased science-based information; 2) promote watermelon production through Watermelon Field Days (which are open to the public); and 3) provide educational events for growers and consumers who are interested in 'Certified SC Grown' watermelons.

Since 2002, the SCWA has supported a watermelon research program at the Edisto Research and Education Center (EREC). Research results from EREC and other research institutions have been presented annually at the EREC Watermelon Field Day and also during the educational sessions at the SCWA Annual Meeting for growers. The annual Watermelon Field Day at EREC is attended by 250+ participants including growers, industry and the public in general.

The purpose of this project was to financially support research initiatives at the EREC. The research findings, as concluded on Clemson University field trials, provide watermelon growers unbiased research which assists in helping them make better management decisions. For example, a seed trial helps growers make appropriate selection of a particular variety, and this decision can be critical to the successful production and marketing of their fruit. Having a local variety trial provides southeastern growers with the specifics as to the yield and quality of varieties grown in their geographical area. EREC Watermelon Variety Trail results are disseminated to growers from Virginia to Florida, as a result.

The principal goal of this project was to provide all watermelon growers' sound research-based crop management recommendations which have the potential impact of improving the growers net per acre and reducing environmental risk due to unsound management practices.

Not only is the yield of a particular watermelon variety important to the grower but the average size of the watermelon variety has become increasingly important to today's consumer. Production practices can have an influence on yield and size of watermelon varieties. Annual research trials that are replicated with watermelon varieties can assist growers in choosing the appropriate variety for their customers.

Project Approach

1. Watermelon Variety Trial Planting – The replicated seedless watermelon variety trail was conducted at EREC. Twenty-four (24) commercial seedless watermelon varieties were evaluated. Through coordinated efforts the same varieties were planted in seedless watermelon variety trials in GA, FL and NC. These combined results provide all southeastern growers a much better idea of what can be expected from a particular seedless watermelon variety.
2. Sensor Based Irrigation Implementation – Sensor based irrigation research was conducted at EREC in 2015. An on-farm demonstration of sensor-based irrigation was also installed and successfully controlled on a 50-acre field of watermelons on Hamilton Dicks' Farm. A significant reduction in the use of electricity (fewer pump runs) and the number of gallons per acre applied compared to other similarly sized plots were reported. Unfortunately, the overall yields, not only for the sensor-based irrigation field but other fields were lower than normal in 2015. This result could be attributed more to the 10 days of triple digit temperatures during pollination and

early fruit set experienced during the 2015 growing season. The two other project cooperators, Brad O'Neal and Chalmers Carr, used the sensors to develop charts and graphs that indicated soil moisture, and then made their management decisions as to when to irrigate. Sensor based irrigation continues to show tremendous conservation of water compared to typical on-farm drip irrigation management. Unfortunately, the infrastructure for equipment, implementation, service and consultation has not developed in SC and because the technology and understanding of the technology is not typically found on the farm, the use of sensor-based irrigation for the high value fruit and vegetable crops is a great risk. Until this infrastructure is established the widespread use of sensor-based irrigation will be curtailed.

3. Soil Microbe Research – During both 2014 and 2015 research was conducted at EREC exploring the potential benefits of the weekly addition of Pathway Biologic soil microbes for seedless watermelon production. During 2014 root cores were taken and root length density (RLD) was determined for treated and check watermelons. The addition of the Pathway Biologic soil microbes did not improve RLD nor fruit yield or quality in 2014. The 2015 research was conducted in a nematode infested field area to determine if the addition of soil microbes might reduce the plant stress caused by nematodes. In addition, during 2015 the soil moisture deficit prior to a triggered irrigation event was increased to see if the addition of moisture stress might allow the soil microbes to aid the treated plants in the acquisition of water and subsequently improve fruit yield. Overall there was no difference in quality or yield in the treated and check plots in 2015. Maybe coincidental but worth noting, the first two of four harvests the treated plots showed significantly greater fruit yield. During the fruit set and development period for harvest 1 and 2, rainfall was low and plant moisture stress should have been greater than the fruit set and development period for harvest 3 and 4 when rainfall was plentiful and plant moisture stress limited. Results from the 2014 and 2015 trials indicate that in a well-managed field of watermelons with limited stress the addition of soil microbes did not improve fruit yield or quality.
4. Root Cores in Soil Microbe Research – Root cores were taken during the 2014 growing season but during the same period ((4 weeks after planting (WAP), 8 WAP and 12 WAP)) in 2015, nematode samples were taken. There were no differences in the nematode numbers or species between treated and check plots. Root cores were taken in the research plots were grafted and non-grafted watermelons were being researched for efficiency of nutrient use.
5. Research Plot Maintenance – All plots at EREC were successfully maintained and summer interns learned proper equipment use and maintenance. Normal pest control measures were applied and there was no significant pest pressure which attributed to fruit yield or fruit quality reduction. The 10 days of triple digit temperature did reduce fruit set and subsequent fruit yield per acre.
6. Research Plot Harvesting – All EREC plots were harvested 4 times by summer interns and other employees. As previously mentioned yields although good, were not exceptional due to high temperatures during the fruit set and development periods.
7. Research Data Analysis – Research results for Seedless and Mini Watermelon Variety Trials and Pathway Biologic Soil Microbes was completed by Dr. Gilbert Miller. Sensor based irrigation and fertigation of grafted and non-grafted watermelon research was also completed by Dr. Miller, with the assistance of the grower project cooperators.

Goals and Outcomes Achieved

1. Board Meetings/Research Updates – Attendees were provided with SCWA research updates and results from the seedless watermelon variety trials that were conducted at EREC at both the board meetings in October 2014 and 2015, as well as at the SCWA Annual Meeting in January 2015 (85 growers present).
2. During the 2015 SCWA Annual Meeting a hands-on grafting workshop was conducted by Clemson University Researchers and Extension Agents. Attendance at the educational session was the greatest it had been in many years with close to 100 attending the workshop. Attendees also observed how to graft watermelons and tomatoes by several different methods.
3. Watermelon Spray Guide (2015) –This Guide can be found at: http://www.clemson.edu/psapublishing/PAGES/PLNPATH/IL86.pdf
4. EREC and SCWA Watermelon Field Day – An extremely well attended (300 participants) Watermelon Field Day was held on July 9, 2015. Topics for the field day included: SCWA activities; How Much Does It Cost to Not Spray Watermelons, Tri-Hishtil Plant Grafting; Honey Bee Biology; Bayer Feed a Bee Program; Watermelon Grafting Update; UAV and Sensor Imaging; Merge and Root Know Nematodes; Field Day Watermelon and Melon Varieties (81); and CCA and Pesticide License Recertification credits were offered.
5. Research Results Presentations – Research results were provided to more than 500 growers and industry personnel at the following events; 1) SE Fruit and Vegetable Expo in Myrtle Beach, SC, November 31 – Dec 2; 2) Mississippi Vegetable Growers Association State Meeting, Natchez, MS, Dec 1; 3) Annual SCWA Meetings

Beneficiaries

Those that benefited most from this project are the watermelon producers in South Carolina. There are approximately 250 producers in this state, ranging in size from direct market sales to large wholesale operations.

Lessons Learned

There were no significant problems or delays to report with the project. As previously mentioned, there was excessive heat during pollination and early fruit set which reduced overall watermelon yield and size. Also, the field used for the Pathway Biologic trial did not show as great of a nematode pressure as was hoped. To add a higher degree of stress on the plant to see if the added soil microbes could help the plant, the soil water deficient prior to irrigation was increased from 15% to 30%.

A survey of the SCWA members indicated an endorsement of the proposed research/demonstration/field days proposed and implemented in this project. Suggestions for improving the project were also received and included the following:

1. Adding to the Seedless Watermelon Variety Trial report an assessment of how the varieties yield was proportioned into the different selling weigh categories. Watermelons are generally sold in the shipping market by standard bin sized where the watermelon count per bin is 30, 36, 45 or 60. Usually but not always the most requested bin count is 45. A watermelon variety might show a high yield in the variety trial yet have a low percentage of its watermelons weigh appropriately for the 45-bin count. Knowing how a particular seedless watermelon variety's yield is proportioned into the different bin counts will help the grower better determine which variety might be suitable for their operation.
2. Include in the Watermelon Spray Guide a brief description of the major diseases of watermelons, including pictures, and highlight the fungicides MOST effective in controlling these diseases. This was done but it was also noted in the Spray Guide that it is absolutely

necessary to rotate systemic fungicides to reduce the risk of fungicide resistance. This might necessitate that the very most effective fungicide will need to be rotated with a fungicide which might not have the greatest efficacy but over the long term will provide the best disease control.

3. The survey also indicated a need for continued research in addressing Fusarium wilt problems in SC watermelon fields. Although the grafting of watermelons on Fusarium wilt resistant rootstock does provide a means of continuing watermelon production in a Fusarium infested field, the cost per plant is extremely high compared to a normal seedless watermelon transplant with granted transplants costing approximately $1.25 compared to $0.25 for non-grafted transplants. Growers want a less expensive and more direct way to control Fusarium wilt in their watermelon fields. Grafting research/demonstrations were conducted as part of this project but no other research to address Fusarium wilt problems was included in this project Work Plan.

Contact Information

South Carolina Watermelon Association
Dr. Gilbert Miller
PO Box 11280
Columbia, SC 29211
803-793-6614
gmllr@clemson.edu

Project Title: The Ornamental Horticulture Education Project 2014-15
Partner: South Carolina Nursery and Landscape Association

Project Summary
The Ornamental Horticulture Education Project 2014-15 offered 20 educational programs over a 3-day period. Total registration for the seminars was 415, which was an increase over 2014. The seminars offered topics relating to environmental issues, new technology, plant varieties, regulatory issues, and business management.

The impetus of this project is to provide timely information on issues that affect the nursery/green industry, to provide new and/or innovative information and to provide required continuing education credits for those in the industry. The SCNLA Education Committee is made up of members of different segments of the "green" industry. They bring firsthand experience of problems they encounter and issues that are shared by this vertically integrated industry. Plant pests and diseases are a never-ending problem for the green industry. Water quality and quantity is also a concern. New pests and diseases enter the state, old ones re-occur, and new technology provides new solutions so environmental issues are always a priority. The committee determines issues that they think need to be addressed based on the attendee comments from previous event evaluations as well as their own experiences. Speakers that committee members have heard at other events or suggested by SCNLA members are also considered. The need for Continuing Education Units (CEUs) is also considered. Time away from work can be expensive for many so we try to offer a variety of CEUs so that credits can be earned at this one conference.

Ten of the seminars offered 1 or more Continuing Education Credits (CEU). 714 CEU's were earned over the 3 days: 626 Pesticide Applicators License CEU's and 88 International Society of Arboriculture CEU's.

The Education Committee planned the program based on suggestions for topics taken from the 2014 convention surveys, industry trends, speakers heard at other events, criteria for the Specialty Crop Program, and current relevant issues. For example, a daylong landscape design class was offered because of past requests, and a turf grass specific program was incorporated so that local members of the sod industry could receive up to date information. The committee also considers the timeliness of topics, for example identifying and controlling invasive plants is a timely concern for the industry for both economic and environmental reasons.

This project continues to build on previous SCBGP funding as the suggestions for topics and/or speakers from participant evaluations are considered for the next year's program. New attendees are added to the mail list so that they can receive information on future educational opportunities. Having a multi topic event held at approximately the same time each year allows participants to plan for time away from work, budget for the trip, and know that they can earn needed CEU's on a regular schedule. The SCBGP has allowed SCNLA to provide this consistency at **very** reasonable registration fees.

The project purpose was to deliver a timely and informative program by 1) providing seminars with relevant content, 2) providing an educational program at an affordable price, 3) providing seminars that had been approved for various industry Continuing Education Units and 4) to do this at a time of year when it is the least difficult for our stakeholders to miss work. The program was designed to provide education to various segments of the nursery and greenhouse industry and its "direct influencers" (landscape contractors and other installers, landscape maintenance workers, retail garden centers staff, etc.)

We encourage our commercial nurserymen (growers) to reach out to their customers and encourage them to attend the event. Growers can request stickers with the event date and contact information that they put on invoices and other mailings, information cards that they can display at their nurseries or include in their regular mailings, posters that can be displayed at their nurseries, and conference brochures – there is no charge to growers for these items. Their help in promoting the event reaches people that are new to industry or for some other reason we may not have access to their mailing address or email. It is also a positive "endorsement" when industry folks encourage others in the industry to participate in an event.

Because of the support of this Specialty Crop Grant we did not have to raise the registration fee for the Wednesday, full day program. January and early February are traditionally the best time of year for our conference, the winter weather means it is a relatively slow for work and these early months allow for planning for the busy spring season.

The program was open to all horticulture industry professionals, so attendees came from production nurseries, production greenhouses, retail garden centers, public gardens, landscape design and installation companies, landscape maintenance companies, technical colleges and universities. We want this program to provide valuable information to the entire industry.

We worked with several partners to expand our ability to offer a well-rounded program that offered problem solving information and to attract all segments of our industry. Clemson University faculty and staff contributed to the planning of this program and were also speakers on the program, with one faculty member serving as moderator. Trees SC provided a complimentary exhibit space at their fall conference where we promoted this program and included our conference in their calendar of events, South Carolina Landscape and Turf Grass Association provided a complimentary exhibit space their winter conference where we promoted this program. The SCLTA President also participated in the Education Committee planning meeting.

The education committee gave a lot of thought to what programs would provide timely information as well as speakers that could present the information in an interesting manner. While we have found that participants love any seminar on "New Plants" we appreciate that they need a broad range of information and if we make an extra effort they can gain knowledge and information on topics they are not as excited about if make the delivery of the of the information more interesting. The following list includes all topics featured in the 2015 seminars and workshops:

- Landscape Design & Graphics (this was a day long class)
- Update on SC Regulations and Requirements for Trucks and Trailers
- Pesticide Record Keeping: What you Need to Know
- Weeds in Turf Grass and Fate
- New Turf Varieties
- The Behavior of Pesticides in the Landscape
- How to Build and Retain a Winning Team
- Air spading and Other New Technology in Soil Management
- Technical Pruning at its Best
- The Plants, The Pests and The Bees: Surviving the Three-way Duel
- What Not to Do: Some Interesting Regulatory Cases Arising From Pesticide Misuse
- New and Emerging Pest and Disease Concerns for the Carolinas

- Fungicides for Ornamental Crops in the Nursery and Landscape in 2015
- The True Cost of Invasive Species
- Trials and Tribulations – A Year in Review (UGA Trial Gardens)
- Utilizing More Interesting Southeastern Natives in the Landscape
- Rainwater Harvesting for Irrigation and Storm Water Control
- Trends in Sustainable Stormwater Management
- Irrigation – Beyond the On/Off Switch
- Innovations in Nursery and Personnel Management

The number of participants and their positive evaluations lead us to believe that we were successful in providing timely information on environmental issues, technology, plants, regulatory issues, and management that was valuable and appreciated. Out of the 505 participants surveyed, 86% indicated an increase in usable knowledge gained from the educational series.

Project Approach
All activities outlined in the work plan were performed on time as shown in the work log below:

Work Log: SC Nursery and Landscape Association:
The Ornamental Horticulture Education Project 2014-15

Project Activity	Responsibility of:	Date completed
Meet and plan seminars,	SCNLA Education Committee	July 21, 2014
Contact speakers about participating	Donna Foster, SCNLA Exec. Dir.	September 22, 2014
Report to SCNLA Board on progress at quarterly board meeting	Donna Foster, SCNLA Exec. Dir.	September 11, 2014
Report final program to Education Committee	Donna Foster, SCNLA Exec. Dir.	September 26, 2014
Send conference information to other industry groups for their calendar of events	Donna Foster, SCNLA Exec. Dir.	September 15, 2014
Apply for pesticide applicators' re-certification credits and other CEU's	Donna Foster, SCNLA Exec. Dir.	September 29, 2014
Send event fees to registration company for registration form development	Donna Foster, SCNLA Exec. Dir.	Sept 29, 2014
Confirm with speakers, time, date of their presentations, let them know what audio/visual equipment will be in the seminar room, ask what night(s) will need a hotel room, etc.	Donna Foster, SCNLA Exec. Dir.	September 29, 2014
Gather seminar titles and descriptions, speaker bios, CEU's, photos, etc. for brochure	Donna Foster, SCNLA Exec. Dir.	October 14, 2014
Provide information for Graphic Artist to create brochure, posters, postcards for event promotion	Donna Foster, SCNLA Exec. Dir.	October 14, 2014

Approve registration form	Donna Foster, SCNLA Exec. Dir.	October 14,2014
Go over meeting space assignments, A/V needs, etc. with hotel	Donna Foster, SCNLA Exec. Dir.	October 30, 2014
Exhibit at Trees SC conference to promote event	Donna Foster, SCNLA Exec. Dir.	October 23-24, 2014
Make hotel reservations for speakers at conference hotel	Donna Foster, SCNLA Exec. Dir.	November 5, 2014
Create print pieces	Allison W. Mossburg, Brainstorm Print & Design, LLC	November 10, 2014
Send (Email) mail lists to Printer for mailing postcards	Donna Foster, SCNLA Exec. Dir.	November 12, 2014
Final approval of print pieces	Donna Foster, SCNLA Exec. Dir.	November 13, 2014
Print pieces to Printer	Allison W. Mossburg, Brainstorm Print & Design, LLC	November 13,2014
Provide promotional article to SCDA Market Bulletin, ISA & SCGGA	Donna Foster, SCNLA Exec. Dir.	November 17, 2014
Report to SCNLA Board on progress at quarterly board meeting	Donna Foster, SCNLA Exec. Dir.	December 4, 2014
Update mail lists as address corrections are returned by US Postal Service	Donna Foster, SCNLA Exec. Dir.	December 31, 2014
Send (by Email) updated mail lists to Printer for mailing brochures	Donna Foster, SCNLA Exec. Dir.	December 23, 2014
Printer Prints, Mails, & Delivers extra print materials	ProPrint Solutions, LLC	December 29,2014
On line registration available on SCNLA website	Donna Foster, SCNLA Exec. Dir.	November 21, 2014
Review Specialty Crop Grant Responsibilities	Donna Foster, SCNLA Exec. Dir.	December 2, 2014
Ship growers' brochures, free passes, stickers, etc. so they can help promote conference to their buyers	Donna Foster, SCNLA Exec. Dir.	December 20, 2014
Ship growers' brochures, free passes, stickers, etc. so they can help promote conference to their buyers	Donna Foster, SCNLA Exec. Dir.	December 20, 2014
Exhibit at SC Landscape & Turf grass Conference to promote conference	Donna Foster, SCNLA Exec. Dir.	January 21, 2015
Packets to speakers with hotel confirmation number, copy of complete program, confirm audio/visual needs	Donna Foster, SCNLA Exec. Dir.	January 6, 2015

Send moderator packets with complete program, speaker bios and announcements	Donna Foster, SCNLA Exec. Dir.	January 12, 2015
Printer Prints, & Delivers on site brochure	ProPrint Solutions, LLC	January 29, 2015
Add names to event mail list	Donna Foster, SCNLA Exec. Dir.	January 31, 2015
Pay printer and graphic artist after receiving and reviewing invoices	Donna Foster, SCNLA Exec. Dir.	February 1, 2015
On site management of conference: Seminar room set up, evaluations in seminar rooms, pest re-certification credit signup sheets in seminar rooms and collect after events	Donna Foster, SCNLA Exec. Dir.	February 7, 2015
Give out & take up seminar evaluations	Program Moderators	February 6, 2015
Mail (certified mail) Re-certification credit sheets to appropriate offices/agencies.	Donna Foster, SCNLA Exec. Dir.	February 17, 2015
Receive, review and pay conference facility invoices	Donna Foster, SCNLA Exec. Dir.	March 5, 2015
Get final attendance report from registration company	Donna Foster, SCNLA Exec. Dir.	February 27, 2015
Tally evaluations	Donna Foster, SCNLA Exec. Dir.	March 9,2015
Review Event with SCNLA Board	Donna Foster, SCNLA Exec. Dir.	March 12, 2015
Collect speaker reimbursement sheets and receipts from speakers, review, and pay. Send along with thank you note.	Donna Foster, SCNLA Exec. Dir.	March 9, 2015
Add new attendees to mail list for 2014	Donna Foster, SCNLA Exec. Dir.	March 10, 2015
Have all expenses related to event paid	Donna Foster, SCNLA Exec. Dir.	March 13, 2015
Make copies of reimbursable receipts	Donna Foster, SCNLA Exec. Dir.	March 13, 2015
Final Report to SCDA	Donna Foster, SCNLA Exec. Dir.	March 27, 2015

The attendee evaluations reflected their appreciation of the information the speakers provided and how they would use what was learned. The number of CEU's earned (714) reflected the need for the courses offered and the interest of the participants in the specific topics offered.

Promoting the program was vital to its success. Foster provided all the descriptions, event times and dates, and photos for the graphic artist to create the full color print materials (promotional postcards,

informational cards, brochures, posters). All the print pieces had the same cover design for consistent marketing purposes. She worked with the graphic artist and printer to have print materials ready on schedule so that they could be distributed in a timely manner. The first postcard mailing was in late November, the complete 8-page brochure was mailed in early December, and a 2nd post card mailing went out the end of December. Event Posters and information cards were also printed and distributed to growers, so they could promote the program to their customers. Information cards and brochures were also given out at the SC Landscape and Turf Grass Association trade show, the NC Nursery and Landscape Association Trade Show, and information cards at the Trees SC conference.

SCNLA mailed the brochures and postcards with "Address Service Requested" from the US Postal Service so that "bad" addresses (moved- no forwarding address, etc.) are returned to SCNLA then the mail file can be corrected.

On-line conference registration opened on December 2, 2014. Registrations could also be mailed and faxed in. In early January Foster sent each of the speakers a packet containing a copy of the program, a list of the audio/ visual equipment available, the speaker's hotel room reservation, and a speaker reimbursement form to be completed after the seminar.

Promotional articles, ads, etc. were printed in the South Carolina Greenhouse Growers e-newsletter, in the Southern Region International Society of Arborists newsletter, the SC Department of Agriculture *Market Bulletin*, the *South Carolina Nurseryman*, Virginia Nursery and Landscape Association magazine, and NCNLA *Nursery Notes*. We advertise with neighboring state Nursery Associations to encourage their buyers to buy from SC Growers.

After the conference the evaluations were tallied, and the results are a part of this final report.

For 2015 650+ stickers, 1,500 information cards, 3,000 8-page brochures, and 17 posters were used to promote our event by growers and at other industry events. There was also an on-site brochure with the complete program. This was in addition to the postcard and brochure mailings. We increased our promotion with social media for this event by posting pre-registration price deadlines, highlighting seminar topics, etc. on Facebook, Twitter, and email.

Goals and Outcomes Achieved

- 626 Pesticide Applicators License CEU's were earned
- 88 International Society of Arboriculture CEU's were earned
- 415 total number of participants for the various educational programs

We were pleased with the increase in attendance over 2014. Antidotal indicators suggest that an improvement in the economy and a strong seminar program contributed to the increase.

Our mailing list database has increased to 2,401 (from 2,222) and this takes in to account names that have been deleted because the Postal Service was not able to provide forwarding address.

The participants were asked to complete an evaluation of each program they attended and while not everyone did so we did receive and tally 505 evaluations.

<u>Measurable Outcome: Knowledge</u>
Goal: participants in each class gain useful knowledge

Performance Measure: at least 60% of the participants increase their useable knowledge
While we cannot force participants to complete evaluations 1) we can encourage and entice them to do so and 2) get a good idea of how a seminar/speaker was received from the evaluations that are completed.

Of the evaluation questions asked:
The lowest combined score of 4 & 5 (agreement with the statement) was 65% (while the highest was 95%). More often than not there were no 1 or 2 scores expressing disagreement with the statements.

Many participants listed specific information that was learned and even more importantly how they would implement that information. Those comments are listed in the SpeakerEvaluationTally2015 document that is attached to this document.

Measurable Outcome: Continuing Education Units
Goal: Have at least 4 SC Pesticide Applicator Re-Certification Credit approved classes
This program offered 8 SC Pesticide Applicator Re-Certification Credit approved classes.
Our performance measure as to have at least 200 SC Pesticide Applicator Re-Certification Credits earned and 509 were earned. These numbers were taken from the credit signup sheets provided by the SC Department of Pesticide Regulation. These sheets have been sent back to the SC Department of Pesticide Regulation by certified mail for processing.

Beneficiaries
This program attracted attendees from all segments of the "green" industry: those who grow trees, shrubs, turf grass, annuals, and perennials and those that add value to the product (landscape contractors, landscape maintenance, arborists, etc.) and those that make it available to the final consumer (public gardens, and retail garden centers).

We are pleased to report an increase in the number of participants over last year and that in the evaluations, sharing information with fellow employees was listed numerous times. It is rewarding to learn that our participants felt that the information they learned was important enough to make sharing it a priority. Ultimately the final consumer benefits because the education provided to the industry helps them provide a better (healthier, more variety, etc.) product and to be more conscientious of the pests, diseases, and chemicals that are a part of plant production and the landscape environment. Making the best choices when chemicals do have to be used is also a better economic decision for the user as well as better for the environment. This is also true of awareness of invasive plant species. The more people who are educated on the costs of invasive species in our environment the better. A higher ability to identify and properly remove invasive plants benefits and improves the environment for everyone.

While our participants vary greatly in skill and knowledge levels we strive to offer topics that provide information to a variety of people. Although the economic impact cannot be measured, the fact that so many chose to spend their time and money to attend reflects their confidence that SCNLA educational programs have a history of offering value and that this program specifically was of value to them. Our trade show that follows the educational conference offered participants to meet growers and make purchasing decision on plant material.

It cannot be stated enough that this conference is for the industry and not just SCNLA members. Of the total number of attendees only 20% checked off that they were SCNLA members. We want to provide

the opportunity for anyone in the industry to gain knowledge and improve their businesses and to purchase plant material from South Carolina Growers.

From a practical perspective those that do not earn the required CEU's for their licenses and certifications will lose those designations which will impede their ability to do their work and their ability to earn an income in this field.

There were 415 total participants in the classes offered. And while there is no way to measure it, participants do go back and share what they learn with their employees or fellow workers.

Lessons Learned

The duties outlined in the work plan were accomplished and completed on time. We had one speaker that had to cancel but she provided someone else from her office to speak and this was before the brochure went to the printer, so we were able to make appropriate name change.

While we have had requests for a full day design class we were hesitant to plan one because the registration fee would be expensive compared to our other events but 100% of those who completed the evaluation of the program gave it a 5/strongly agree to the question "Today's overall program was worth the time away from work and the registration fee" so it appears people understand that they have to pay more for detailed instruction on a specialty topic.

We continue to urge more people to complete the evaluations so that we can better provide the education they want and need. Having the moderators encourage attendees to complete the surveys helps to some degree. It appears that participants are less likely to complete evaluations later in the day. We will also consider an on-line evaluation option in the future. On-line evaluations will be totaled quickly and neatly, although we have concerns participants may be less like to answer the open-ended questions. The open-ended responses provide better information for planning future seminars. We will research this option more before deciding.

Having open-ended questions about future topics that participants would like continues to be a good source of information for planning for us.

Promotion of the event requires multiply methods. While emails are good for deadline reminders, many people still want to receive the complete paper brochure. This means it is difficult to reduce printing costs.

At the request of the Specialty Crop Block Grant Administrator we reworded a survey question to ask participants to list specific information that was learned from a seminar and it was good to see what they learned and how they wanted to implement what was learned. The knowledge level of the participants was also reflected, some are new and take away so much new information and some have years of experience and are harder to impact but they all seem appreciative of the speakers' knowledge and willingness to share.

Contact: Donna Foster, Executive Director
South Carolina Nursery & Landscape Association
(803) 743-4284
scplant@bellsouth.net

Project Title: A Portable Demonstration Kitchen Used to Teach People How to Cook Fresh Fruits and Vegetables

Partner: The Catawba Farm and Food Coalition

Project was terminated in year one due to inactivity. No funds were expended.

Project Title: Organic Farming Conservation Outreach Project
Partner: Carolina Farm Stewardship Association
*This project was listed as Project 19 by USDA AMS, but was included as Project 12 in the SCDA report.

Project Summary
The Organic Farming Conservation Outreach Program (OFCOP) improved the competitiveness of South Carolina specialty crop producers by helping them take advantage of the high-value market for organic produce by providing technical assistance to specialty crop producers seeking to transition to certified organic production. Specifically, we accomplished the following 1) wrote seven Conservation Activity Plans Supporting Organic Transition (CAP 138) for specialty crop producers, 2) conducted eight workshops on organic certification and production to 230 attendees, and 3) provided direct assistance services to 51 specialty crop producers seeking organic certification. This has resulted in five specialty crop producers obtaining organic certification, with the vast majority of the remaining producers who received direct assistance still in transition. OFCOP increased the organic acreage and annual farm sales; however we will not know the impact this had on annual farm sales until the next USDA Ag Census.

Project Purpose
In the spring of 2011, Carolina Farm Stewardship Association (CFSA) initiated an Organic Produce Market Survey (OPMS), funded by the NCDA Specialty Crop Block Grant Program (SCBGP), for the purpose enhancing the competitiveness of North and South Carolina specialty-crop producers entering the expanding market for organic fruits and vegetables. The results of this survey showed a considerable gap in the Carolinas between the demand for 12 organic produce items commonly grown in the Carolinas and what Carolina growers are currently supplying. The estimated value of that gap is over seven million dollars a year. OFCOP will improve the competitiveness of South Carolina specialty crop producers seeking to take advantage of the high-value market for organic produce by providing farmers with the tools they need to transition to certified organic production.

Federal cost share programs for adopting organic farming practices, such as the Natural Resources Conservation Service Environmental Quality Incentive Program Organic Initiative, (NRCS EQIP-OI) provide opportunities for South Carolina specialty crop producers to increase their competitiveness in the organic food market. NRCS provides cost-share assistance to farmers to retain professional help from NRCS-certified Technical Service Providers (TSP) to develop Conservation Activity Plans Supporting Organic Transition (CAP 138) which serves as basic building blocks of the organic system plan required for certification by the National Organic Program. In order to receive cost-share assistance, farmers may only hire TSPs certified by NRCS to complete these plans, and CFSA's Farm Services Coordinator is one of two TSPs certified in SC to write CAP 138s. CFSA does not have a TSP on staff to write CAP 104s or CAP 146s due to continued lack of farmer demand for these plans.

This project was a continuation of previously funded projects launched in 2011 with SCBGP funding awarded to the South Carolina Department of Agriculture (SCDA). Through that project, we hosted fourteen workshops providing information on organic production, organic transition, and resource conservation to over 300 SC growers and Natural Resources Conservation Service (NRCS) employees and provided direct consulting services to over 50 producers. We published on our website a Carolinas

Organic Production Handbook (1,438 total unique views) and the Carolina Organic Transition Handbook for Produce Farmers (2,735 total unique views). We reviewed 20 NRCS EQIP-OI job scenarios and payment schedules and provided outreach and education to over 250 farmers about the NRCS EQIP-OI program, resulting in a 513% increase in funds allocated by the SC NRCS through the EQIP-OI program in 2011. That work resulted in at least thirteen specialty crop growers transitioning to certified organic classification, which will result in a 39% increase in the number of certified organic operations in SC. This iteration of funding built on those previous projects by enabling us to continue to offer workshops on organic certification and production, provide direct consulting to specialty crop producers seeking organic certification, and promote the EQIP-OI program by writing conservation activity plans.

This project is important and timely because as the organic industry continues to grow nationwide, SC lags behind in the number of certified organic operations. The organic industry increased 10.8% in 2015, adding $4.2 billion in sales, the largest growth rate in one year to date[1]. With organic price premiums as high as 60% above non-organic prices, SC farmers are missing out on the opportunity to take advantage of organic price premiums[2]. Moreover, 72% of SC households purchased certified organic products in 2016, however, much of that is being imported from other states. Therefore, not only are SC farmers missing out on the economic benefits of organic production, SC is "exporting" the economic and environmental benefits of certified organic production to other states.

Project Activities

The goal of this project was to increase the number of SC producers transitioning to certified organic production in order to take advantage of organic price premiums. In order to do this, we retained on staff a certified Technical Service Provider (TSP) to write Conservation Activity Plans Supporting Organic Transition (CAP 138), provided direct consulting to producers who were seeking USDA Organic Certification, and provided workshops on organic production practices.

ORIGINAL	MODIFIED	COMPLETED
Write ten Organic Transition (CAP 138), six Nutrient Management (CAP 104), and four Pollinator Habitat Plans (CAP 146).	Write sixteen CAP 138s or conduct EQIP-OI site visits with producers.	Completed seven CAP 138s Conducted two EQIP-OI site visits
Provide direct assistance to 20 producers seeking USDA organic certification.	Provide direct assistance to 25 producers seeking USDA organic certification.	Provided direct assistance to 51 producers seeking USDA Organic Certification.

[1] Organic Trade Association, 2016. State of Organic Industry Fact Sheet. Sourced from: https://www.ota.com/resources/market-analysis. Verified 8/25/2017.

[2] Greene, C. et al., 2017. Growing Organic Demand Provides High-Value Opportunities for Many Types of Producers, Amber Waves. Sourced from: https://www.ers.usda.gov/amber-waves/2017/januaryfebruary/growing-organic-demand-provides-high-value-opportunities-for-many-types-of-producers/. Verified 8/25/2017.

Conduct six workshops on organic production practices.	Conduct seven workshops on organic production practices.	Conducted eight workshops on organic production practices.

Goals and Outcomes Achieved

GOAL 1: Increase the number of SC producers transitioning to certified organic production in order to take advantage of new markets for organic specialty crops. As a result of this program, 30 new producers will begin transitioning to certified organic production and ten will become certified. Two hundred twenty-five growers will attend organic production workshops.

Promoted CFSA's organic certification assistance program through direct emails, follow-up emails with producers that previously expressed interest, at tabling and speaking events, and through our monthly electronic newsletter. Provided direct technical assistance to 51 transitioning or certified organic specialty crop producers, and of those producers the following 21 producers received one-on-one consultation or substantial time investment to review paperwork or find solutions to their certification and production challenges:

- Carolina Community Farm, Columbia
- Crazy Chick Heritage Farm, Ridgeway
- Earthworm Farm, Swansea
- Field2Fork, Sumter
- Ghost Riders Ranch, Charleston
- Gilbert Organics, Gilbert
- Glory Farm, Chester
- Grass Fat Farm, Hodges
- Greenpond Farms, Fountain Inn
- Howell Specialty Farm, Fort Mill
- Hyman Vineyard, Conway
- Metts Organix, Greenwood
- Norris Farm, Cheraw
- Plum Hill Farm, Yamasee
- Pompey's Rest, Ware Shoals
- Silver Lake Farm, Duncan
- Sweet Picking Berry Farm, Swansea
- Sylvan Farm, Saluda
- The Happy Berry, Six Mile
- Wild Hope Farm, Chester
- Growing Green Urban Farms, Johnsonville

Conducted eight workshops on organic certification and production practices to 230 specialty crop producers, and transitioning to certified organic production specialty, extension agents, and government agriculture agency representatives. Pre- and post-workshop tests and questionnaires indicated that workshop attendees learned much about the nuances of organic certification and organic management of pests, cover crops, soil.

- **Organic Certification, Columbia, SC on Feb. 23, 2015 (40 attendees).** Topics included an introduction to organic certification, developing an Organic System Plan, meeting NOP soil management standards, organic pest management, the organic certification cost share program, allowable and prohibited inputs, recordkeeping, and a mock audit was conducted to discuss compliance issues.

- **Sustainable and Organic Pest Management, Columbia, SC on March 23, 2015 (36 attendees).** Topics included organic pest management considerations and input selection tips; a grower and

professional roundtable discussion on pest management planning; and field demonstrations covering pest scouting and thresholds, choosing and calibrating scale-appropriate equipment, and proper pesticide handling and application.

- **Organic Certification Field Day, Pelion, SC on October 15, 2015 (31 attendees).** Topics included an introduction to organic certification, developing an Organic System Plan, meeting NOP soil management standards, organic pest management, the organic certification cost share program, allowable and prohibited inputs, recordkeeping, and a mock audit was conducted at WP Rawl to discuss compliance issues.

- **Integrated Pest Management: Introduction, Special Topics and Application, Bluffton, SC on Dec. 1, 2016 (19 attendees).** Topics included an introduction to IPM, soil health, and organic farming, with a site visit to Three Sisters Farm to tour the facility and talk about practical IPM applications.

- **Cover Crops for Soil Health & Weed Control in No-Till Vegetable Production, Columbia, SC, June 8, 2016 (41 attendees).** Topics included cover crop selection, establishment and termination methods, and equipment selection in an organic system.

- **Organic Certification & Production Workshop, Greenwood, SC June 13, 2016 (14 attendees).** Topics included organic regulations and the certification process, organic nutrient and pest management, organic production in high tunnels, certifying agencies in SC, and a site visit and mock audit conducted at Metts Organix Farm.

- **Organic Certification Basics, Chester, SC March 8, 2017 (18 attendees).** In collaboration with Clemson, Catawba Farm and Food Coalition, and Ben Dubard from WP Rawl Farm. Topics included organic certification regulation, certifying agencies in SC and processes, recordkeeping, and other resources.

- **Organic No-till Cover Crop Management, Clemson, SC on May 11, 2017 (31 attendees)**. In collaboration with Clemson's Sustainable Ag program. Topics included organic management of cover crops, weeds, soil fertility, and cash crops in an organic no-till system.

According to the USDA's Organic Integrity Database, 44 operations (crops, livestock, and handlers) were certified organic in South Carolina in 2014. During the project period (Jan 1, 2015 – Sept. 31, 2017) 46 new operations obtained organic certification, resulting in a 104.5% increase in the number of certified organic operations in South Carolina. Of those, 30 were crop producers, 20 were specialty crop producers.

GOAL 2: Increase access and utilization by organic/transitioning producers of NRCS EQIP-OI cost share programs by offering NRCS-certified Technical Services to specialty crop producers.

CFSA's TSP services were promoted through direct emails, as well as follow-up emails with producers that previously expressed interest at tabling and speaking events, and through our monthly electronic newsletter. Seven Conservation Activity Plans Supporting Organic Transition (CAP 138) were written and two site visits to discuss the EQIP-OI program were conducted for the following specialty crop producers:

- Asya's Organic Farm, Sumter
- BioWay Farm, Ware Shoals
- Brant Family Farm LLC, Varnville
- Cleveland Preserve, Spartanburg
- JB Family Farm, Camden
- Just Real Life Farms, Aiken
- Maria's Farm, Ravenel (site visit)
- Metts Organix, Greenwood
- Millgrove Farm, Georgetown (site visit)

Survey Results

We surveyed program participants twice during the funding period, from which we were able to draw several conclusions: first, while only 12% of survey respondents in South Carolina are currently certified organic, an additional 24% are in the transition period and are planning to become certified within the next three years, indicating that 36% of survey respondents plan be certified organic within three years. This number is reassuring given that the vast majority of survey respondents (92%) were workshop attendees and did not receive direct assistance via consulting; we expect that commitment to becoming certified organic in the near future would be higher among program participants who received direct assistance (a result not captured in survey). In this way we consider our work to help South Carolina growers achieve organic certification a success, given the many challenges to organic certification and production.

Among these challenges several issues were common among respondents: first, a majority of respondents (60%-80%) found that interpreting organic regulations, avoiding accidental use of prohibited materials, and sourcing inputs to be "very challenging" or "challenging". Second, a majority of respondents (60%-80%) also found management of weeds, diseases and insects, and access to inputs to be "very challenging" or "challenging" in certified organic production. These results highlight the need for outreach – both through workshops and direct assistance – to South Carolina to help address issues around organic certification and production.

Beneficiaries
Direct beneficiaries of this project were specialty crop producers who received a Conservation Activity Plan Supporting Organic Transition (CAP 138), received direct technical assistance transitioning to certified organic production, or attending a workshop of organic certification and production.

Beneficiaries served are listed below:

TYPE of INFORMATION DISSEMINATION	NUMBER OF BENEFICIARIES
Viewed Online Resources	1,433[3]
Attended a Workshop (Producers)	230
Received One-on-One Organic Transition Consultation	51
Received a CAP Plan	7
Received organic transition and/or organic production technical assistance.	30

Lessons Learned
We had intended to write sixteen CAP 138s during the funding period but were only able to write seven due to low interest in EQIP-OI and the CAP 138. While we continue to promote CAP 138s as an excellent way to transition to organic production, prepare for certification, and gain access to cost share money to implement conservation practices, we have had surprisingly limited interest in this program. In fact, when talking with farmers interested in organic production or certification throughout South Carolina, it's clear that very few are aware of such opportunities with the NRCS, as well as the certification cost share through FSA (cost was also identified as a limitation to certification by our surveys). We plan to continue to promote CAP 138s and provide outreach on organic production and certification to producers.

While our efforts to train producers in organic production methods and provide support with certification have resulted in many farms starting the transition process or becoming certified organic, we have learned that 1) CAP 138s may not be well-promoted enough or a good match for many farmers, and 2) not all producers who learn about organic production and certification will choose to become certified organic due to various farm- or producer-specific constraints including, limited access to organic markets, and challenges associated with production or meeting regulations.

Contact Person
Karen RM McSwain
919-542-2402
karen@carolinafarmstewards.org

Additional Information
Attachment A: Workshop Registration List. Note we do not have registration lists for two workshops organized by Clemson: Organic Certification Basics (Chester, SC March 8, 2017) & Organic No-till Cover Crop Management (Clemson, SC on May 11, 2017)

[3]Number of views of online resources contains all unique views, not solely those from SC. We are unable to differentiate views by state.

Project Title: VeggieFest 2015
Partner: Freewoods Farm Foundation

Project Summary
Health professionals tell us that people need to eat more vegetables, especially the elderly and children. Obesity, diabetes and other health conditions are implicated. We also want to help small farmers by encouraging people in their communities to purchase their fresh produce. Freewoods Farm VeggieFest Project targeted senior citizens, youth groups and the general public and introduced these groups to local growers of fruits and vegetables.

The project provided information on the Nutritional Value of Fresh Vegetables (Why Eat Vegetables), How to Cook Vegetables and How to Grow Vegetables in Your Yard to each participant. The information was presented in mini-classes and workshops held at Freewoods Farm taught by Professors and Graduate Interns from the Health Promotion Program at Coastal Carolina University in Conway, SC, and Master Gardeners of Horry County. The classes on growing vegetables in home yards included taking attendees to a home across the road from Freewoods Farm to see how vegetables can be integrated with yard flowers or grown in a separate section of a yard. Attendees also toured Freewoods Farm and saw growing vegetables. They saw how African Americans farmed during their early years of freedom and they received information on how to grow vegetables. In addition, attendees enjoyed a vegetable lunch and our Farmers Market was open so that they could buy fresh vegetables to take home.

A second purpose of Veggie Fest was to encourage local farmers to grow and sell vegetables. A couple of local farmers sold produces at Freewoods Farm during VeggieFest.

In summary, the purposes of this project were to promote the sale of fresh locally grown vegetables and thereby help local farmers; encourage the consumption of fresh local vegetables; provide information on the health value of eating more vegetables and how to cook them; and how to grow vegetables in one's own yard. The health need for vegetables is well known and immediate.

Project Approach
Local farmers were given free Vendors Tables from which to sell vegetables. While Burgess has been a community of African American farmers, there are now only four left. Senior citizens and youth groups in Burgess and Bucksport were our primary target groups. The general public, church groups and nearby residents were also invited. One senior citizen group and one youth group was invited to each VeggieFest. We held seven (7) VeggieFests. We provided information on how to eat right, stay fit, and enjoy a healthy life by buying locally grown fresh vegetables. From eighty (80) to one hundred ten (110) persons attended each of the VeggieFests, for a total of more than six hundred fifty (650) project participants. Grant funding was very helpful. Providing free lunches to the targeted senior and youth groups and providing financial assistance for transportation clearly encouraged participation. The nonfunded VeggieFest had fewer persons in attendance.

Goals and Outcomes Achieved
VeggieFest provided valuable information to the public at large, senior citizens and teenagers on the nutritional value of vegetables, and on cooking and growing vegetables. Information in handouts and flyers were distributed and available for participants to take with them. Touring Freewoods Farm and seeing nearby home yards with vegetables integrated with flowers impressed all participants. Funds from the grants were used to cover the cost of transportation and lunch for targeted senior citizens and youth groups. Grant funds were also used to provide stipends for teachers and farmers, promotion, and

for other administrative expenses. In addition, the general public, other seniors, and teenagers attended; they made their own transportation arrangements and paid for their lunches.

Beneficiaries
More than six hundred fifty (650) persons attended the VeggieFests and were beneficiaries of the day. In addition, people in nearby residential developments and the public were invited to attend. They paid for their own lunches. However, they all benefitted from free classes and the tours made possible by this grant. In addition to Freewoods Farm, two other local farmers (James Small and Eugene Harriott) participated. The Winburn Farm in Aynor, SC supplied some of the vegetables for sale.

Lessons Learned
Senior citizens are deeply interested in the nutritional value of vegetables, especially as they relate to various health conditions. Getting young people to appreciate this information is a greater challenge. Providing free lunches and helping with transportation to and from the events result in far better attendance. Handouts containing useful information were taken by participants and are most valuable. They serve as reference for participants and can be shared with other family members. During VeggieFest, we also provide information on food vouchers and food checks that are available to seniors and children to assist in purchasing fresh vegetables.

We need more farmers in the Burgess community. Community folks will buy fresh locally grown vegetables, but there is not enough supply. There has been a dramatic increase in the population in Burgess in recent years. We have adequate space for farm vendors at Freewoods Farm. Existing farmers are willing to grow more vegetables, if we could find ways to keep the deer out.

Contact Person
O'Neal Smalls, Esq.
President, Freewoods Farm
803-776-8072
Oneal8072@yahoo.com

Project Title: The Development of a Niche Market for Distribution of Historically Important Crops for South Carolina

Partner: People's Farmers' Cooperative, Inc.

Project Summary

The intent of this project was to assist small socially disadvantage farmers in developing a niche market for the distribution of asparagus, a historically important crop in South Carolina. Participating farmers were to be identified from four regional cooperatives throughout the state. Developing such a market among this group would allow farmers with limited resources to benefit from a specific crop that currently is not in direct competition with other small farmers. Additionally, this project was designed to use the three-year maturing process of the asparagus crop to highlight, educate and capitalize on the health benefits of asparagus by offering educational workshops to inform both project participants and local consumers.

Project Approach

Early in the project period partial funds were requested in advance to hold an initial workshop. The session was presented to twenty-two participants to train on asparagus production. Subsequently, land preparation also began. Unfortunately, during the land preparation process it was discovered that the chosen region was too low and held too much water for asparagus production to be successful. Project leaders discussed niche market crop alternatives and intended to research medicinal herbs to determine if they may meet the objectives of this project. However, a Scope of Work Amendment was never submitted for approval and no further funds were requested for this project. Due to lack of activity and returned communication, the project was eventually terminated.

Project Title: Marketing Campaign Promoting South Carolina Watermelons – One Year Program
Partner: South Carolina Watermelon Association

Project Summary
The South Carolina Watermelon Association, Inc. (SCWA) used funding to promote the SC watermelon industry to retailers, wholesalers, and to the consuming public via an extensive Industry Spokesperson Program. The SCWA Industry Spokesperson was an ambassador and public relations representative for the SC Watermelon Association. Our objective was to increase the consumption of watermelon while providing education regarding the health benefits of our product. Promotions included appearances at a wide range of retail food stores, professional and collegiate sporting events, media appearances via television, radio, and print, and participation in various festivals and food show events to promote watermelon.

The project's purpose was to educate consumers on the benefits of consuming watermelon and to promote sales of South Carolina Watermelon during promotional events. By educating consumers at these events, we saw an increase in demand for watermelon throughout the season. Watermelon production in the state of South Carolina ranks in the top 10 nationally every year. In South Carolina over 7,500 acres of watermelon are planted each year. This reflects a significant portion of overall fruit production in the state and provides significant income to the state.

The SC Watermelon Spokesperson served as an industry spokesperson during a summer tour. This requires attention when working media or promotional events and the representative must be well versed in current agricultural trends, watermelon production and the benefits of consuming watermelon. Our representative was able to utilize their training and promoted our message to over 150,000 consumers throughout the 2014-15 grant period.

Recently published scientific studies have shown watermelon is superior to sports drinks when used for replenishment during athletic activities. By promoting the message in a timely manner at actual sporting events the spokesperson was able to effectively promote the message and influence demand for watermelon. Research shows that consumers are more concerned about the quality of foods they use before, during and after exercise than ever before. By promoting the health benefits of watermelon to these consumers we are able to help establish healthy eating habits that include South Carolina watermelons.

As a non-profit association of growers and allied industry members, resources to fund projects of this nature are limited. The SCWA is only able to host one fundraising event each year and these additional funds are vital to continue this marketing program. Consumers are constantly bombarded with advertisements from large sports drink and supplement manufacturers. The SCWA hopes that by utilizing these funds and this program, we can continue to influence consumers to purchase fresh fruits and vegetables, and specifically South Carolina watermelons, instead of other processed foods. By continuing to promote watermelon in this manner, we hope to secure future business for growers and allied industry members, while building healthier eating habits.

Project Approach

Project	Timeline
Food Shows - Southeast Produce Council Southern Exposure, PMA Fresh Summit, Eastern Produce Council Produce Show, Regional SYSCO/US Foods events, Regional Retailer Food shows	January 2015-October 2015
Development of promotional materials for use at promotional events.	October 2014-April 2015
Media Appearances - Local News, Social Media and radio participation before and after events	April-August 2015
Retail promotions - Bi-Lo, Food Lion, Harris Teeter, Walmart, IGA, Ingles, Lowes Foods, Piggly Wiggly, Giant Foods and Earth Fare	April-October 2015
Media Appearances throughout state - "Your Carolina" Greenville, SC - "Lowcountry Live" Charleston, SC - "Taste of SC" Columbia, SC - "WLTX" Columbia, SC - "Making it Grow" Sumter, SC - "Watermelon Field Day" Blackville, SC	April 2015 September 2015
Festival Activities - Hampton and Pageland Watermelon Festival - Schutzenfest - SC State Fair - SC Commissioner's Cup BBQ	April-October 2015
Visits to watermelon farms - Melon 1, Coosaw Farms, Goat Hill Farms, - Williams Farms, Kinard Farms	April-August 2015
Sporting Events - Cooper River Bridge Run, Charleston, SC - Charleston Riverdogs Baseball	March – July 2015
Appearances and promotions at farmer's markets - Columbia, SC - Greenville, SC - Florence, SC	March-September 2015

Goals and Outcomes Achieved

This marketing program was successful in reaching our target of over 150,000 consumers. The Cooper River Bridge Run in Charleston, SC was a tremendous success, reaching over 40,000 runners and additional attendees. Utilizing these grant funds, we were able to distribute over 25,000 individual samples of fresh cut watermelon and interact with runners, fans and media covering the event. With all this combined, we reached an audience of over 80,000.

During retail store promotions we were able to talk with consumers while shopping in stores. We received positive results from grocers, one noting a watermelon sales increase of over 15% when we had a representative in the store interacting with customers. Studies have shown that over 35% of those who sample a product will purchase it. We saw this impact in person with local grocery stores. In addition, many consumers also asked for help in identifying other locally grown fruits and vegetables. This further shows how positive interaction and presentation of information can positively affect sales not only in watermelon, but other fruits and vegetables. It should also be noted that sales ads for watermelon were up from 199 in 2014 season to 287 in 2015 season. Retailers said they were more likely to continue with ads during our promotional events and when we are in their town for events.

The 2015 season saw an increase in revenue from watermelon sales at an average of $9,526,801 from 2012-2014 to $11,796,166 in 2015 for the state of South Carolina. Growers saw a decline in price per melon but an increased demand in volume helped to offset that. It was also noted that the price of cut and packaged melon and mini melons increased from $1.37/pound to $1.60/pound for cut and from $.78/pound to $.81/pound for mini melons during our season. This is compared to average price of whole melons fluctuating around $.32/pound. We saw evidence of this data first hand when interacting with consumers and talking about serving whole melons versus and cut and packaged product or a smaller melon.

Beneficiaries

This program directly benefits over forty companies that are currently growing, packing, selling and shipping watermelons in the state of South Carolina. In addition, allied industry members see growth in their business as a result of these successes. These agricultural service companies depend on the success of watermelon growers in order for their business to thrive. This could include farm equipment, packaging materials, seed, fertilizer, pesticides and other essential pieces of business.

Lessons Learned

During promotional events all consumers responded positively to information regarding watermelon as a healthy option for replenishment after sporting events. We found increased interest while at an actual sporting event and more interest than we expected with children. At events where the SCWA provided samples of melon, we saw the most positive response. While expensive, we will try to have fresh watermelon available during future events. We will also focus more heavily on events and promotion towards children and young adults. We found that many millennials and older age groups enjoyed printed information and visual marketing pieces while children and younger adults reacted to samples. We also identified this young age group as making more of an impact when it comes to sales. Parents and guardians were more likely to purchase melons when combined with facts regarding nutritional value and the demand from the children or dependents. We will use this knowledge in future marketing campaigns to continue to build growth in the South Carolina watermelon business.

Contact Person

Matt Cornwell, Executive Director
SC Watermelon Association
mcornwell@scda.sc.gov
803-734-2225

Project Title: Financial Assistance to Specialty Crop Producers Seeking GAP Certification
Partner: South Carolina Department of Agriculture, Inspections and Grading Division

Project Summary
This project is a direct continuation from previous SCBGP agreements (12-25-B-1695, 12-25-B-1486, 12-25-B-1253) in which financial assistance was provided to each specialty crop producer that sought and received certification through a Good Agricultural Practices (GAP) audit.

Project Purpose
The South Carolina Department of Agriculture (SCDA) recognizes the importance of supporting its specialty crop producing stakeholders in their every effort made toward fiscal stability. This includes the certification requirements for food safety. Thus, the purpose of this project is to increase the number of produce farms that complete the Good Agricultural Practices Food Certification program and receive certification in this area. The funding of this project by the Specialty Crop Block Grant Program supplements the efforts of SCDA personnel by enabling specialty crop producers to participate in the program who may not otherwise be able to afford to do so.

Project Activities
Specialty crop producers are made aware of the GAP financial assistance program at varied industry events throughout the year including specialty crop-related association board meetings and agriculture conferences. Support from the SC Farm to School and SC Farm to Institution Programs assisted in letting farmers know that the GAP financial assistance is available to them; these programs promote new markets for growers. The SC Fruit, Vegetable, and Specialty Crop Association (now SC Specialty Crop Growers Association) has also displayed solid promotional support for this project.

During the first year, SCDA held two (2) statewide GAP readiness training sessions. Shortly thereafter, an SCDA resignation of a key person in the GAP program led to an agreement between SCDA and Clemson University Cooperative Extension Service (Clemson Extension) to offer a joint approach to teaching and training GAP readiness. As a result, two (2) “Train the Trainer” workshops were offered jointly by SCDA and Clemson Extension over the next year/two years. Two of these were specifically designed for Clemson Extension agents in order to prepare them for conducting GAP audits.

Goals and Outcomes Achieved
The goal of having the program is twofold; first, it enables small and disadvantaged farmers the ability to more easily obtain their GAP certification by partially removing the financial barrier, and secondly, the program helps South Carolina contribute to a safer food supply. The ability to offset the cost of the audits is a true catalyst of which many small growers take advantage, so that they will then be able to sell their fruits and vegetables in more marketplaces.

The following activities contributed to the success of the GAP cost share reimbursement program funded by the SCBGP: 1) the public was notified by social media posts, bi-monthly department printed newsletter announcement (The Market Bulletin), and department press releases. 2) Audits have been conducted as needed and requested by the SCDA Fresh Fruit and Vegetable Inspection Service. 3) Farms are tracked on SCDA’s USDA web site. Once audits are completed, all paperwork is sent to the USDA Audit Branch in Washington. Once all audit information is verified, the USDA Audit Branch sends the GAP certificate to SCDA to issue to applicator.

During the project period of October 1, 2014 – September 30, 2017, the $24,000 awarded from this SCBGP funding cycle reimbursed forty-eight (48) farms for GAP certification and water testing costs. The goal of assisting more (up to sixty) produce growers has been achieved. Of the forty-eight (48) applications that were received by SCDA requesting GAP audits, 48 specialty crop producers gained certification. This success rate is due largely in part to having SCDA personnel available to provide on-farm consultations with specialty crop producers prior to an audit. Consultations often included assistance with farm food safety manuals and other activities that would prepare them to achieve GAP certification. Although SCDA did not reach its target 135 firms with GAP certification, it did reach a total of 114 total firms GAP certified since the inception of the program. This was a 73% increase over the original sixty-six (66) certifications funded in prior SCBGP cycles. These two factors: the success rate of applications to certifications along with the percentage increase in certifications, demonstrate the need for more and future funding.

Currently data has not been collected from producers regarding increased number of market opportunities or percentage of increase in sales. Personnel transitions have resulted in delays and lapses in project management activities as well as information sharing. Counteractively, SCDA hired a new grants coordinator in April 2017 who has been working to develop more effective systems and procedures for improved grants management.

Beneficiaries
Small and disadvantaged farmers are the primary beneficiaries of this project, but countless consumers also benefit from having access to healthy, safe produce. From this project funding, forty-eight (48) farms directly benefitted by receiving GAP reimbursement.

Lessons Learned
The most important lesson reinforced by offering GAP cost share reimbursement is that specialty crop producers continue to want, need and seek out financial and educational assistance. Another need recognized from this project is for more statewide training to help farmers learn how to create the required food safety manuals. As these needs continue, it is evident that more efficient and effective systems are required for tracking reimbursements as well as performance measures. Moving forward it will be helpful to have better data to share with growers to promote the benefits of GAP certification.

Contact Person
Jack Dantzler, Director
Inspections and Grading
jdantzler@scda.sc.gov
803-737-4597

Project Title: Providing Platforms for the SCDA and SC Specialty Crop Producers at Trade Shows outside of South Carolina

Partner: South Carolina Department of Agriculture, Marketing Division

Project Summary

The purpose of this project was to provide additional funding to assist SCDA and specialty crop producers in South Carolina promote and facilitate sales by attending and exhibiting at traditional produce industry marketing conventions and trade shows. These events included the Produce Marketing Association Fresh Summit, the Southeast Produce Council Southern Exposure Expo, and the Southeast Produce Council fall meetings. These unique venues offer a broad platform on an annual basis to reach potential wholesale market buyers at national, regional and local levels.

This successful project was a collaborative effort between the SCDA, the SC Fruit, Vegetable and Specialty Crop Association, the SC Peach Council, and the SC Watermelon Association, as well as private companies.

Project Approach

In December 2014, two members of the SCDA marketing staff exhibited at the New York Produce Show in New York, NY. Other organizations/companies that were also exhibiting at this show include WP Rawl (leafy greens, vegetables, and value-added vegetable products), Chappell Farms (peaches), SC Watermelon Association and SC Peach Council. Personnel from McEntire Produce, a fresh cut vegetable operator located in Columbia, SC, and Titan Farms (peaches, peppers and broccoli) were also present. As a result of this show, increased sales have been experienced by Chappell Farms and WP Rawl.

Two events sponsored by the Southeast Produce Council were attended by SCDA staff members to promote specialty crops. The first, Southern Exposure Expo, was held in Orlando, FL in February 2014. The Fall Conference took place in Charleston, SC during September 2014.

Participation with SC specialty crop growers in 3 major trade shows again provided opportunities to engage the executive staffs of produce departments of retail chains, independent food stores, and foodservice distributors throughout the US. With these personnel, we were able to target leads, update crop opportunities, and set follow up visits, all in order to maximize results from leads generated.

2015 Trade Shows:

Name of Show	Attendees	Leads	Growth/Percent
Southeast Produce Council Hollywood, FL March 2015	3,100	Previous Averages (54) New (59)	 10 % Growth
PMA Fresh Summit Atlanta, GA	16,500	Previous Average (86) New (103)	 12.04 % Growth
New York Produce Show New York, NY	5,900	Previous Average (66) New (82.6)	 14.0 % Growth

The following shows were attended by both SCDA Personnel combined with South Carolina Growers:

- Southeast Produce Council - March 2015
- P.M.A. Summit - October 2015
- New York Produce Show - December 2015

Growers that Attended:

- W. P. Rawl (leafy greens, root vegetables, value added vegetable products)
- Coosaw Farms (watermelons, blueberries, Asian vegetables)
- Titan Farms (peaches, broccoli, bell peppers)
- Richter & Associates (peaches, strawberries, Vidalia onions, blueberries)
- Chappell Farms (peaches)
- S. C. Watermelon Association
- S. C. Peach Council
- Melon One (watermelon, cantaloupe)

Goals and Outcomes Achieved

1) The target number to increase the number of contacts was 50; 245 new contacts were made for the specialty crop industry in SC.
2) SCDA Personnel approved to updating Board of the SCPC that will further provide quality association/direction/idea sharing, that enhances the produce industry in SC
3) Dialogue with industry leaders, speakers enabled working comprehension of important segments of the produce industry; i.e., ethnic produce marketing, perception of local and organic, consumer purchasing behavior, opportunity to export to the U. K., food safety (GFSI), new product development, that is all done in "real time"

Beneficiaries

Although the long-term benefits of how these marketing activities and sales contacts is difficult to measure at this time, it may be accurately said that members of the commodity associations that attended, and/or the companies themselves in attendance are the direct beneficiaries of this project.

Lessons Learned

1) Continue this avenue of exposure at trade shows and industry meetings for South Carolina growers to industry buyers for platforms to listen, project, develop and partner in produce for growth, establishing mutual goals, expand and manage fruit and vegetable category for optimum results.
2) The project partner (SCDA) role is essential to the planning of the project as they are the ultimate key to produce integrity, safety, promotion, distribution and consumer trends. They need to be present for all involved to win.
3) In execution of our work plan we did face a minor confrontation to the orderly compilation of sales lead data. The use of electronic scanning devices in the display booth proved to be less than what we deemed acceptable due to size of booth, traffic patterns, and training requirements for booth personnel. Due to diminishing return, we installed a system of collecting leads by appointing designated staff to oversee booth visitation by grower, compiling the data, and delivering results to administration for distribution. This change was easily accepted by attendees and their overall dialogue indicated and confirmed the more personable way to capture lead data. We will continue to utilize this procedure for future shows.
4) Analyze goals with participating growers to be a proactive partnership to achieve a 15% overall growth in leads for all shows in which we jointly attend.
5) Implement electronic trailers and update to booth attendees no later than 3 weeks after show concludes.

6) Booth training for personnel 2 months prior to event to develop communication and data collection, and overall booth objectives for increased skills and execution.

Contact Person
Matt Cornwell
mcornwell@scda.sc.gov
803-734-2210

Project Title: Supporting Plant and Flower Shows through the use of Media Advertising
Partner: South Carolina Department of Agriculture, Marketing Division

Project Summary
The purpose of this project was to enable promotional support for the six Plant and Flower Festivals held at the three SCDA Farmers Market facilities during the 2015 calendar year. These markets are located in Columbia, Florence and Greenville. There are two shows at each market – one in the spring, and one in fall. The ongoing goal is the increase of direct sales of locally grown ornamental and edible plants at these shows through the attraction of more customers. The project provided funding for advertising materials to showcase the festivals, including radio, print media and outdoor boards.

This project is timely, as the monies received are used to augment the monies appropriated in SCDA marketing budget for the 2015 Plant and Flower Festivals. The impetus of the project is to continue the recent growth in attendance to the shows, the increase in purchases made from the South Carolina producers of horticultural crops, and to continue the exposure of this industry to the public. The Plant and Flower Festivals are held to promote the green industry in South Carolina while also offering exposure to our state farmers markets. Holding these festivals on an annual basis allows horticulturists in the state as well as other 'Certified SC Grown' vendors, additional outlets to market their products. Additionally, these festivals allow consumers the opportunity to connect with farmers and producers throughout the state.

SCDA continues to ask for SCBGP funding to support the Plant and Flower Shows as these six weekends are the only direct sales outlets for many of these hobby growers, or master gardeners. Most of these vendors are in remote, rural areas of South Carolina, and delivery distance is a barrier to sales. When Plant and Flower Festivals take place, and a guaranteed audience will be on hand to purchase the plants, the vendors are willing to come to the State markets and sell for three days.

The Plant and Flower Festivals sponsored by the SCDA have historically enabled many SC producers of both ornamental and edible plants the opportunity to gain visibility, and make direct sales to customers, at a relatively low cost. For example, the costs have remained low for the vendors due to having the advertising budget for this project stretched using Specialty Crop Block Grant Program funding. The previous projects from former SCBGP Agreements have all had an increased trend in both the number of customers shopping at the festivals, and in the average amount that each vendor sold. These two trends both began an upward movement when SCDA coupled the two funding sources (general appropriations and SCBGP funding) together. Thus, given the successful past, SCDA continues to build the festival momentum that has been established through previous project funding.

Vendors have indicated through survey responses from previous festivals that effective advertising has increased foot traffic, and thus, increased their sales. Vendors at these shows are only allowed to sell SC grown plant material. Therefore, all project funds have been used to solely enhance the competitiveness of specialty crops.

Project Approach
In January of 2015, the project manager mailed registration forms for each of the six shows scheduled for 2015. The mailing list is taken directly from the database the project manager has established and manages from year to year. This database has the contact information for all previous vendors at the plant and flower festivals. Additionally, the project manager reached out to the stakeholder organizations for the horticulture industry (SC Nursery and Landscape Association and the SC

Greenhouse Growers Association) and provided copies of the registration forms for any of their members that may be interested in participating as show vendors.

The dates and number of customers for the Plant and Flower Festivals in 2015 were as follows:

Spring 2015

Pee Dee	Pee Dee State Farmers Market	Florence	April 9-12	29,807 customers
Midlands	State Farmers Market	Columbia	April 16-19	39,071 customers
Piedmont	Greenville Farmers Market	Greenville	April 30-May3	17,600 customers

Fall 2015

Autumn Fest	Greenville Farmers Market	September 25-26	5300 customers
Midlands Fall Festival	State Farmers Market	September 18-20	15,850 customers
Pee Dee Fall Fest	Pee Dee State Farmers Market	October 2-4	3900 customers

The project manager worked in collaboration with the SCDA Public Information Director and the contracted Public Relations Agency (Chernoff-Newman, LLC) in the development and purchase of radio spots for these festivals. Print media ads were created the SCDA Graphic Artist. To increase media exposure, SCDA Public Information Director was able to arrange for the Commissioner of Agriculture to appear on local television stations in both Public Service Announcements about the festivals, and as a guest on morning and mid-day broadcasts.

Marketing staff members also utilized social media to augment these paid efforts, by posting information about the festivals on Facebook and Twitter sites.

Goals and Outcomes Achieved

The number of customers in 2015 at the six Plant and Flower Festivals only totaled 111,528. This is a 50% drop in attendance from previous years. (2014 had 233,689 customers).

Only two of the Festivals brought a higher sales average for the vendors; 22.5% of the vendors at the Spring Pee Dee Festival, and 11% of the vendors at the Midlands Spring Festivals. The remaining four festivals either had sales that remained the same or decreased.

Beneficiaries

The beneficiaries of this project are typically the vendors that participate in the Plant and Flower Festivals and sell the plants that they have grown in South Carolina. Despite this year's startling numbers, most vendors indicated by survey that they will return to participate in future festivals. Six stated that they will not be back. Also, on a scale of one to ten, with ten being the best, the average experience of the vendors was an 8.

The beneficiaries of these festivals include regular farmers market vendors, festival vendors (horticulturists, farmers and specialty vendors), and the state farmers markets as a whole. Without having the actual amounts sold by each vendor at these events, it is difficult to ascertain the true economic impact of the project. On average, each vendor sells a minimum of $1400.00 of plants to the public. When multiplied by the total number of vendors at each of the six shows, the estimated minimum value to the vendor beneficiaries comes to $504,000.00.

Lessons Learned
An ongoing concern from the vendors is that there is not enough advertising for the festivals. Although SCDA has increased advertising efforts for these shows throughout the past five years, the vendors would still appreciate more, especially radio and TV ads. Many stated that the print advertisements were rarely seen. To improve this situation, the project manager will place a greater emphasis on purchasing outdoor boards, and radio ad placements in future project years.

The additional complaints listed most often on the vendor surveys included concerns about inclement weather, horrible scheduling (one festival happened when three other festivals were occurring in the same city), bad hours selected by SCDA, parking too far away, difficulties getting in and out of Farmers Markets (especially Midlands), lack of variety compared to previous years, and little or no fresh produce for sale.

SCDA will move forward with this information as they plan for the 2016 Plant and Flower Festivals.

Contact Person
Brad Boozer
bboozer@scda.sc.gov
803-737-4664

Project Title: Supporting Specialty Crop Growers in all Market Arenas with Targeted Messaging under the 'Certified SC Grown' Logo

Partner: South Carolina Department of Agriculture, Marketing Division

Project Summary

While it is not built on the funding of a previous SCBGP award, this project does extend efforts of the ongoing marketing and merchandising of the Certified SC Grown branding program to drive consumer demand for specific specialty crops that are grown throughout the state by adding clarity to produce that is currently in season.

The objective of the project is for the SCDA to be able to provide its stakeholders (growers, market managers, retailers) with advertising and merchandising materials that will enable quick identification of locally grown fruits and vegetables at no cost.

Project Approach

The overarching goal is to increase opportunities that are available for specialty crop producers to expand their production by increasing demand from the consumers at the retail and direct market distribution opportunities. Through the creation, purchase and distribution of specialty crop targeted messages the SCDA will enable a higher profile for these growers among the consumer, increase the sales of these specific specialty crops, and create more stability in both our marketplaces and the rural economies across the state.

SCDA employed a public relations firm (the Firm) which created 6 versions of outdoor/signage featuring the following specialty crops - (1) peaches, (2) watermelon, (3) strawberries, (4) tomatoes, (5) Christmas trees and (6) a cornucopia. Additionally, 100 vinyl banners (20 of each, except for the cornucopia) were printed for growers to display outside their establishments or at a Community Based Farmers Market.

The Firm proposed and implemented a statewide digital outdoor media campaign that featured the new graphics. Using digital boards made it easy to switch out creative based on what produce is in season. (Examples follow.)

Note: From January to May 2017, progress on this grant was put on hold because SCDA was in the process of rebidding its public relations contract. The Firm was awarded the bid in June, and then in July developed new creative, and a digital outdoor plan to feature specialty crops statewide. Impressions for these efforts totaled 30,569,744.

In addition to the billboards, 100 banners (20 each of five designs) were produced to share with specialty crop producers and market managers. Because of getting a late start in the season, only three of the Christmas tree banners were distributed. A survey was developed and distributed asking each producer to report whether the signage had a direct effect on their sales. All reported that the signage did, in fact, increase sales. However, actual sales numbers were not provided.

In terms of work plan activities, new price cards were not produced as originally planned, largely in part due to loss of momentum during turnover of personnel involved with the project as well as the delay in reestablishing the public relations contract. However, once reestablished, as mentioned above the Firm did secure outdoor board contracts for the project and banners were created as well. All outdoor boards were completed and displayed except for the strawberry billboard which will be placed on 3/5/2018 and will be displayed through 4/1/2018 to coincide with strawberry harvesting in SC. While

only three Christmas tree banners were initially distributed, plans are in place to distribute the other banners at strategic times. Collection of initial surveys used to gather benchmark information has taken place with post season collection still in process. Unfortunately, site visits to stores and markets has not yet occurred, but SCDA will extend the efforts of this project throughout the upcoming specialty crop season.

Goals and Outcomes Achieved

Because of poor timing in the rebidding process at the Department, our contract with the Firm was not reestablished until July 1, 2017. However, we were able to strategically place three vinyl billboards that drivers see near the State Farmers Market in West Columbia; these billboards illustrated the cornucopia of specialty crops. In addition, the ability to place statewide digital boards that showcasing specific specialty crops (strawberries, tomatoes, peaches, watermelon) demonstrated a sales increase. Those digital boards will be running through the spring of 2018. Although the vinyl banners with the strawberries, tomatoes, peaches, watermelons, and Christmas trees were not ready to be sent out during their season, we have twenty of each slated to go out to producers this spring for them to use while they sell at roadside markets and community farmers markets.

Due to internal position turnover and NAAS sensitive reporting, there have been difficulties in gathering data and statistics in regards to specific specialty crop production in South Carolina. There has been no participant data conducted from 2013-present. Information regarding strawberries from 2013-2015 are combined with other states which are unfortunately not published. The value of production for peaches in 2014 was $67,602 million. In 2015 and 2016, the production value for SC peaches was combined with other states. There are only a few farms in South Carolina producing peaches so the individual producer numbers were combined for confidentiality reasons. Another problem encountered with gathering data is that Specialty Crop reporting in South Carolina and across the US is very sensitive to the NASS annual budget which makes it difficult to find exact numbers on individual crops. All of this combined has made it difficult to determine if we reached our goal of increasing sales by 10%.

Beneficiaries

It is estimated that approximately 350 specialty crop producers in the state that participate at roadside markets or community-based farmers markets have benefited from the digital and vinyl billboards although no firm data is available at this time.

Lessons Learned

Throughout the research and planning stages of this grant, the intention seemed to be to send the specialty crop banners directly to producers to use where they sell, either a community farmers market or roadside market. In the future, it may be best to send the farmers market a few of the specialty crop banners to advertise for the entire group of specialty crop producers on site. Seemingly, this would extend a broader reach to multiple producers collectively rather than sending to individual growers.

Additionally, SCDA has experienced multiple personnel changes during this project period, namely in the grants administration office and marketing department. This has made it difficult to keep the original intent and work plan of the project in focus. SCDA has learned from this that communication needs to be clear and direct from the outset, and project activities must be well documented and maintained, to transfer responsibility and carry on the work appropriately when transition does occur. This has prompted SCDA staff to take an improved, proactive approach with future funding opportunities, especially in the planning stage. Clarification of roles and responsibilities is paramount in this process.

Contact Person
Ansley Turnblad
Branding Coordinator
803-734-2210
arast@scda.sc.gov

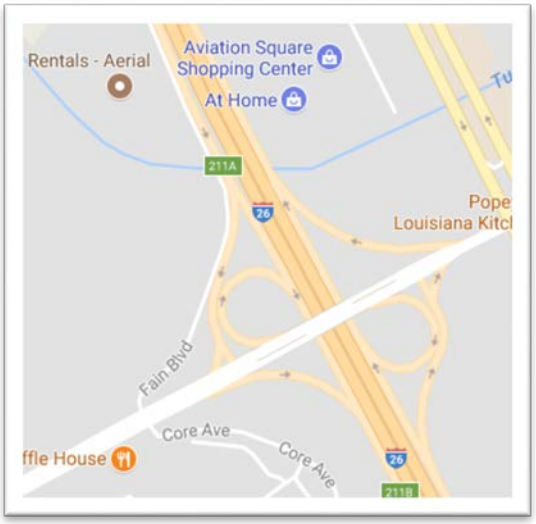
SC Department of Agriculture

2018 Digital Outdoor Recommendation

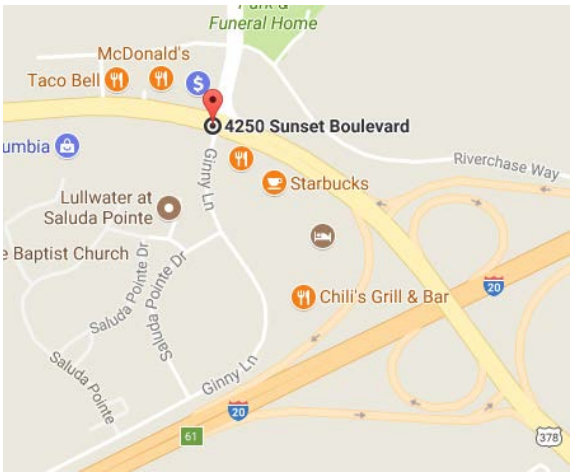
August 17, 2017

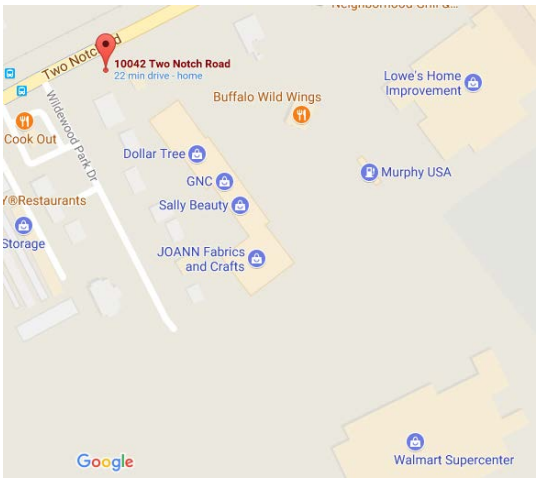
Market	Location	Weekly Impressions	Periods	Total Impressions	Cost
Columbia	Hwy. 378, E/O Corley Mill Rd. LHR	219,100	4	3,505,600	$8,471
Columbia	I-20 @ Mile 74 (Two Notch Rd)	221,200	4	3,539,200	$3,530
Charleston	I26 @mm 211 W/O I-526 LHR-WB Traffic Board	1,136,800	4	18,188,800	$13,177
Greenville	307 E McBee Ave	175,000	4	2,800,000	$14,589
Myrtle Beach	US HWY 17 BYP W/S 2.34 S/O Harrelson Blvd	158,509	4	2,536,144	$5,647
Total		**1,910,609**		**30,569,744**	**$45,414**

Above is the digital outdoor recommendation for the SC Department of Agriculture 2017-2018 digital outdoor campaign. In addition to the farms market static boards we currently have we would like to run on five digital outdoor boards to help increase presence and exposure within the four major DMAs in South Carolina. For the Columbia DMA we recommend placing two boards just outside downtown on boards on heavy traffic routes. The first board is located on 378 just off i-20 in Lexington and the second within the Sandhill area near the intersection of Highway 77 and i-20. Both boards are placed strategically within large shopping center areas with slow traffic patterns and offer a combined 440k impressions per week.

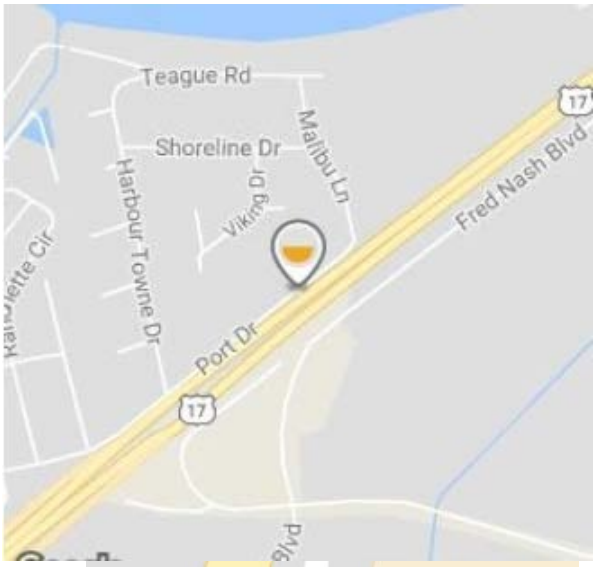


For Charleston, we recommend placing a board right on i-26 on mile marker 211. With the growing population and heavy tourism to Charleston the board offers over a million impressions per week.





In Greenville, we'd like to take advantage of the growing popularity of the downtown area and place on a board directly downtown at East McBee Ave, viewed along South Church Street. This placement gives our creative 175k impressions per week.



Lastly, in Myrtle Beach we would like to be positioned on one of the area's major arteries, US 17 Bypass. This area has constant exposure to rush hour traffic and is just north of a busy shopping area.

Adding a digital outdoor presence allows us to not only increase our reach but also to switch out and update creative more frequently. Based on produce seasonality and available creative we recommend the following rotation and run dates for the digital outdoor campaign. We'd like to start as soon as possible with a four-week run of the summer seasonal produce with the peaches and watermelon boards. In line with creative we'd like to run the tomatoes and cornucopia boards in the weeks leading up to Thanksgiving and the Christmas trees and cornucopia boards in the weeks leading up to Christmas. For the Spring, we'd like to push the strawberries board, but the run date will be more flexible with when the actual strawberry season starts next year.

Run Dates	Creative
8/28 -9/24/17	Peaches & Watermelon
10/23-11/19/17	Tomatoes & Cornucopia
11/28-12/24/17	Christmas Trees & Cornucopia
3/5-4/1/18	Strawberries

Through this proposal, we anticipate a very successful digital outdoor campaign as we continue to have a presence in high traffic metro areas while also running on highly commuted highways or interstates throughout the state.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