



# Mississippi Department of Agriculture and Commerce

## Specialty Crop Block Grant Program-Farm Bill FY2009

**Final Performance Report**

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### PROGRAM CONTACT

**Susan Head, Marketing Specialist  
Market Development Division  
121 North Jefferson Street  
Jackson, MS 39201  
Phone: (601) 359-1196  
Email: [susan@mdac.ms.gov](mailto:susan@mdac.ms.gov)**

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## Introduction

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The Mississippi Department of Agriculture and Commerce (MDAC) was awarded \$268,376.55 in funding for the Specialty Crop Block Grant Program-FB (SCBGP-FB) in November 2009. MDAC has partnered with six organizations to implement twelve projects to enhance the competitiveness of specialty crops throughout the state. The Final Report for the project *Beekeeping Educational Workshops*, implemented by the Mississippi Beekeepers Association, was previously submitted and approved in the Second Annual Report.

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## MISSISSIPPI SWEET POTATO MARKETING AND EDUCATION CAMPAIGN

### Project Summary

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The Mississippi Sweet Potato Council (SPC) conducted several activities to promote and market Mississippi sweet potatoes to produce buyers and consumers. In addition, this project also provided a quality educational seminar for growers, packers, shippers, and processors of sweet potatoes.

Through the execution of this project, the Council expected to reach more consumers and produce buyers, therefore increasing sales of Mississippi sweet potatoes. The educational seminar topics included: food safety, traceability, and organic production systems. These topics were timely in light of ongoing national incidents regarding produce recalls and food borne illnesses. The educational seminar taught growers how to grow, pack, and ship sweet potatoes utilizing recognized industry standards for food safety. All aspects of this project were aimed to increase the demand and use of Mississippi sweet potatoes.

This project built on gains achieved during the 2008 Specialty Crop Block Grant, Sweet Potato Promotional Campaign. The 2008 SCGBP and the addition of the 2009 Specialty Crop Block Grant, brand awareness continued to grow for Mississippi sweet potatoes.

### Project Approach

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Educational seminars were planned as part of the annual meeting of the United States Sweet Potato Council. This high quality educational seminar was directed towards growers, packers, shippers, and processors of sweet potatoes. Over 375 participants attended the seminar, including 52 Mississippi sweet potato growers. Specific issues addressed included food safety and traceability as it relates to the sweet potato industry. Seminars also included topics on

organic production systems. These topics were extremely appropriate in light of recent issues regarding food safety and produce. As a result of the seminar, one grower adopted organic production practices and eight packers returned home and completed the process to become USDA-GAP certified; another five packers are currently in the process of becoming USDA-GAP certified. As a result of the number of Mississippi participants altering production practices, the seminar proved to be successful.

The Mississippi Sweet Potato Council participated as an exhibitor in the Produce Marketing Association's (PMA) Fresh Summit Trade Show to promote and market Mississippi sweet potatoes to domestic and international buyers. By exhibiting at the PMA Fresh Summit, Mississippi growers and shippers were part of a premier produce tradeshow. During the exhibition, contacts were made with new produce buyers searching for sweet potatoes. As a result of the show participation, five new produce buyers placed orders for 26 truckloads of sweet potatoes during the six months following the tradeshow. This resulted in over 25,000 cartons of additional sweet potatoes sold, according to phone interviews with the Mississippi grower attendees. The PMA show continues to be an important venue to increase orders and sales of Mississippi sweet potatoes.

Radio ad placement with Mississippi State University Baseball Network was implemented to build brand awareness among consumers for Mississippi Sweet Potatoes. The radio ad campaign targeted likely consumers during the spring and summer seasons, which aren't typically popular times for sweet potato purchases. Ads promoting Mississippi sweet potatoes were implemented by the MSU Baseball Network which included 22 radio affiliates covering the entire state of Mississippi, Memphis, TN, Mobile, AL, and a portion of Louisiana. Two radio spots aired twice per game for 40 games. A telephone survey to four Mississippi packers and shippers noted stronger sales than normal during the 2010 season, following the radio spots. These four businesses estimated sales increased by two percent as a result of the ads. Consumers were informally surveyed six months following the ad and reported a favorable impression directly from the ad campaign.

A sweet potato and nutrition recipe card was designed and printed to educate consumers and food service professionals about the nutritional benefits of sweet potatoes and influence purchasing decisions of Mississippi sweet potatoes. A total of 40,000 recipe cards were distributed to the following locations: 24 sweet potato packing operations; Mississippi Cooperation Extension Offices; Mississippi Department of Health, Nutritional Service Director-Donna Speed; Mississippi Welcome Centers; and various retail markets. The goal of reaching at least 500 consumers and 100 food service professionals has been met.

There were no other partners in this project.

## Goals and Outcomes Achieved

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The goal of the project was to implement a coordinated promotional campaign for Mississippi sweet potatoes that targeted both consumers and produce buyers. Additionally the SPC targeted this project to educate growers, packers, and shippers on food safety, traceability, and organic production systems. In order to meet this goal, the following activities were completed: exhibited at the Produce Marketing Association's Fresh Summit Trade Show; purchased radio ad spots with MSU Baseball Network; and distributed the sweet potato nutrition and recipe cards.

The goal of the tradeshow was to increase sweet potato sales; as a result, five new buyers purchased 25,000 cartons of sweet potatoes. Additionally, radio advertisements increased sales by two percent from the previous year, as reported from the four Mississippi packers surveyed, and consumers surveyed noticed an increase in brand awareness. The sweet potato nutrition and recipe card has reached and surpassed its goal of 500 consumers and 100 food service professionals as 3000 cards have been distributed to consumers and 100 to food service professionals to date.

To accomplish the goal of educating sweet potato growers, packers, and shippers, a seminar was conducted at the United States Sweet Potato Council's Annual Meeting. The educational seminar reached 375 growers, packers, and shippers, slightly less than the original goal of 400. Of the 375, 52 were Mississippi growers. As a result of the seminar, eight MS packers have become USDA-GAP certified, five MS growers are in the process of becoming USDA-GAP certified, and one grower has become a certified organic sweet potato producer.

Consumer awareness outcomes will continue to be generated long after the initial activities have ceased. Brand awareness is an example of a long-term outcome of this project and was enhanced by all of the activities accomplished.

## Beneficiaries

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The 104 sweet potato growers of Mississippi benefitted from the completion of this project. The Town of Vardaman and the State of Mississippi benefitted from economic activity generated from the increased sales of sweet potatoes.

Twenty-five thousand bushel cartons of sweet potatoes were sold as a result of the PMA Trade Show. The educational seminar provided 375 sweet potato industry professionals information on the latest food safety standards. Eight packing sheds were USDA-GAP certified following the grower educational seminar. Five additional packers are currently in the process of becoming USDA-GAP certified and one grower adopted organic production practices for sweet potatoes.

## Lessons Learned

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At the conclusion of this project, the PMA tradeshow continues to be a very effective venue to contact new buyers looking for Mississippi sweet potatoes. The radio ads airing during the non-holiday, spring and summer seasons proved to be a very effective way to reach consumers. The educational seminars were well attended and effective in educating growers/packers about the need and value of becoming USDA-GAP certified. The recipe cards were also well received by consumers and food service professionals, providing a unique and enjoyable form of education.

## Contact Person

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Benny Graves, Executive Director, Mississippi Sweet Potato Council

662-769-7300

[benny.spcouncil@gmail.com](mailto:benny.spcouncil@gmail.com)

## Additional Information

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Sweet Potato Nutrition and Recipe Card:

**Maple-Roasted Sweet Potatoes**

*Roasting sweet potatoes is even easier than boiling and mashing them. Maple syrup glaze transforms this ultra-simple dish into something sublime.*

**Ingredients**  
2½ pounds sweet potatoes,  
peeled and cut into 1½-inch pieces (about 8 cups)  
½ cup pure maple syrup  
2 tablespoons butter, melted  
1 tablespoon lemon juice  
½ teaspoon salt  
Freshly ground pepper, to taste

**Preparation**  
1. Preheat oven to 400°F.  
2. Arrange sweet potatoes in an even layer in a 9-by-13-inch glass baking dish. Combine maple syrup, butter, lemon juice, salt and pepper in small bowl. Pour the mixture over the sweet potatoes; toss to coat.  
3. Cover and bake the sweet potatoes for 15 minutes. Uncover, stir and cook, stirring every 15 minutes, until tender and starting to brown, 45 to 50 minutes more.

**Tips and Notes**  
*Make Ahead Tip:* Cover and refrigerate for up to 1 day. Just before serving, reheat at 350°F until hot, about 15 minutes.  
12 servings, about ½ cup each | Active Time: 10 minutes | Total Time: 1 hour 10 minutes

**Nutrition**  
Per serving: 96 Calories; 2 g Fat; 1 g Sat; 0 g Mono; 5 mg Cholesterol; 19 g Carbohydrates; 1 g Protein; 2 a Fiber; 118 ma Sodium; 189 ma Potassium.

**NATURE'S BEST!**  
**Powerhouse of Nutrition**

- Bursting with Beta Carotene (Vitamin A)
- High in Vitamin C
- Good Source of Fiber
- Fat-Free and Cholesterol-Free

**VARDAMAN, MISSISSIPPI**

**Sweet Potatoes**

Photograph from the 2012 PMA tradeshow:



# INVESTIGATION OF DIFFERENT HIGH TUNNEL SYSTEMS FOR SPECIALTY CUT FLOWER PRODUCTION IN MISSISSIPPI

## Project Summary

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This initial purpose of this project initiated by Mississippi State University (MSU) in 2009 was to enhance the competitiveness of cut flower production in Mississippi through research in the field and under high tunnel conditions for extending production seasons. This was to be accomplished by investigating a wide selection of specialty cut flowers and investigating various aspects of cut flower production including soil amendments, fertilization, planting density, and transplanting date on the growth and yield of specialty cut flowers.

This project researched the shade cloth effect in high tunnel production. Specialty cut-flowers are a niche market and are the highest value crop on a per acre basis, but many Mississippians remain doubtful on its production in the hot summer under high tunnels.

The original project investigator left Mississippi State University near the end of December 2011. The new investigator was unfamiliar with specialty cut flower research and the project was eventually terminated and remaining funds were relinquished to Mississippi Department of Agriculture and Commerce (MDAC).

This project does not build upon previously funded SCBGP projects.

## Project Approach

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During the time when the proposal was submitted and funding allocated, numerous growers inquired about the effect of shade cloth to control high temperatures in the high tunnel during the summertime in Mississippi. The objectives were altered to address grower concerns to investigate the microclimate profile under high tunnel with shade cloth in Mississippi and investigate the effect of shade cloth in high tunnel systems on warm season specialty cut flower production in Mississippi. This change in the project delayed the project one year. Cut flower transplants were then planted in the field in April 2011 for trials, due to delay in high tunnel construction. Cover crops were planted at the high tunnel site to smother the weeds. Information on the field cut flower trial has been conveyed to growers in presentations and one-on-one interaction with growers, particularly new growers. The high tunnel was constructed on June 29, 2011 at Mississippi State University South Farm; however, due to the Principle Investigator's (PI) departure from Mississippi State University, the cut flower trial was not initiated in the high tunnel.

The project investigator did conduct twelve presentations on high tunnels. These included various workshops and grower meetings across the state.

By the end of 2011 the project investigator and the co-project investigator both left Mississippi State University. A new PI assumed the project and quickly realized the he would be unable to perform the original work promised in the proposal, especially since their research concentrations were not similar. The high tunnel used for this project was also destroyed by a tornado. Eventually the new project investigator terminated the project and relinquished funds to MDAC.

## Goals and Outcomes Achieved

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Due to growers concern of high tunnel production and overheating in during the summer in Mississippi, the initial objectives were altered slightly to accommodate this concern. The research was to investigate the microclimate profile under high tunnels and the effects of shade cloth in high tunnels on warm season specialty cut flower production in Mississippi. Two extension publications were created:

- P2635 Metal Quonset High Tunnel Construction Costs (<http://msucares.com/pubs/publications/p2635.pdf>)
- P2595 High Tunnel Suppliers (<http://msucares.com/pubs/publications/p2635.pdf>)

The goal to reach an audience of 300, comprised of 100 growers and 200 consumers was also reached as high tunnel production was promoted in the following events through presentations, field day and walking tours. The total number of audience members reached was approximately 800-900:

1. 12/08/2011. High tunnel workshop. Houston, MS
2. 10/22/2011. Fall Flower and Garden Fest. Crystal Springs, MS
3. 03/10/2011. High tunnel field day. Crystal Springs, MS
4. 11/30/2010. Specialty crop producer workshop. Pontotoc, MS
5. 10/26/2010. 'High tunnel production of specialty crops'. Marks, MS
6. 10/15-10/16/2010. "High tunnel walking tour". Fall Flower & Garden Fest. Crystal Springs, MS
7. 10/04/2010. Specialty crop producer workshop. Jackson, MS
8. 09/28/2010. Specialty crop producer workshop. Hattiesburg, MS
9. 09/27/2010. Specialty crop producer workshop. Biloxi, MS
10. 07/31/2010. Mississippi Homegrown Sustainability Conference. 'High tunnel production'. BOST, MSU.
11. 05/05/2010. Farmers Market Manager Workshop. Raymond, MS
12. 03/11/2010. High tunnel field day. Crystal Springs, MS

The goal of reaching a 10% adoption rate of specialty cut flowers production one year after the research has been conducted was not reached due to the unforeseen circumstances of the destruction of a high tunnel and the project investigators leaving Mississippi State University.

## **Beneficiaries**

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The beneficiaries of this project include the original project investigators, who wrote and managed this project through its first two years, as well as all 800-900 growers and consumers that benefited from presentations and research conducted thus far. These would be specialty crop growers of cut flowers and growers of other specialty crops. The damage that one of the high tunnels sustained during a tornado could be interpreted as a learning point in which both the PI and the growers could benefit from reevaluating the design specifications of the high tunnel.

Benefits of this project were extended beyond this initial scope of this project through the various workshops and field days listed above in addition to the two Extension publications.

## **Lessons Learned**

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This project experienced many challenges over the course of the grant period. Destruction of the high tunnel by tornado winds proved to be a major setback. The weather-damage cleanup and salvaging the parts from the existing tunnel took some time, and the adverse weather event led to additional extensive research on high tunnel structures to prevent such damage from happening in the future. The project director took extra precaution in making the decision on which high tunnel structure to purchase, as there are no additional funds available to rebuild the high tunnel if such weather damage happens again.

By the end of 2011 the project investigator and the co-project investigator both left Mississippi State University. A new PI assumed the project and quickly realized he would be unable to perform the original work promised in the proposal, especially since their research concentrations were not similar. Eventually, the project investigator terminated the project and relinquished funds to MDAC.

Due to the fact that the project was terminated, the goal of reaching 10% adoption rate was not achieved because the research wasn't fully carried out and the project leaders were unable to make recommendations.



## Contact Person

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Dr. Rick Snyder

601.892.3731

[Rick.Snyder@msstate.edu](mailto:Rick.Snyder@msstate.edu)

# DEVELOPING SPECIALTY CROP EDUCATION FOR MISSISSIPPI PRODUCERS

## Project Summary

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Mississippi State University aimed to enhance competitiveness of Mississippi specialty crops by educating producers at the Greenhouse Tomato Short Course and the Fall Flower & Garden Fest. These programs attract a variety of participants therefore furthering the cause of education in specialty crops.

In recent years there has been growing interest in specialty crops. Grower questions and concerns about greenhouse tomatoes and other vegetables, ethnic vegetables, shiitake mushrooms, organic vegetables, cut flowers, specialized fruit crops, and many other specialty crops are now a daily occurrence. This project addressed the need to assist our Mississippi growers with the information required to shift into specialty crop production and develop successful farm businesses in a number of various crop alternatives. The project was motivated by the numerous calls from commercial producers asking for assistance in production of various specialty crops. Educational assistance to help growers pursue more lucrative specialty crops production proved very timely as many growers have suffered under economic problems.

This project was previously funded by the FY2008 Specialty Crop Block Grant and was a continuation of this project. The FY2009 project was an extension of the previous grant and aimed to increase the educational reach of specialty crop growers.

## Project Approach

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In order to enhance the competitiveness of specialty crops in Mississippi, the primary activities were selected: The Greenhouse Tomato Short Course and the Fall Flower & Garden Fest.

The Greenhouse Tomato Short Course was conducted at Eagle Ridge Conference Center in Raymond, MS in March of 2010, 2011, and 2012. Growers from about 25 states and various countries such as Trinidad, Ghana, Jamaica, Bahamas, and Brazil, attended the program to learn how to produce this highly specialized crop. Attendance at the short course was around 130 people each year. Exhibitors were also an integral part of the program, with about 20 commercial exhibitors from South Dakota, Colorado, Florida, Louisiana, Connecticut, Ontario, Canada, and various other areas. Speakers chosen were recognized as experts in their respective field to insure the quality of the program. The speakers included MSU extension staff and various other speakers from across the country. This project improved promotion and publicity of the short course so more growers would become aware of the program and take advantage of this opportunity. The comments on the evaluation forms reported positive feedback and were supportive of the continuation of this program. More information on the

Greenhouse Tomato Short Course can be found on the website, <http://www.greenhousetomatosc.com>.

The Fall Flower and Garden Fest was held at the Truck Crops Experiment Station in Crystal Springs in October of 2010, 2011, and 2012 with attendance reaching 5,000 in 2010 and 2011 and 4,500 in 2012. The focus of the event was a 3-acre garden of half vegetables and half flowers and also included a number of educational seminars, demonstrations, walking tours, wagon ride tours, etc., to provide as much educational programming as possible. More information on the Fall Flower & Garden Fest can be found on the website, <http://msucares.com/fallfest>.

The Deep South Fruit and Vegetable Growers Conference was discontinued in 2009 due to lack of participation, therefore speakers for the conference were not obtained as original outlined in the project.

## Goals and Outcomes Achieved

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The Deep South Fruit and Vegetable Growers' Conference was discontinued in 2009 due to lack of anticipated numbers of exhibitors and grower participation. Therefore the goal of conducting surveys to determine effectiveness of the speakers and topics was no longer attainable.

The 2010 Fall Flower & Garden Fest webpage, <http://msucares.com/fallfest>, was a huge success and served as a very important method to promote the Fest and answered many frequently asked questions about the program and event logistics. The home page website had a total of 5,356 page views by 3,818 individuals. However, when looking at all of the pages on the Fest web site, there were 10,740 page views by 7,747 individuals. A survey station was not set up in 2010, but several emails were received in the days following the Fest which were all favorable and complimentary of the event. For 2011, the Fall Flower & Garden Fest webpage increased to a total of 11,831 page views by 8,603 browsers. This represents an increase of 10.2% in page views and 11% in browsers, exceeding the goal of a five percent increase. A Facebook page was created in 2011 for the Fall Flower & Garden Fest; to date the page has 275 likes. Friends on the page are helpful in distributing information about the Fest, new garden and program updates, speakers, and time slots, etc. In addition, the comments on the page have received positive feedback and can be viewed at <https://www.facebook.com/FFGFest>. The volunteer survey station was not set up; instead every five years a detailed demographic survey has taken its place. Attendance increased above the anticipated five percent from 4,500 to 5,000 in 2010 and 2011, an increase of more than 11%.

A webpage for the Greenhouse Tomato Short Course web page, <http://greenhousetomatosc.com>, also proved to be a huge success and served as a very important method to promote the course and provide information including the agenda, list of

accommodations, directions and map, and registration materials for growers and exhibitors. The home page of the web site had a total of 6,379 page views by 4,602 unique browsers. This was an increase of 644% from the benchmark of 618 browsers. Attendance averaged about 130 each year, an increase of more than 44% from the benchmark of 90, well above the target of five percent. Written evaluations were conducted for the Greenhouse Tomato Short Course; overall, the scores for speakers and topics were excellent. The Pest Management Workshop of the second day of the workshop proved to be especially popular. High ratings were given for the location, facility, meals and refreshments. There were multiple requests for information on organic production, however a qualified speaker was hard to find. Most participants indicated they would attend the short course again, if given the opportunity. These results were encouraging to the project investigators.

## **Beneficiaries**

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The Fall Flower & Garden Fest benefitted around 14,500 home gardeners and those interested in plants benefited from the many seminars, walking tours, demonstrations, workshops, and exhibits at Fall Flower & Garden Fest in 2010, 2011, and 2012. The Greenhouse Tomato Short Course benefitted about 400 commercial growers, county extension agents, extension specialists, and researchers in 2010, 2011, and 2012.

An exact estimate of the dollar of value gained for each event would be difficult to measure. If each home gardener were to have learned enough information from the extension educational programs at the Fall Flower & Garden Fest to save them \$100, then over the 2 years, \$1,000,000 of educational value was provided. If each grower of greenhouse tomatoes were able to increase yield and/or save \$1,000 in costly mistakes, then over the 2 years, \$260,000 in informational value was provided to them.

The beneficiaries of the programs implemented in this grant were the commercial specialty crop growers not only in Mississippi but other states as well. These included greenhouse, hydroponic growers, small fruit, tree fruit, and field vegetable producers. While it is impossible to extract financial data from each of the producers who were the beneficiaries of this grant, it is clear from the responses, both oral and written, that the producers were very appreciative of the programs offered and would make excellent use of the information provided to them through these programs.

## **Lessons Learned**

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This project experienced only one major challenge. Originally, funding included support for the Deep South Fruit & Vegetable Growers Conference and Trade Show in Mobile, AL. However,

since that conference was canceled after this grant began, funding was available for other efforts that this grant also supports.

Participation for the Fall Flower & Garden Fest was excellent with about 5,000 in attendance during the course of the three years of this grant period. The Fest has taken place over 30 years and the attendance has varied from a few hundred to over 6,000. In recent years, however, 4,000 to 6,000 has been the norm. In 2009 the attendance was down to about 4,000 due to cold, rainy weather and muddy grounds. Therefore, having 5,000 present was a positive increase.

The Greenhouse Tomato Short Course has proved very popular and will continue on into the future as there is still a demand for this specialized course. Participants continue to give excellent feedback, as they are attending from all of the United States and many countries.

## Contact Person

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Dr. Rick Snyder  
601.892.3731  
[Rick.Snyder@msstate.edu](mailto:Rick.Snyder@msstate.edu)

# **SPECIALTY CROPS TO IMPROVE CHILD AND ADULT NUTRITION, INCREASE CONSUMPTION OF LOCALLY GROWN PRODUCE AND INCREASE CITIZEN GROWN SPECIALTY CROPS**

## **Project Summary**

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Mississippi faces many challenges associated with obesity, low incomes, loss of jobs, and the ability for individuals to provide nutritious fruit and vegetables to their families. The increase of health issues is associated with poor nutrition, high fat diets, and the decrease of consumption of fresh fruits and vegetables. This project demonstrated, encouraged, and provided important information to increase the growing of local produce. Through this project, individuals learned appropriate to grow, fruit orchard maintenance, and how fruit trees contribute to city landscapes, green infrastructure, and individual health and welfare. This project proved important and timely due to requests received for assistance and trend towards education of nutrition and home gardens.

The catalysts behind the project included the refreshed focus on city produce gardens, the mission of the MS Urban Forest Council to provide education on trees in the city, and the partnership between the local Food Kitchen in a low income part of Jackson. The project components included establishing a model fruit orchard and vegetable site in the downtown Jackson area and developing an educational toolkit with information one would need to begin a fruit and/or vegetable garden. This model fruit orchard was the first of its kind in Mississippi; “Food Forests” is a new concept in the state and has contributed to an increase in locally grown produce and aided in healthier diets. This effort is expected to expand and establish Food Forests throughout Mississippi based on the successes of this model project.

This project did not build upon previously funded SCBGP projects.

## **Project Approach**

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The model fruit orchard was developed between a partnership between Wells Church, a local church that feeds the less fortunate; Operation Shoestring, a low income children’s group; and Mississippi Urban Forest Council, a state organization. A knowledgeable and committed work team provided consistent planting and maintenance that made this project a significant success. The orchard site is on a downtown lot on Bailey Avenue in Jackson, MS. Twenty-six varieties of fruit, vegetables, herbs, and other produce were planted. Each season appropriate produce was planted, maintained, and harvested for the two year developmental period. Well’s Church and their food pantry volunteers provided all the labor and oversight of the orchard. Produce continues to be harvested by local citizens and the church to supply their food pantry each Tuesday.

Education and outreach was a large contribution of the project. Local children, citizens, and church members were taught how to plant and maintain a garden. Eleven on-site training workshops, one statewide training conference (February 7-9, 2012), Farmers Market displays (June 3, 2012), and an orchard tool kit were part of the outreach that included topics on nutrition, value of locally grown fresh produce, and growing and processing fresh produce. The orchard tool kit was distributed to every community in MS and available on the Mississippi Urban Forest Council's web site: [www.msurbanforest.com/edible\\_forest.html](http://www.msurbanforest.com/edible_forest.html).

Media support for the project included: two TV spots, interviews, flyers, newsletters, displays, and other media covering the implementation and success of the orchard. Approximately 150,000 citizens were impacted by the project with 1,014 participating directly. Audiences that actually were touched by the project included: TV, radio, neighborhoods, local schools, cities statewide, a nationally recognized church membership, and others. Volunteer hours were tracked and provided \$25,185.00 value in services.

Beginning and ending surveys were conducting focusing on three groups: local citizens, church members, and local children and parents. The surveys indicated that people were buying and consuming more locally grown produce, increasing their visits to the farmers market and increasing their willingness and knowledge of growing fruit modeled at the garden site. The accomplishments of this project were exceeded in every way. Most importantly, for the long term success of such project, there must be an adult and a well-informed committed group of people willing to work in an orchard or garden. Without these key factors the long term success is limited. Site selection is the other key factor in establishing this type of garden/orchard. The orchard proved not only beautiful and visibly appealing, but also very productive and functional. It served as a common cause that brought many groups together including the local citizens, church members, the local school and children's groups.

Significant contributions from project partners were as follows:

- Mississippi Urban Forest Council developed the concept of Food Forest/Orchards for MS, wrote the grant, and developed the education tool kit, provided guidance, direction, reporting, training, and outreach.
- Wells Methodist Church and its members provided labor and oversight of planting and maintenance of the orchard. They also assisted with outreach to local citizens and training. The orchard is located on church property and will continue as a community garden, supplying produce to local citizens. The orchard fits comfortably into the church mission of feeding and helping the less fortunate. The church has proved to have a vested interest in this project.
- Operation Shoestring, a local child care program, provided the involvement of their children and parents to learn and participate in the garden-planting, harvesting, eating, and sharing of the produce.

## Goals and Outcomes Achieved

The Mississippi Urban Forest Council originally aimed for 300 participants in the model orchard and garden site, but in the end had a total of 1,014 participants directly involved. Increases in participation and impact were determined by surveys and volunteer hours. The survey produced results from 209 direct participants. Summary of surveys showed a significant increase in interest levels, very positive feedback, and responses that the orchard provided food when it was much needed.

The surveys were taken of three audience groups at both the beginning and ending of the project. The results showed an increase in buying and consuming more locally grown produce, increased number of visits to farmers markets and increased their willingness and knowledge about growing fruit and vegetables as modeled from the garden.

Other short term goals included establishment of the orchard, outreach to local citizens, training, and development and distribution of the educational tool kit to communities statewide were all achieved. Seventy-five toolkits were distributed to communities statewide. Every city leader in the state received a copy of the toolkit, informational material, and how to apply for assistance. Overall, 1,500 plus toolkits were distributed over the course of the grant period, well above the anticipated 375. The MUFC reports that they receive constant site visits and emails asking for more information and requesting an orchard in their area. Communities statewide were surveyed as to their desire to host a food forest or orchard; thirty-seven communities responded to the survey and stated they would like to host a community orchard and that it would be beneficial to their citizens.

The goal was to have over 200,000 people exposed to the project; the following is a summary of the impacts of the Edible Forest of Mississippi model project.

Promotional Methods	Number of People Exposed
Blog	37,380
Clarion Ledger -2 articles	30,000 circulation
Neighborhood Homes	30
Operation Shoestring	100
Wells Church	500
Wells Church Website	4,350 hits
Wells Church Wellsfest	200
WLBT -3 TV Interviews	45,000
MS Municipal League Members	2,590
MS PBS	2,500
<b>People Participating (Goal:300)</b>	

Operation Shoestring	55
Wells Church	80
Wells Church Food Pantry	120
Training Workshops	759
<b>Community Toolkits(Goal:75)</b>	1500
<b>TOTAL EXPOSURE</b>	<b>125,182</b>

Total exposure was hard to quantify, especially with newspaper circulation, television reports, and toolkits. It is estimated that many household have more than one person occupying the residence and the reach was far greater with newspapers and television reports than listed above. The toolkits sent to communities again likely had more than one person come in contact with the information. Taking these factors into consideration, the MUFC most likely came closer to reaching the 200,000 exposure they aimed for and possibly even exceeded their goal.

MUFC hoped to have fifty new sites as a result of the model garden site; this however was not attained and was determined as a long term goal. Currently there are six other model garden sites in southern Mississippi, with many more communities inquiring of developing their own community garden in the near future.

Other long-term goals include the continuation of the orchard site, planting and maintenance, harvesting and community involvement. MUFC is actively looking for funds to expand the number of public orchards in the state, as there has been significant response from communities across the state.

## Beneficiaries

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Beneficiaries of the programs included motivating Operation Shoestring to do a school garden across the street. The US Forest Service recognized the project as a good model for the country. The multiple TV interviews and workshops helped to educate individuals on the fruits and vegetables acclimated to Mississippi. The educational workshops were well attended. The website continues to get good feedback and interest. The toolkit and brochure has been reprinted twice to date, due to popularity. While MUFC is not quite certain of a quantifiable number of persons reached from there outreach efforts, it is certain that this has heavily impacted the state more than expected.

Direct beneficiaries are the 1,014 volunteers that helped maintain the garden, recipients at the food pantry that benefited in a nutritious fashion, and the 125,000-200,000 plus learned at least something about the Model Garden project, and how to care for plants, what to plant, work to maintain a garden, or harvesting a garden, etc.

## Lessons Learned

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This project proved very successful in many ways. Most importantly, the following characteristics must be met and supported by an organization interested in implementing an Edible Forest. A well-trained orchard work team is vital for plant maintenance and general upkeep. A long-term agreement is useful for continued maintenance, planting, and use of the produce as well as a commitment to keep the project in operation. Site selection is important in regards for adequate water supply, sunlight, soil type, etc. Organizations considering implementing this project should also develop a stable method to benefit the public, either through a local soup kitchen, church, other non-profits, citizens, etc. As with any successful operation, there must be committed support and encouragement to others. Comments from the survey indicated support and understanding of the role of the orchard and its need and impact on the community is vital to its survival. The local television stations and newspapers provided consistent coverage of the orchard and was well received by others.

The goals of the project were achieved, and also provided additional advice. After many years of developing specialty crop gardens, placement of a garden with groups that have the capacity and desire to work the site for long term impacts offer more produce and other benefits. Many school gardens fall to the wayside and become expensive short term investments because there is no source of continued program management, site development and maintenance. It is highly recommended to work with a local church or city department that has a committed and vested interest in the project and its community impacts.

## Contact Person

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Donna Yowell  
(601) 672-0755  
[dyowell@aol.com](mailto:dyowell@aol.com)

## Additional Information

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Website: [http://www.msurbanforest.com/edible\\_forest.html](http://www.msurbanforest.com/edible_forest.html)

Edible Forest Tool Kit:

## Visit The Jesse Gates EDIBLE FOREST

The Jesse Gates Edible Forest at Wells Church is a current edible forest pilot project in Jackson, Mississippi. Many things set this project apart from others before. The site has nine raised beds for vegetables but the design includes twenty-four fruit trees, sixteen berry bushes and three grapevines. The gardens are kept organic as much as possible, specifically avoiding any chemical fertilizers and pesticides. Construction of the garden utilized recycled material including concrete to outline the beds from an old driveway, dirt that was leftover from edging and gutter cleaning, and composted limbs and twigs, plus layers of newspaper to control weeds. Organic compost was also purchased from a local garden center to supplement the gardens. The Wells Church food pantry is the outlet for the garden produce and the church members as well as the food pantry recipients are involved in maintaining the garden. A partnership was also created with Operation Shoestring, a nearby nonprofit organization, to bring children to the garden to plant and harvest. The children dined on the harvest of the garden and the harvested produce was then distributed among the food pantry recipients. To ensure the success of this project, the community, church and food pantry recipients were surveyed and interest in the project gauged. These are vital steps in insuring the success of this project.

*The Jesse Gates Edible Forest is located next to Wells Methodist Church at 2019 Bailey Avenue, Jackson, MS*

### Resources:

Edible Forests of Mississippi is a statewide program of the Mississippi Urban Forest Council. Visit our web site to learn more. Funds for this project were provided in part through the Mississippi Department of Agriculture and Commerce, USDA Specialty Crop Grant Program.

**Mississippi State University Extension Service:** [www.msucare.com](http://www.msucare.com)

**National Gardening Association:** <http://assoc.garden.org>

**Food Skills For Self Sufficiency:** [www.food-skills-for-self-sufficiency.com](http://www.food-skills-for-self-sufficiency.com)

**American Community Gardening Association:** [www.communitygarden.org](http://www.communitygarden.org)

**Mississippi Department of Agriculture and Commerce:** [www.mdac.state.ms.us](http://www.mdac.state.ms.us)

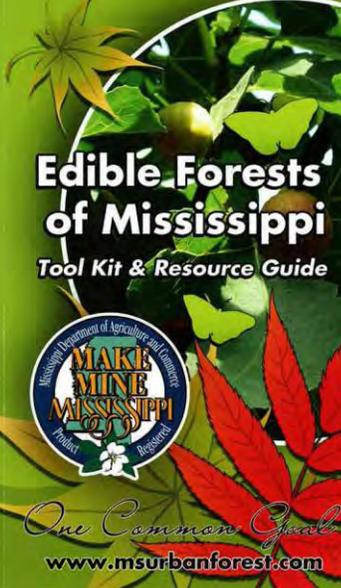
**America The Beautiful Fund:** <http://america-the-beautiful.org/>

Donna V. Yowell, Executive Director  
Mississippi Urban Forest Council  
164 Trace Cove Drive  
Madison, Mississippi 39110  
Cell: 601-672-0755

Fax: 601-856-1660  
Email: [dyowell@aol.com](mailto:dyowell@aol.com)  
[www.msurbanforest.com](http://www.msurbanforest.com)



**MISSISSIPPI URBAN FOREST COUNCIL**



**Edible Forests  
of Mississippi**  
Tool Kit & Resource Guide



*One Common Goal*  
[www.msurbanforest.com](http://www.msurbanforest.com)

## EDIBLE FORESTS Tool Kit & Resource Guide OF MISSISSIPPI

### Why An Edible Forest?

Edible Forest of Mississippi provides education, training and additional resources in an effort to encourage the establishment of community orchards statewide. Mississippi citizens have the highest rate of obesity in the US at well over 30%. A large segment of the population also suffers from poor nutrition and other health issues, such as diabetes and heart disease, related to diets low in fresh fruit and vegetables. Many also do not understand the direct health benefits of a good diet derived from fresh, locally grown produce. Communities statewide have open spaces and opportunity to plant fruit orchards with minimal cost and maintenance. In addition to supporting healthier citizens, locally grown produce can supplement incomes and serve as a source of produce for local shelters, soup kitchens, churches and other groups.

### Site Selection:

Site selection is very important when planning an orchard. Sites should have good drainage, nutrient rich soil, and lots of sunlight. Soil nutrients can be addressed if that is lacking but sunlight and good drainage are vital. It is also necessary to assess the surrounding areas to determine if vegetation is on the site that could block sunlight or steal nutrients from the orchard as it grows. A location close to the orchard's human resources and water sources is imperative. Planning should also encompass awareness of utilities and underground service lines.

### Human Resources:

Manpower and commitment to success is critical to the development and continuation of a successful orchard. A number of approaches that can be taken to plant and maintain an orchard exist. Citizen volunteers, civic groups, students, church groups, local government or some combination of these are all viable options. It is necessary to have the involvement of trained individuals even if only as consultants.

### Elements Needed:

A few basic elements are key to the success and sustainability of an orchard:

1. People -Human resources to plant and maintain.
2. Place -A site with necessary ingredients for a bountiful harvest.
3. Plants -Proper plant selection.
4. Preparation -This includes all aspects from soil, sun light, water and tools.
5. Purpose -A solid plan for distribution and use.
6. Establish a method for produce distribution or use by the local community.

### Suggested Uses:

Local soup kitchens or food pantries  
After school programs or senior meal delivery  
Sell for profits and provide demonstrations  
Citizen's dispersal on harvest days  
Community composting and recycling center  
Harvest festivals and training workshops  
Mulching and local farmers' markets

### Plant Selection:

Selecting the appropriate variety of fruit trees is critical to the success of the orchard. It is important to match tree selection with the USDA defined separate zones for different areas of the country. Also, consider the space requirements as well as the amount of maintenance, insect control, sunlight and pollination needed. This should be considered during planning. Suggested native fruit species include:

#### Tall Trees

- Pecan & Hickories
- Mulberry

#### Small Trees

- Persimmons
- American Plum
- Pawpaw Fig
- Chinquapin
- Chickasaw Plum

#### Shrubby Berries

- Blackberry
- Sparkleberry
- Elderberry
- Blueberry

#### Fruiting Vines

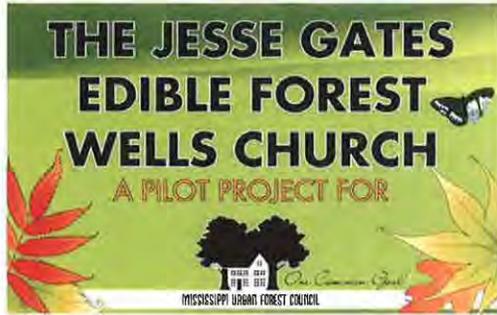
- Muscadines
- Grapes




### Site Preparation:

Once the design of the orchard has been determined, several elements should be considered in preparing the site. The most important is the initial soil test. This will determine which nutrients need to be added. Remove vegetation that competes with the fruit trees and find sources for mulch that will be used for weed control and root protection.

Survey and Results:



## Summer 2012 Educational Survey

The mission of the project includes teaching citizens what fruit and vegetables can be grown locally, how to eat healthier by consuming locally grown produce, and ways to supplement incomes with products derived from locally grown produce. The purpose of this survey is to help us gather information to measure the success and impact of

the project.

1. Do you currently grow fresh fruit and/or other produce on your own property? (Circle One) Yes or No
2. Do you know which type of fruit is best to grow on your property? (Circle One) Yes or No
3. Do you think fresh fruit and vegetables support better health?(Circle One) Yes or No
4. Do you eat fresh fruit and/or vegetables daily? (Circle One) Yes or No
5. If you had access to fresh fruit and other produce daily would you use it? (Circle One) Yes or No
6. Do you use products made from fruit and/or other produce? (e.g- jelly, preserves?)  
(Circle One) Yes or No
7. Do you buy from a local farmers market? (Circle One) Yes or No
8. Would you be interested in making a product from produce you grew? (Circle One) Yes or No
9. Would you consider supplementing your income by selling fresh products? Yes or No
10. Do you think the Wells Church garden has a positive impact on the community? Yes or No
11. What product would you like to grow? (Circle choices)

Flowers

Vegetables

Herbs

Fruit

Not Interested

12. What have you learned from the Wells Church garden?

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**Please return this survey to Wells Church or Operation Shoestring**  
**For more information on this project contact the**  
**Mississippi Urban Forest Council, Donna Yowell at [dyowell@aol.com](mailto:dyowell@aol.com)**

JESSE GATES EDIBLE FOREST AT WELLS CHURCH

**EDUCATIONAL SURVEY RESULTS**

WELLS CONGREGATION

EARLY AND MID-MORNING SERVICES

JUNE 3, 2012

60 RESPONDENTS

QUESTION	YES			
	06/03/2012	NO 06/03/2012		
1. Do you currently grow fresh fruit and/or other produce on your own property?	34	26		
3. Do you know which fruit is best to grow on your property?	23	36		
3. Do you think fruit and vegetables support better health?	60	0		
4. Do you eat fresh fruit and/or vegetables daily?	45	13		
5. If you had access to fresh fruit and other produce daily would you use it?	59	0		
6. Do you use products made from fruit and/or other produce? (e.g. jelly, preserves?)	53	6		
7. Do you buy from a local farmers market?	43	15		
8. Would you be interested in making a product from produce you grew?	35	23		
9. Would you consider supplementing your income by selling fresh products?	18	41		
10. Do you think the Wells Church garden has a positive impact on the community?	58	0		
11. What product would you like to grow?	Flowers-34	Vegetables-40	Herbs-38	Fruit-32
12. What have you learned from the Wells Church garden? (See comments below.)				

COMMENTS:

1. I think it has been a great experience for the neighborhood and the church.
2. I learned to dig a hole properly to plant. I learned the joy of gardening in community.
3. Great community involvement & support; I think a need has been met.
4. Vegetables; blueberries; plums
5. That working together as a community makes growing fruits and vegetables easier and more educational and more fun to grow
6. That it can be done and thrive! Thanks to Loy and the many others who have committed themselves to it;  
That it is a thoughtful memorial to Jesse; God be praised and His bounty be recognized.
7. That's a good witness in the community
8. Goodness.
9. Community impact is very positive

#### JESSE GATES EDIBLE FOREST AT WELLS CHURCH

10. If we all worked together we could feed the world!
11. Seemingly how easy it is to have a garden, but I know it's hard work.

- I learned the different lettuces and what's required for "natural" healthy plants - calming effects of a garden
12. If it helps feed one person, it's worth it. Healthy mind, body, & spirit - get your health on.
  13. Positive impact on all.
  14. Edible diversity combined with beauty.
  15. That a food producing garden can be beautiful; that urban land can produce food; that it does not require constant attention to have a productive, beautiful garden
  16. That the city/neighborhood has a lot of unused capacity
  17. I'm a visitor and plan to learn from it.
  18. That gardens can thrive in an urban environment
  19. How to group plants together.
  20. The shared information and produce from this effort show how easily diets can be supplemented with minimal expense and effort
  21. Vegetables are wonderful; fruit makes fabulous jellies and jam!!
  22. We can grow apples & asparagus and grapes in MS.
  23. That some fruits grow in MS that I didn't know grew here.
  24. I've learned that I can get involved in gardening.
  25. How to become a better gardener and a steward of this planet!!!
  26. Value of community
  27. I have learned that here can be a productive beautiful garden in an urban setting; It is a little place of sunshine in an otherwise vacant lot.
  28. Just being introduced as this is my 2nd time at Wells Church.
  29. Good for everyone - healthwise and spirit uplifting
  30. What I have learned how much the Well church garden can have a positive impact on us and our community
  31. Another opportunity to serve the parish
  32. A small space can make a difference
  33. That people working together to share with others creates community and is a great blessing! That teaching healthy eating is a vital part of ministry.
  34. how to establish a raised bed; how beautiful a vegetable garden can be; how peaceful and renewing the garden is.

Page 2 of 3



# ORGANIC PRODUCTION OF SPECIALTY CROPS IN HIGH TUNNELS

## Project Summary

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With interest and organic markets steadily growing, many specialty crop growers are looking toward organic production to become more ecologically and economically sustainable. Further, recent growth in farmers markets has led to a need for information on using high tunnels for extended-season production of organic crops to serve year-round markets. High tunnels are unheated greenhouse-like structures that provide a modified environment for year-round crop production. Due to the relatively modest inputs required and the potential high profitability, high tunnels are rapidly emerging as a desirable system for many producers. The high value of high tunnel production makes improvement and maintenance of soil health critical. One aspect of high tunnels that differs from open fields is that nutrients and salts are not readily leached due to the lack of leaching rain events inside high tunnels. This makes proper nutrient management in the tunnels critical to long-term health and productivity of the soils within them.

While there has been extensive research on fertility management for field and greenhouse production, fertility management in high tunnels has not been well researched, especially along the U.S. Gulf Coast. Around the country, farmers approach fertility management in high tunnels in a variety of ways, many of which are similar to their field practices. Since most high tunnel growers produce their crops in the soil on which the tunnel rests, it is recommended that soil amendments including various composts be added to the soil to increase the organic matter content. Adding organic matter to soils can improve soil structure. This in turn increases the soil's capacity to provide adequate oxygen, water, and nutrients to the crop. The objective of this study conducted by Mississippi State University was to investigate the effects of pre-plant compost incorporation and subsequent fertigation during the growing season on plant growth and yield in a high tunnel.

Over the course of this project, vegetables including tomato and cucumber, and cut flowers including zinnia, dianthus, and snapdragon were grown in a high tunnel in central Mississippi. Two composts - composted broiler litter and vermicompost were tested as pre-plant compost incorporation, and a liquid catfish processing byproduct – MultiBloom was tested as side dressing (fertigation) during growing season. Results indicated that in general, pre-plant compost incorporation and subsequent fertigation during the growing season can improve plant growth, vegetable yield, and the total number of cut flowers produced in a high tunnel. The project's activities and results were shared during high tunnel workshops, field days, and at the Fall Flower & Garden Fest. In addition, results from this project have been presented at local and regional trainings and a national conference.

This project does not build upon previously funded SCBGP projects.

## Project Approach

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Faculty at MSU conducted replicated trials over three seasons in a high tunnel at Mississippi State University Truck Crops Branch Experiment Station in Crystal Springs. Crops and cultivars were selected based on experience of the researchers and consultation with growers and extension personnel. Crops evaluated included: tomato, cucumber, zinnia, dianthus, and snapdragon. Two organic products were selected for initial soil amendment in the high tunnel: composted broiler litter and vermicompost. A liquid catfish processing byproduct MultiBloom was chosen for organic fertilizer as side dressing (fertigation) during the growing season.

Crops were tested for both spring and fall production. Vegetables and cut flowers were sown from seeds, and seedlings were grown in a greenhouse and then transplanted into the high tunnel. Plants were grown using standard organic production practices. All plants were grown on raised beds inside the high tunnel. Plastic mulch was used to cover the beds. Plants were drip irrigated based on plant need. Two locally produced organic products were selected for initial soil amendment in the high tunnel: composted broiler litter (Currie Farms, Raleigh, MS) and vermicompost (Church Hill Worm Farm, Church Hill, MS). A liquid catfish processing byproduct MultiBloom (Hydrosylate Company of America, Isola, MS) was chosen for organic fertilizer. The study was arranged as a randomized complete block design with three replications. The three pre-plant compost treatments included composted broiler litter, vermicompost, and the control with no compost. The compost rate used was 6 tons/acre and the compost was incorporated into the bed before laying the plastic mulch. Under each compost treatment, there were three fertigation treatments: no fertilizer, organic low (100 ppm N from MultiBloom), and organic high (200 ppm N from MultiBloom). Each treatment combination included 5 to 20 plants based on plant growth habit. Each plant was supplied with 200 ml of solution from each fertigation treatment once a week during the growing season.

Pests and diseases were scouted weekly. Cut flowers were harvested once or twice every week using recommended practices. Data included stem length and the number of total and marketable stems. Vegetables were harvested once or twice every week and graded into Marketable and Cull grades. Fruit in each grade were counted and weighed.

Results from this project indicated that in general, pre-plant compost incorporation and subsequent fertigation during the growing season can improve plant growth, vegetable yield, and the total number of cut flowers produced in a high tunnel. It is important to note that over-application and its associated negative environmental impacts are possible with organic fertilizers and composts, just as with synthetic fertilizer sources. It is recommended that users of these materials test them thoroughly before incorporating them into their practices.

The significant contributions and role of project partners in the project:

- Drs. Bi and Evans built and set up all the experiments in the high tunnel.
- Dr. Bi is responsible for the cut flower experiments, while Dr. Evans is responsible for the vegetable experiments.

- Drs. Bi and Evans hosted high tunnel workshops, field day, and informal tours that showcased the studies being done under this grant.
- Drs. Bi and Evans prepared the progress reports and final report.

## Goals and Outcomes Achieved

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The goal of this project was to develop and deliver best management practices, based on local data and local conditions, focusing on optimizing fertilizer management for organic vegetable and cut flower production in high tunnels in Mississippi to benefit growers and consumers and was achieved during the project period. Two locally produced organic products were tested for initial soil amendment in the high tunnel: composted broiler litter and vermicompost, and a liquid catfish processing byproduct, MultiBloom for fertigation during the growing season. Both vegetable and cut flower crops were tested. Yield and quality data were collected on the tested crops. Recommendations were delivered through field days, presentations, trainings, individual contacts, and web postings.

Proposed measurable outcomes included publications, a research and demonstration site, and increased awareness and adoption of the production practices recommended based on the results of this study. This project resulted in more than 1,000 direct contacts at field days and trainings, with many more indirect contacts. The project has also helped support the high tunnel website at [www.msucare.com/crops/hightunnels](http://www.msucare.com/crops/hightunnels). The project has directly or indirectly helped grow the number of high tunnels in the state from under 10 before 2009 to over 300 in 2012. Data from the project has been used in several grant applications and helped develop interstate research and outreach teams with members from Alabama, Mississippi, Louisiana, Texas, and Arkansas. The project increased the knowledge base of the research team and attendees at both field days and workshops. The project helped us to advise clients on organic production of vegetables and cut flowers using high tunnel in MS. Team members have also presented high tunnel information at local, regional, and national conferences. Several publications are currently being prepared and should be completed soon after the official end of the project period. These include peer-reviewed journal publications and experiment station bulletins.

It was anticipated that the results from this project would lead to more support from other funding sources, therefore leading to a stronger program in support of organic production of specialty crops in MS and serve the year-round market in the state. The project has been leveraged in several grant applications, including the USDA Organic Research and Education Grants, the USDA International Scholars Program, and the USDA Specialty Crops Research Initiative.

**Quantifiable Impact:** as listed in the following Table.

<b>Measurable Impact</b>	<b>Expected Results</b>	<b>Achieved Results</b>
The No. of clientele reached by websites, presentation, workshop, popular articles, and field days	1,000	Over 1,000
Conference presentations	4	4
Peer-reviewed journal publications	2	We anticipate publications in 2013
MAFES Bulletins	4	We anticipate publications in 2013
Grower adoption	10%	Based on grower feedback and extension questions into the office, growers are using the local products to produce crops in high tunnels. Company owners have reported to us that sales are up for both the composted broiler litter and the vermicompost.

Examples of the presentations related to this project include, but not limited to, the following:

- Bi, G. W. Evans, and V. Cerven. 2012. Effects of pre-plant compost and subsequent fertigation on organic production of zinnia cut flowers in a high tunnel. American Society for Horticultural Science (ASHS) Annual Conference. Miami, Florida. August 31 – September 3. 2012. Attendance: 350.
- Evans, W. B., G. Bi. M. Gu, and V. Cerven. 2012. High tunnel successes in Mississippi. Presented to the 5<sup>th</sup> Annual Small Farms Conference. Memphis TN. Sept. 15, 2012. Attendance: 300.
- Evans, W.B. 2012. Organic and conventional high tunnel tomato production. Presented during the 2012 Alabama Fruit and Vegetable Growers Conference. Invited. Attendance: 60.
- Evans, W.B. 2012. Vegetable production in high tunnels. Presented to the North Mississippi Vegetable Producers Conference. February, 2012. Attendance: 100.
- Evans, W.B. and G. Bi. 2011. High tunnel workshop and walking tour. Presented during the 2011 Fall Flower & Garden Fest. Crystal Springs, MS. Oct. 2011. Attendance: 200.
- Evans, W.B. and G. Bi. 2010. High tunnel walking tour. Presented during the 2010 Fall Flower & Garden Fest. Crystal Springs, MS. Oct. 2010. Attendance: 200.
- Gu, M., G. Bi, and W. Evans. 2011. High tunnel field day. March 2011. Attendance: 200.

## Beneficiaries

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Beneficiaries of the project have included new and existing specialty crop growers in MS and surrounding states. More than 1,000 growers and gardeners have toured the research site over the life of the project. More than 100 NRCS and university staff members have toured and trained at the site. Knowledge gained from this project has supported invited trainings in Mississippi, Arkansas, and Alabama.

## Lessons Learned

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Data obtained from this project indicated that organically growing vegetables and cut flowers in high tunnels in MS are feasible and can be profitable, even though profit might depend on crop/cultivar selection and management practices.

Organic tomatoes and English-style cucumbers were tested in the studies. The cucumbers grew well in all plots and produced marketable crops at least six weeks ahead of what might have been seen under field conditions. Fruit quality was high in all treatments the first year. No amendment-related nutrient toxicities were seen. In the second year, all cucumber plots had some leaf miner damage to leaves and fruit. In the fruit, the miners resulted in some culling. The broiler litter compost plots did seem to have somewhat more root disease present than the other plots in 2012, resulting in some plant death and reduced yields. This could have been related to the treatment, water management, or location in the tunnels.

The first year's fall crop of tomatoes was cut short by frost. In the second year, good yields of high quality fruit were produced by all treatments. Leaf nutrient concentrations were somewhat higher in the fertilized and high-fertility treatments compared to the unfertilized and low treatments. Fruit quality samples were taken and are awaiting completion of analyses. Soil samples were taken before, during and after all crops; sample analysis has been completed and the data is awaiting analysis.

Overall, results showed that locally available organic amendments and fertilizers can be used to produce high quality vegetables and cut flowers in high tunnels in MS. Results of some of these studies have been discussed at high tunnel field days and tours at Truck Crops. Additional data will be presented at regional scientific meetings in early 2013. Results and findings of the studies are being used to develop additional research and to seek leveraged funds.

The work has also helped the local producers of the amendments used to understand their products better and to support their marketing efforts. Growers have benefited from increased knowledge about the products and their performance.

## Contact Person

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Guihong Bi  
601-892-3731  
[gb250@msstate.edu](mailto:gb250@msstate.edu)

## Additional Information

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Poster Presentation:



# Effects of Pre-plant Compost and Subsequent Fertigation on Organic Production of Zinnia Cut Flowers in a High Tunnel

Guihong Bi, William B. Evans, and Vasile Cerven  
Truck Crops Branch Experiment Station, Mississippi State University

## Abstract

This study evaluated the effects of pre-plant compost incorporation and subsequent fertigation during the growing season on organic production of zinnia (Benary's Giant Mix) cut flowers in a high tunnel. There were three pre-plant compost applications: composted broiler litter, vermicompost, and control (no compost). The compost rate used was 6 tons/acre and the compost was incorporated into the bed before laying the plastic mulch. Under each compost treatment, there were three fertigation treatments: no fertilizer, organic low [100 ppm nitrogen (N) from MultiBloom, a liquid catfish processing byproduct], and organic high (200 ppm N from MultiBloom). Plants were transplanted into the beds in early September and each plant was supplied with 200 mL of solution from each fertigation treatment once a week. Zinnia stems were harvested as soon as the blooms were completely opened, starting from early October through November. Results indicated that during the early stage of plant growth, plants that received compost had significantly higher SPAD reading than plants that did not receive any compost, and plants that received composted broiler litter had significantly higher SPAD reading than plants that received vermicompost. Plants that received composted broiler litter had significantly higher plant growth index than plants that received no compost. However, plants that received vermicompost had similar plant growth index as plants received no compost. Results also indicated that both pre-plant compost incorporation and fertigation during the growing season increased the total number of stems produced.

## Introduction

Organic agriculture emphasizes ecologically sound management and active soil biology that continually strengthens overall soil health and productivity. With interest and organic markets steadily growing, many specialty crop growers are looking toward organic production to become more ecologically and economically sustainable. Further, recent growth in farmers markets has led to a need for information on using high tunnels for extended-season production of organic crops to serve year-round markets. High tunnels are unheated greenhouse-like structures that provide a modified environment for year-round crop production. Due to the relatively modest inputs required and the potential high profitability, high tunnels are rapidly emerging as a desirable system for many producers. The high value of high tunnel production makes improvement and maintenance of soil health critical (1, 2). One aspect of high tunnels differs from open fields is that nutrients and salts are not readily leached due to the lack of leaching rain events inside high tunnels. This makes proper nutrient management in the tunnels critical to long-term health and productivity of the soils within them.

While there has been extensive research on fertility management for field and greenhouse production, fertility management in high tunnels has not been well researched, especially along the U.S. Gulf Coast. Around the country, farmers approach fertility management in high tunnels in a variety of ways, many of which are similar to their field practices. Since most high tunnel growers produce their crops in the soil on which the tunnel rests, it is recommended that soil amendments including various composts be added to the soil to increase the organic matter content. Adding organic matter to soils can improve soil structure. This in turn increases the soil's capacity to provide adequate oxygen, water, and nutrients to the crop. The objective of this study is to investigate the effects of pre-plant compost incorporation and subsequent fertigation during the growing season on plant growth and yield in a high tunnel.

## Materials and Methods

This study was conducted at the Truck Crops Station in Crystal Springs, MS, using practices within the National Organic Standards, under USDA's National Organic Program (3). The high tunnel is 90 ft long by 30 ft wide, and placed in full sun and oriented north to south. Benary's Giant Mix was selected for zinnia cut flowers. This is a series that has good market acceptance, produces long stems, and has large flowers. Zinnia seedlings were transplanted to raised beds in a certified organic high tunnel on September 3, 2010. The soil was Providence silt loam. The beds were 1.5 ft across the top and were spaced 4.5 ft center to center. A single drip tape was placed in the center of the bed and buried 1 inch below the top of the bed. Irrigation was supplied as needed through the drip tape. The beds were covered with plastic mulch.

Two locally produced organic products were selected for initial soil amendment in the high tunnel: composted broiler litter (Currie Farms, Raleigh, MS) and vermicompost (Church Hill Worm Farm, Church Hill, MS). A liquid catfish processing byproduct MultiBloom (Hydroxylate Company of America, Isola, MS) was chosen for organic fertilizer. The study was arranged as a randomized complete block design with three replications. The three pre-plant compost treatments included composted broiler litter, vermicompost, and control (no compost). The compost rate used was 6 tons/acre and the compost was incorporated into the bed before laying the plastic mulch. Under each compost treatment, there were three fertigation treatments: no fertilizer, organic low (100 ppm N from MultiBloom), and organic high (200 ppm N from MultiBloom). Each treatment combination included 16 zinnia plants which were planted at half ft. spacing in a single row. Each plant was supplied with 200 ml of solution from each fertigation treatment once a week from early October through November.

On September 21, 2010, leaf greenness was quantified using a SPAD-502 Chlorophyll Meter. On the same date, plant growth index [(height + widest width + perpendicular width) / 3] was recorded. Zinnia stems were harvested as soon as the blooms were completely opened, starting from early October through November.

## References

1. Monri, A. and J.A. Biernbaum. 2009. Management of the soil environment in high tunnels. HortTechnology 19: 34-36.
2. Reeve, J. and D. Drost. 2012. Yields and soil quality under transitional organic high tunnel tomatoes. HortSci. 47: 38-44.
3. USDA. 2012. National Organic Program. <http://www.ams.usda.gov/nop/>

## Acknowledgment

This work was supported by the Mississippi Department of Agriculture and Commerce Specialty Crop Block Grant.

Table 1. Effects of pre-plant compost on plant growth index (PGI), leaf SPAD reading, and the total number of cut flowers of zinnia (Benary's Giant Mix) in a high tunnel.

Compost treatment	18 DAP		Total number of flowers/plant
	PGI (cm)	SPAD	
No compost	23.98 b <sup>2</sup>	34.70 c	16.85 b
Vermicompost	24.6 b	35.61 b	18.86 a
Broiler litter	25.84 a	36.83 a	19.05 a

<sup>2</sup>Means followed by the same letter within each column are not significantly different according to Fisher's protected LSD test (P = 0.05).

Table 2. Effects of fertigation on the total number of cut flowers of zinnia (Benary's Giant Mix) in a high tunnel.

Fertigation treatment	Total number of flowers/plant
Water	16.91 b <sup>2</sup>
100 ppm N from MultiBloom	18.57 a
200 ppm N from MultiBloom	19.03 a

<sup>2</sup>Means followed by the same letter within each column are not significantly different according to Fisher's protected LSD test (P = 0.05).

## Results and Discussion

Incorporating compost into the soil before transplanting significantly affected leaf SPAD readings during the early stage of plant growth. On 18 days after transplanting (DAP), plants that received compost had significantly higher SPAD reading than plants that did not receive any compost, and plants that received composted broiler litter had significantly higher SPAD reading than plants that received vermicompost (Table 1). Plants that received composted broiler litter had significantly higher plant growth index than plants that received no compost. However, plants that received vermicompost had similar plant growth index as plants received no compost (Table 1). Results also indicated that both pre-plant compost incorporation and fertigation during the growing season increased the total number of stems produced (Tables 1 & 2).

The present work shows that pre-plant compost incorporation and subsequent fertigation during the growing season can improve zinnia plant growth and the total number of cut flowers produced in a high tunnel. It is important to note that over-application, and its associated negative environmental impacts, are possible with organic fertilizers and composts, just as with synthetic fertilizer sources. We recommend users of these materials test them thoroughly before incorporating them into their practices.



Fig. 1. Zinnia (Benary's Giant Mix) grown in a high tunnel at Truck Crops Experiment Station in Crystal Springs, MS

# EFFECTIVE EDUCATION AND TRAINING FOR SMALL LIMITED RESOURCE FARMS FOR PROSPEROUS PROMOTION AND MARKETING

## Project Summary

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This project implemented by the Mississippi Association of Cooperatives (MAC) was to develop and implement a state-wide promotion and marketing program through regional education and training. Mississippi has over 42,000 farming operations and 11,000 acres in production, yet over 65% of these farms have reported a farm income of \$1,000-\$9,999 a year. Farming in the 21<sup>st</sup> century necessitates new technologies which require more capital inputs, mechanization, and/or higher levels of education, which are disadvantageous to small farms. Small farmer and farmer-members of limited resource cooperatives report experiencing problems in sustaining their farm operation. The participants have reported unsuccessful efforts in attaining adequate resources such as land, labor, capital, and management. Resources were and still are needed for maintenance and improvement of farm operations' sustainability.

The development and implementation of this project provided Mississippi's small farmers access to education and training so that specialty crops could be successfully promoted and marketed in local, state, and regional markets. Regional trainings consisted of promotion and marketing specialty crops and targeted farmers of specialty crops and those interested in specialty crop production.

This project did not build on a previously funded Specialty Crop Block Grant project.

## Project Approach

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The project team conducted regional education, training, and demonstrations for the development and implementation of a state-wide promotion and marketing program. The following describes the steps taken to implement the program.

The participants were identified through 12 MAC membership cooperatives and the Annual Alcorn State University (ASU) Small Farmers Conference. Application for participation was also disseminated at various agricultural events. A total of 123 applications were received from small farmers; however, livestock and other types of farm operations completed the application process as well. The applications were screened by the project director and staff selected 99 specialty crop producers to participate in the project. The participants produced the following specialty crops: basil, bay, cucumber, eggplant, honey, lettuce, leafy greens, melon, mushrooms, okra, oregano, southern peas, rocket, squash, sweet corn, sweet potato, and tomato.

Assessments were conducted of farm operations' past history of marketing specialty crops. Each project participant completed an intake form requesting demographic information, specialty crops produced, and experience of product marketing. The participants also identified whether they conducted value-added production and if they were a member of a cooperative. Prior to partaking in the project, the farm operators were selling their products at farmers markets, roadside stands, and pick-your-owns. Some participants subsidized their farm operations and households with income from off-farm employment.

The next step was to identify challenges in small farm marketing in order to find an alternative or solution to these problems. The Mississippi Association of Cooperatives identified challenges in small farm marketing as: small acreage, production practices, poor quality, negotiation skills, farm financial management, organization of cooperatives, costly food safety certifications, and infrastructure. The aforesaid challenges were identified by participants in various meetings and trainings so that the staff of the Mississippi Association of Cooperatives could proceed to the next phase of the project.

MAC developed training material to address the majority of the challenges facing small farmers. The training modules included topics on: value-added production of specialty crops, farm financial management, promotion and marketing, packaging, harvesting and grading, and new and beginning farmers. Research was conducted to obtain the necessary materials for the trainings. In addition, professional experience, knowledge, and education of the staff members provided significant recommendations to the project participants. These recommendations led to successful outcomes including new value-added product development, increase in production acreage of specialty crops, and increased farm income.

After the materials and information were consolidated for trainings, a total of nine regional trainings for the delivery of the effective education and training for prosperous promotion and marketing were conducted. These trainings were held at the ASU Small Farmers Conferences in Jackson, Hattiesburg, Natchez, Marks, Tchula, Petal, Mound Bayou, Holly Springs, and Sallis, MS. These workshops throughout the state of Mississippi were focused on value-added production, promotion, and marketing of specialty crops.

Various project participants had the opportunity to tour and visit the following to learn more about promotion and marketing:

- Restaurants and farmers markets in Oxford, hosted by a local chef
- Whole Foods Distribution Center in Memphis, TN
- Palzoola Processing Facility in Memphis, TN
- Family Farmers Cooperative proposed marketing site in Memphis, TN
- Jackson Road Map to Health Farmers Market in Jackson
- Value-Added Conference in Biloxi
- Whole Foods Distribution in New Orleans, LA
- Samuel J. Green Elementary Charter School's value-added kitchen in New Orleans, LA
- ASU's Annual Field Day in Lorman
- Indian Springs Association's Field Day in Petal

These events allowed participants to observe the marketing and promotion of value-added production, fruit and vegetables, water quality, and farm financial management. Seventy-four farm visits took place in Coahoma, Forrest, Jefferson Davis, Humphries, Perry, Rankin, Marshall, and Quitman counties in Mississippi.

The Whole Foods commercial marketing outlet held a demonstration to reduce damage to produce during packaging of okra. The participants learned techniques for packing okra in one and two pound clam shells that lessen damage to the produce. Poor handling and abuse to produce, such as okra, squash, etc., are not always visible during post-handling; however, the damage is observed by the time the product is placed on the market shelves. A subsequent demonstration was held in fall 2011 at the processing facility on value-added processing. This demo gave project participants an opportunity to learn about equipment and machinery that can be used in the production of a product that can be sold in commercial or farmers markets. The produce used during the demonstration was chopped greens packaged in plastic bags. Consumers purchase these ready-to-cook products as a convenient food item. Convenience, location, and health influence value-added production of specialty crops because it allows consumers the opportunity to quickly prepare a nutritious meal and support local farm production.

## **Goals and Outcomes Achieved**

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The goal for this project was for farmers to increase profitability. This was achieved by the workshops and educational activities presented to participants from this grant. Various farmers cooperatives have reported increased sales of specialty crops, increased farmer income, and increased variety of crops and value-added specialty crops to sale. Specifically the grant proposal indicated to increase farm income by 10% in the first year and 35% over the course of the project. The Mississippi Association of Cooperatives was unable to measure this goal from participants, due to unwillingness to share specific personnel income information; the growers only mentioned they experienced increased income from the activities of this project.

## **Beneficiaries**

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The farm operations seemingly increase profitability and were able to increase productivity on a greater level, as well as gain a greater knowledge of market trends and locating niche markets. The Association's membership also benefited from activities held with grant funds to enhance farm operations of cooperative members and new value-added production. Since the implementation and development of the project, members of the Beat IV cooperative in Noxubee County began baking sweet potato pies. Indian Springs Farmers Association has increased sales of specialty crops including okra, bay leaves, leafy greens, sweet potatoes, and melons. The North Delta Produce Growers Association members also witnessed an increase in farm income for their southern pea production.

## Lessons Learned

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This project was effective in providing small farmers access to a state-wide promotion and marketing program; however, the Mississippi Association of Cooperatives was unable to complete the entire work plan during the allocated grant period of three years.

Throughout the duration of the project, MAC experienced key staff turnover and problems getting quality participants. These unanticipated outcomes and complications affected the progress of the assessment of farm operation's marketing of specialty crops post-training and data analysis remains incomplete. The project staff still plans to complete these activities.

## Contact Person

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Ben Burkett  
601-354-2750  
[benburkett@earthlink.com](mailto:benburkett@earthlink.com)

## Additional Information

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Participants learning processing techniques for okra:



# **ENHANCING COMPETITIVENESS AND FOOD SAFETY OF MS SPECIALTY CROP FARMERS THROUGH ON-SITE VERIFICATION, EDUCATION, AND TRAINING IN GOOD AGRICULTURAL AND MANUFACTURING (HANDLING) PRACTICES FOR THE SAFE PRODUCTION, PACKING, AND SHIPPING OF FRESH FRUITS AND VEGETABLES**

## **Project Summary**

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The specialty crop industry in Mississippi has witnessed significant growth, much like other states. With the increase in output and availability of the produce, farmers, packers, shippers and others producing and handling specialty crops have to meet additional requirements from buyers, i.e., Good Agricultural/Manufacturing Practices (GAP/GMP). Most buyers of produce require that farmers and handlers be “certified” and have a food safety plan implemented and documented. In many cases, farmers are subjected to multiple audits in order to sell their products. This results in an additional burden on the farmer, leading to reduced profits and incentive to produce.

The purpose of this project being implemented by Mississippi State University (MSU) is to assess the state of safety and quality of Mississippi farmed produce, train farmers on the latest food safety guidelines/regulations to ready them for certification, and assist them by also training selected extension specialists and providing assistance. The result of this project will be more farmers educated and trained to adhere to Good Agricultural and Manufacturing Practices and to other guidelines and regulations that may affect them in order to provide safe and wholesome produce to consumers.

This project does not build upon previously funded SCBGP projects.

## **Project Approach**

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In order to achieve the outcome on this project, the main focus on activities was implementation of courses on Good Agriculture Practices (GAP) certification, presenting talks on food safety/GAP practices, conducting farm/packing shed evaluations, and developing educational materials.

### Good Agriculture Practices (GAP) Certification Courses

A total of nine Good Agriculture Practices (GAP) certification courses were held training a total of 291 participants (listed in appendix A). Flyers and information were sent by the Mississippi Department of Agriculture and Commerce (MDAC), the Mississippi State University Extension

Service and the MSU Food Science, Nutrition, and Health Promotion Department and by other means to potential participants. The program on GAPs was conducted by staff from MSU and MDAC. The program (see appendix B) consisted of information and requisites/guidelines on food safety/GAP, directions on how to develop a food safety plan, food safety for packing facilities (including sanitation), and information on how to become GAP certified by the USDA. In addition, supplemental material and instructors' contact information was given for follow-up information. More than 50 farms/packinghouses have been USDA-GAP certified/recertified as a direct result of the trainings; these are mainly sweet potato and blueberry farms and packinghouses.

#### Conducting Farm/Packinghouse Evaluations

A total of three blueberry and three sweet potato farms and packinghouses, in addition to six other farms/facilities were evaluated for general food safety practices and samples were taken for microbial sampling. Other samples were taken from a vegetable farm and packinghouse, a fruit farm, and two other farms with mixed production. Results showed no presence of E. coli or pathogens (Salmonella, E. coli O157:H7, Listeria monocytogenes) in produce or environmental samples. Aerobic and total coliform plate counts were also conducted on a total of 150 samples, with normal ranges. However, some points in particular packinghouses where better sanitation/practices could enhance the safety/quality of the product were identified (washing stations, grading, belts, ceiling, and floor). A comparison between new and old facilities (the latter with some deficiencies) showed no difference in microbial profile, but there were observations in Good Manufacturing Practices; these were made to the owners/managers of the facilities.

#### Development of Educational Materials

A CD and other educational materials related to food safety/GAP, a template for a food safety plan, signage, forms, and related materials were developed, compiled, and made available to anyone interested.

Additional activities include:

- Conducted a planning and information meeting with members at the annual fruit and vegetable growers meeting. The project coordinator and one co-PI attended various meetings to explain the educational and outreach activities and answered any questions.
- Prepared and conducted farm evaluations and summary reports were sent to various people that loan facilities to conduct these. As of now we have not found any serious problems (hazards) in the farms/facilities but have addressed specific points to the owners/managers.
- Data from each of the sessions is being compiled and analyzed. A presentation of the results will be given at meetings with stakeholders and at the 2013 MS Fruit and Vegetables Growers meeting.

## Goals and Outcomes Achieved

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This project has surpassed the expected outcomes. The project coordinator was expecting to train at least 150 farmers/packers (certified training) and help certify at least 10 additional farmers/packers as USDA-GAP certified. The coordinator was able to reach 291 through the training workshops and was able to certify/recertify 50 farmers/packers. Since all the goals have been surpassed, we believe this project has had a resounding success. This was due to the strong collaboration between the MDAC, MSU, specialty crop grower groups, and others.

Evaluation scores returned from the courses ranged between 4.4 and 4.7 on a 5-point rating scale, showing the acceptance of the instruction materials and the delivery/instructors by the participants. Feedback from the evaluations (addition of examples, forms, food safety handbook template, certification process, requirements) was taken into account to improve the courses with time.

## Beneficiaries

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More than 50 farms/packinghouses have been USDA-GAP certified/recertified as a direct result of the trainings; these are mainly sweet potato and blueberry farms and packinghouses. Ten courses were conducted on GAP/GHP, reaching and benefitting 305 people. As a result of these trainings and certifications, these participants were able to reduce market risk and expand market opportunities and therefore led to increasing the competitiveness of specialty crops in Mississippi.

## Lessons Learned

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The PI and others involved with this project used this positive experience and data to develop a proposal to deliver at least three additional GAPs/GHPs training sessions in the next three years. The sessions will be modified according to new guidelines/regulations (produce safety, FSMA, etc.) and new technology/knowledge developments. As a result of the training sessions, producers, handlers, and packers were able to achieve GAP/GHP status in a cost-effective way.

## Contact Person

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Juan Silva  
662-325-3200  
[jls@ra.msstate.edu](mailto:jls@ra.msstate.edu)

## Additional Information

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### A. LIST OF COURSES DELIVERED UNDER BOTH TRAININGS (# PARTICIPANTS)

#### a. GAPs

##### 1. 1. Good Agricultural and Handling Practices for Fresh Fruits and Vegetables

- Silva, JL, Braswell, J, Riggins, K. 2010. GAPs for MS Fruit and Vegetable Growers. MS Ag Museum, Jackson, MS. March 12<sup>th</sup>. (30)
- Silva, JL. 2010. Food Safety Issues Concerning Sweet Potatoes. Mississippi Farm Bureau<sup>®</sup> Federation Sweet Potato Summer Commodity Meeting. Pittsboro, MS July 28 (25).
- Silva, JL. 2010. Food Safety for Pecans. Louisiana/Tri-State (LA\_MS\_Ark) pecan Growers Association meeting, Alexandria, LA, September 10<sup>th</sup> (43).
- Silva, JL. 2011. Good Agricultural Practices for Sweet potatoes and development of a food safety plan. Calhoun Cty Extension Off., Pittsboro, MS. February 16<sup>th</sup> (38).
- Silva, JL. 2011. Good Manufacturing/Handling Practices for Sweet potatoes and development of a food safety plan. Calhoun Cty Extension Off., Pittsboro, MS. February 16<sup>th</sup> (38).
- Silva, JL. 2011. Food Safety and GAPs. General Pest Management Workshop, Raymond, MS. Feb. 22<sup>nd</sup> (44).
- Silva, JL. 2011. Good Agricultural Practices for MS Farmers Market Vendors and others. Gale Community Ctr., Hernando, MS, March 7<sup>th</sup> (30).
- Silva, JL. 2012. Food Safety for Sweetpotatoes- GAPs and GHPs. Vardaman Community Center, MS, February 13<sup>th</sup> (30).
- Silva, JL., Matta, FB. 2012. GAPs and GHPs for produce farmers, Tchula Community Center, Tchula, MS. September 12<sup>th</sup> (13).

**Total # participants: 291**

##### 2. Other Food Safety Courses

- Silva, JL. 2012. HACCP/Food Safety for Blueberry Packing Operations, Packing facility, Wiggins, MS. April 21<sup>st</sup> (14)

**Total # participants: 14**

## **B. GAPs and GHPs for Mississippi F&V Producers Course Outline (example, made to fit audience)**

### OUTLINE

This Course will be divided into two parts: training on Good Agricultural Practices (GAPs) and Good Handling and Management Practices (GHPs/GMPs) and the second part on implementation of a program to prepare for an audit/certification. The course will be directed and given by Mississippi State University personnel that are trainers and/or have had training in this area. Attendance to the first part is necessary to participate in the second part.

#### Part I.

Introduction of food safety systems (incl. abroad): GAP/GHPs, GMPs, SSOPs, HACCP, etc.

Food safety systems for fresh fruits and vegetables, and for fresh-cut F&V

Farm food safety system: GAPs

- Field history

- Water

- Animal intrusion

- Sanitary facilities

- Fertilization- organic

- Employees

- Harvest

- Transportation

- Traceback

Packinghouse food safety system: GHPs/GMPs

- Water

- Sanitary facilities

- Employee hygiene

- Pest control

- Storage

- Transportation

- Traceback

- Monitoring and records

#### Part II.

Audits, certification, other requirements

Preparing for an audit

### C. GAPs/GMPs Food Safety Training Evaluation

DATE: \_\_\_\_\_

LOCATION: \_\_\_\_\_

1. What is your overall evaluation of today's training?

(Poor)            1 2 3 4 5            (Excellent)

2. How would you rate the instructor in terms of knowledge and presentation style?

(Poor) 1 2 3 4 5 (Excellent)

(Poor) 1 2 3 4 5 (Excellent)

3. Are you GAPs certified? Are you interested in being USDA-AMS GAPs certified?

a.

b.

4. Please list two examples of how you can apply what you have learned today to your job.

1.)

2.)

5. Was there enough opportunity for interaction and participation?

YES                      NO

6. Was there enough variety of training materials?

YES                      NO

7. Were the materials understandable?

YES                      NO

8. Would you recommend this training to others?

YES                      NO

9. How could your training experience have been improved?

10. What other training topics might help you to do your job better?

# MISSISSIPPI MEDALLION & MISSISSIPPI MEDALLION PLANT OF THE YEAR

## **Project Summary**

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The purpose of this project, implemented by the Mississippi Nursery and Landscape Association (MNLA), was to increase the production and market share of Mississippi grown nursery plants through education, promotion, and marketing campaigns of the Mississippi Medallion Program.

Consumers are demanding tough adaptable plants and in many cases seeking out native plants. The MS Medallion Program was the logical vehicle to help carry out the change or transition to these plants. Through promotion and education we can help create a shift in the growing habits of Mississippi producers and the buying habits of retailers and consumers.

This grant complimented the efforts of the FY2008 Specialty Crop Block Grant, “Enhancing the Competitiveness of Mississippi’s Specialty Crop Industry.” The purpose of the 2008 project was to educate consumers on the benefits of buying Mississippi produced plant materials through a media campaign promoting the Mississippi Medallion Program. This grant further enhanced consumer confidence in the Mississippi Medallion Program and the plants selected, thanks to the continuation of the direct marketing campaign.

## **Project Approach**

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MNLA was responsible for the selection and promotion of the Mississippi Medallion Winners and Native Plant of the Year. The winners for 2011 were SunPatiens, ‘Aristotle’ bell pepper, and Virginia Sweetspire (*Itea virginica*), also the 2011 Native Plant of the Year. For 2012, the winners were Suppertia Vista Bubblegum and Butterfly Weed (*Asclepsia tuberosa*), also the 2012 Native Plant of the Year.

The Mississippi Nursery and Landscape Association designed and produced 1,000 color brochures each year for years 2011 and 2012. These brochures promoted and educated consumers on the Mississippi Medallion and Mississippi Medallion Native Plant of the Year programs. Each year these brochures were distributed at the Gulf States Horticultural Expo in Mobile, AL, all MNLA retail member garden centers, Mississippi Garden & Patio Show, and the annual MNLA Membership Meetings. Brochures were also distributed at the Fondren Greener Conference and the Fall Flower & Garden Fest in 2012. MNLA continues to distribute these brochures as opportunities arise.

A live display of plant materials were used at the 2010 Gulf States Horticultural Expo in Mobile to promote current and past Mississippi Medallion winners. The display also featured materials produced through the FY2008 Specialty Crop Block Grant Program.

Print media included the printing of 11x7 inch billboards that were distributed to all MNLA retail member garden centers and displayed at the Gulf States Horticultural Expo, Mississippi Garden & Patio Shows and Mid-South Green Industry Conference each year. Advertisements and articles were placed in the MNLA News Messenger that is distributed to all MNLA members quarterly. Billboards were also displayed at the Fondren Greener Conference and Fall Flower and Garden Fest in 2012. MNLA will continue to display billboards at future events.

The campaign also included development and distribution of press releases to media personalities and all daily and weekly newspapers in the state. Newspaper ads ran in weekly newspapers and all daily papers across the state in 2011 and 2012. The production and airing of a 20 second television commercial ran in major media markets across the state.

Each year during the Mississippi Garden & Patio Shows, consumers were educated on the Mississippi Medallion Program and the Native Plant of the Year. Consumers were also surveyed each year at the shows to measure consumer's knowledge of the MS Medallion Program. Results over the years show that there is an increase in the percentage of people aware of the program.

Each year during the Mid South Green Industry Conference and the Gulf States Horticultural Expo, the industry has been educated on the Mississippi Medallion Program and made aware of the current and past winners.

Five hundred 12' round, corrugated plastic signs with the Mississippi Medallion logo was printed in August 2012. Distribution of these signs were sent to the MSU Extension Experiment Stations and MNLA members. They will also be sent to other facilities around the state, to be displayed in front of current and past Mississippi Medallion Winners. This permanent form of advertising will reach a large audience and greatly increase the awareness of the program.

Mississippi Nursery and Landscape Association members and board members played a major role in the program by participating on committees and displaying the billboards at local retail centers. Mississippi State Extension Service also played a major role in the development of the billboards and brochures, educating both the public and the industry at trade shows and conferences, writing articles about the winners and the program, and producing the television commercial.

## **Goals and Outcomes Achieved**

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In order to achieve the performance goals for this project, MNLA worked closely with the research arm of Mississippi State University Extension Service to identify plants that would meet the criteria of the Medallion program to uphold its credibility. This information was compiled and presented to growers,

retailers and consumers in a way that could accurately relay the message. Surveys were developed to accurately measure outcomes and implemented in ways to measure results.

MNLA feels that significant progress has been made in increasing awareness of native Mississippi plants. Table 1 shows the results of consumer surveys taken from both the SCBGP FY2008 and FY2009 grant periods. The goal of increased awareness of the Mississippi Medallion Program has been achieved over the course of the grants. Table 2 shows the producer survey for 2011 and 2012 plants; there was over a 40% increase in the number of plants sold in the year of the campaign versus the year prior. Significant progress has been made by the way of increasing awareness of the Mississippi Medallion program and the benefits of growing and purchasing Medallion plants.

Goals for this project were achieved for development, production, and distribution of advertising campaign materials, including brochures, television commercials, print ads, billboards and press releases, educating consumers and the industry, hosting and exhibiting at conferences and trade shows. Surveys of consumers and producers were completed. Results of the consumer and producer surveys are shown below.

Table 1. Mississippi Medallion Program Consumer Survey Results by Year

	<b>2009 Consumer Survey</b>	<b>2010 Consumer Survey</b>	<b>2011 Consumer Survey</b>	<b>2012 Consumer Survey</b>
Number of people surveyed	121	326	312	227
Number of persons who had heard of the Mississippi Medallion Program	32 (26.4%)	118 (36.2%)	128 (41.1%)	92 (40.5%)
Number of persons who have heard of the current year's winners	40 (33.1%)	90 (27.6%)	153 (49.0%)	113 (49.8%)
Number of persons who could name a Mississippi Medallion plant	37 (30.1%)	32 (9.8%)	67 (21.5%)	37 (16.3%)

Table 2. Producer Survey Results showing number of plants sold prior to the campaign and in the year of the campaign

<b>Medallion Plant</b>	<b>Number of Plants Sold in the Year Prior to Campaign</b>	<b>Number of Plants Sold in the Year of the Campaign</b>	<b>Percent Increase</b>
SunPatiens	16,800	19,250	14.6%
'Aristotle' bell pepper	18,000	29,000	61.0%
Virginia sweetspire	557	997	79.0%
Supertunia vista bubblegum	800	1,005	25.6%
Butterfly weed	438	1,200	174.0%
<b>Total Plants Sold</b>	<b>36,595</b>	<b>51,452</b>	<b>40.6%</b>

MNLA was able to poll a couple of the retail garden centers that members. Of those surveyed, it was determined that they sold 99% of the MS Medallion plants purchased from wholesalers. The exact dollar amount of increased sales of awarded plants are difficult to achieve as many business are unwilling to share sales figures, but one can obviously see this increase sales accounted for in Table 2.

## **Beneficiaries**

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Through the Medallion program, growers were made aware of the plant materials that produce well and those expected to be in demand during the upcoming season because of the MNLA promotions. Therefore, producers proved to be a major beneficiary.

Retail garden centers benefited from the project by giving them confidence in promoting certain plants to consumers knowing that is has been tested for performance in the state and is being promoted by nursery industry.

Mississippi consumers also benefited from this project. By becoming more aware of the Mississippi Medallion program and understanding that these plants are produced by local producers, consumers are able to make better choices for plants for their homes and businesses.

## **Lessons Learned**

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The MNLA feels that while television commercials were valuable in increasing awareness of the Mississippi Medallion program, greater benefit was received from print materials and the internet, as it is easier to refer back to and access, and one-on-one contact made with the consumer at the local level using print materials.

The MNLA understood the potential impact of the Medallion program on production and sales of local nursery stock and was pleased to see the extent of the increased production and sales of local growers.

It still remains a challenge to familiarize consumers with the specific names of Mississippi Medallion plants. Local retailers are a key to helping consumers understand the value of buying local and buying plants that are native or adaptive to Mississippi. MNLA hopes to change this with continued promotion and education.

## Contact Person

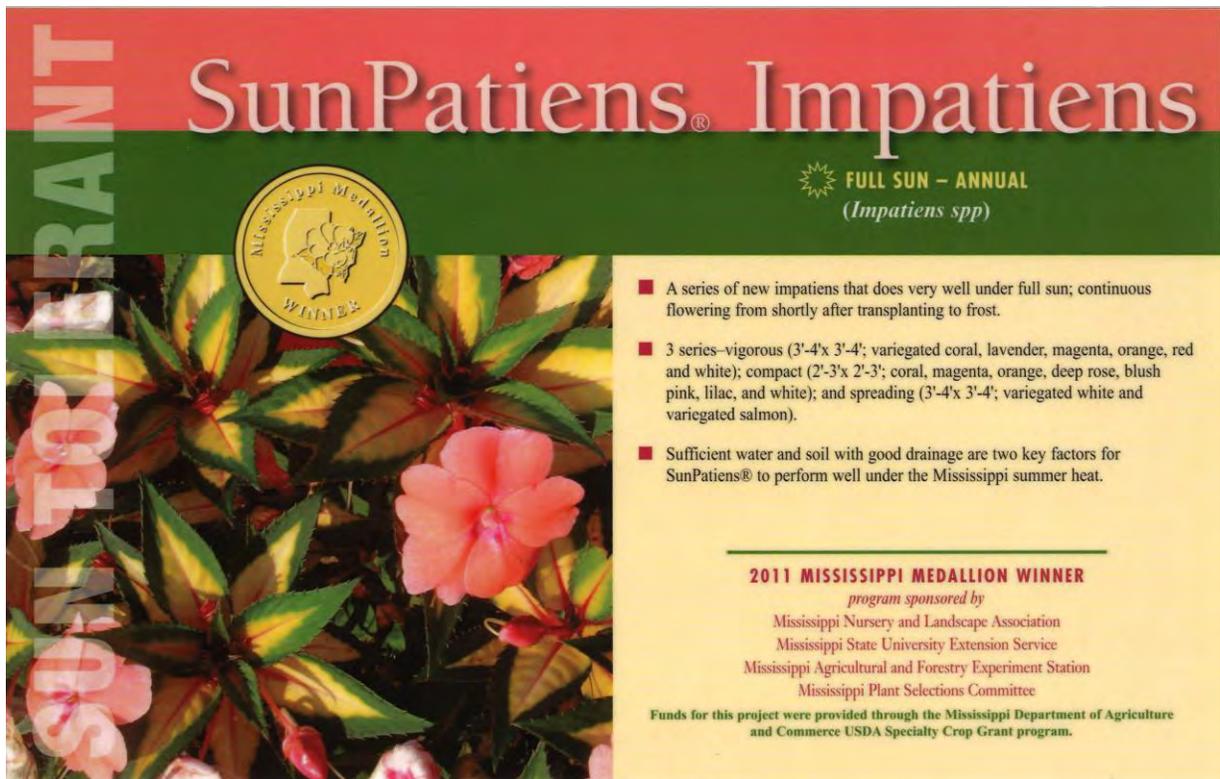
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Haley Barrett  
601-919-8111  
[haleymsnla@aol.com](mailto:haleymsnla@aol.com)

## Additional Information

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2011 MS Medallion Award Billboards:



**SunPatiens® Impatiens**

**FULL SUN – ANNUAL**  
(*Impatiens spp*)

**MISSISSIPPI MEDALLION WINNER**

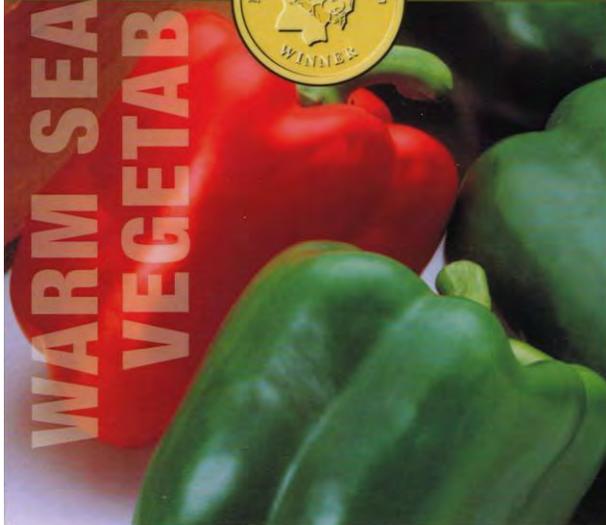
- A series of new impatiens that does very well under full sun; continuous flowering from shortly after transplanting to frost.
- 3 series—vigorous (3'-4'x 3'-4'); variegated coral, lavender, magenta, orange, red and white); compact (2'-3'x 2'-3'); coral, magenta, orange, deep rose, blush pink, lilac, and white); and spreading (3'-4'x 3'-4'); variegated white and variegated salmon).
- Sufficient water and soil with good drainage are two key factors for SunPatiens® to perform well under the Mississippi summer heat.

**2011 MISSISSIPPI MEDALLION WINNER**  
*program sponsored by*  
Mississippi Nursery and Landscape Association  
Mississippi State University Extension Service  
Mississippi Agricultural and Forestry Experiment Station  
Mississippi Plant Selections Committee

Funds for this project were provided through the Mississippi Department of Agriculture and Commerce USDA Specialty Crop Grant program.

# 'Aristotle' Bell Pepper

**WARM SEASON VEGETABLE**



**MISSISSIPPI MEDALLION WINNER**

**FULL SUN**  
(*Capsicum annuum*)

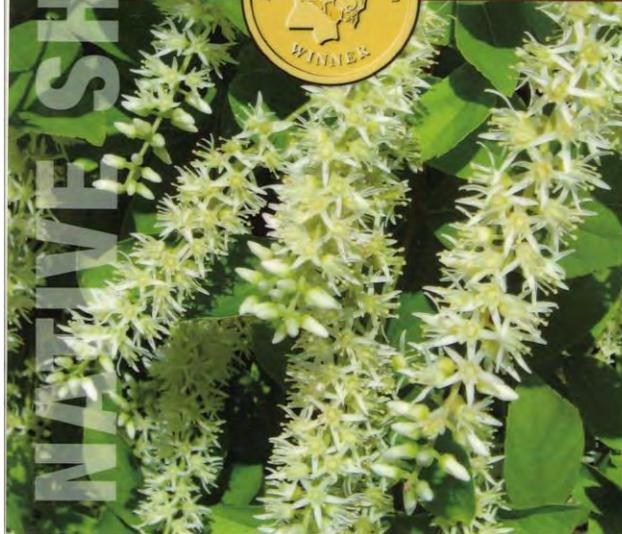
- 'Aristotle' produces green to red bell peppers with thick walls and has tremendous yield potential.
- 72-75 days from transplanting to picking the first pepper.
- The pepper has a nice, smooth shape, and each could weigh about a third of a pound.

**2011 MISSISSIPPI MEDALLION WINNER**  
program sponsored by  
Mississippi Nursery and Landscape Association  
Mississippi State University Extension Service  
Mississippi Agricultural and Forestry Experiment Station  
Mississippi Plant Selections Committee

Funds for this project were provided through the Mississippi Department of Agriculture and Commerce USDA Specialty Crop Grant program.

# Virginia Sweetspire

**NATIVE SHRUB**



**MISSISSIPPI MEDALLION WINNER**

**FULL SUN TO PARTIAL SHADE**  
(*Itea virginica*)

- Does well under full sun to partial shade; 3-6 feet tall; an easy-growing shrub not requiring high maintenance.
- In June, many 4"- 6" inflorescences made of numerous tiny, fragrant, white, star-shaped flowers emerge and cover the shrub.
- Two common cultivars are 'Henry's Garnet' and 'Little Henry' (a more compact form); both cultivars have great reddish purple foliage in late fall; other cultivars include 'Long Spire,' 'Merlot,' 'Sarah Eve,' 'Saturnalia' and 'Shirley's Compact.'

**2011 MISSISSIPPI NATIVE PLANT OF THE YEAR**

**2011 MISSISSIPPI MEDALLION WINNER**  
program sponsored by  
Mississippi Nursery and Landscape Association  
Mississippi State University Extension Service  
Mississippi Agricultural and Forestry Experiment Station  
Mississippi Plant Selections Committee

Funds for this project were provided through the Mississippi Department of Agriculture and Commerce USDA Specialty Crop Grant program.

2011 MS Medallion Ad:

**ANNOUNCING**  
The 2011 Mississippi  
Medallion Award  
Winners

**'Aristotle' bell pepper**

**Hea virginica**

**SunPatiens**

Mississippi Medallion Award Program  
is owned by the Mississippi Nursery and Landscape  
Association 601-919-8111 ~ www.msnsa.org

**Visit your Mississippi certified nurseryman  
today for these and other  
Mississippi Medallion award winning plants.**

Funds for this project were provided through the Mississippi Department of  
Agriculture and Commerce USDA Specialty Crop Grant program.

2012 MS Medallion Ad:

**ANNOUNCING**  
The 2012 Mississippi  
Medallion Award  
Winners

**Butterfly Weed**

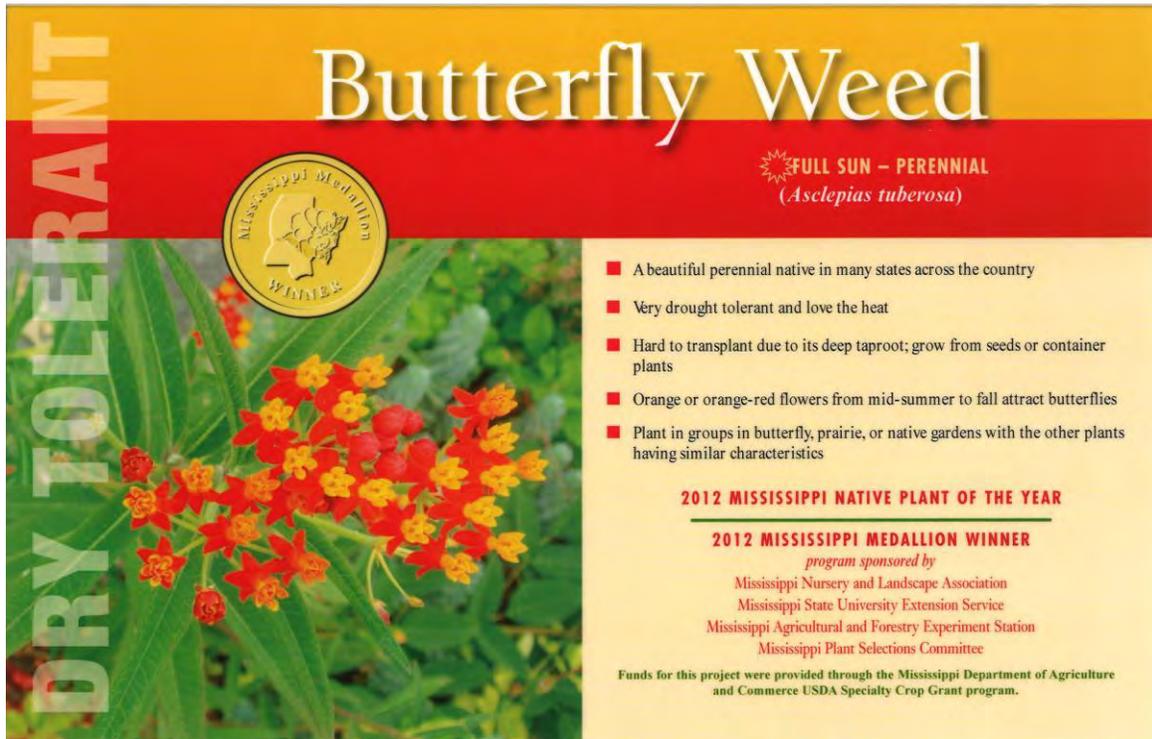
**Supertunia Vista Bubblegum**

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Agriculture and Commerce USDA Specialty Crop Grant program.

2012 MS Medallion Award Billboards:



**DRY TOLERANT**

# Butterfly Weed

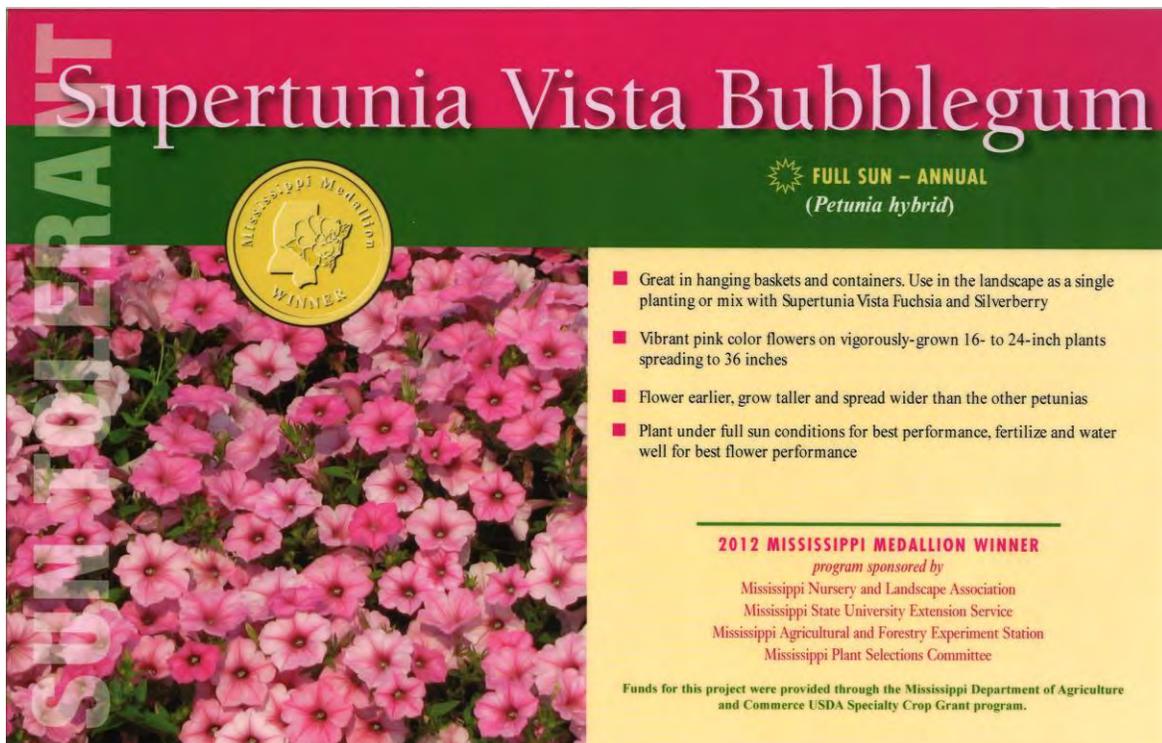
 **FULL SUN – PERENNIAL**  
*(Asclepias tuberosa)*

- A beautiful perennial native in many states across the country
- Very drought tolerant and love the heat
- Hard to transplant due to its deep taproot; grow from seeds or container plants
- Orange or orange-red flowers from mid-summer to fall attract butterflies
- Plant in groups in butterfly, prairie, or native gardens with the other plants having similar characteristics

**2012 MISSISSIPPI NATIVE PLANT OF THE YEAR**

**2012 MISSISSIPPI MEDALLION WINNER**  
program sponsored by  
Mississippi Nursery and Landscape Association  
Mississippi State University Extension Service  
Mississippi Agricultural and Forestry Experiment Station  
Mississippi Plant Selections Committee

Funds for this project were provided through the Mississippi Department of Agriculture and Commerce USDA Specialty Crop Grant program.



**SUN TOLERANT**

# Supertunia Vista Bubblegum

 **FULL SUN – ANNUAL**  
*(Petunia hybrid)*

- Great in hanging baskets and containers. Use in the landscape as a single planting or mix with Supertunia Vista Fuchsia and Silverberry
- Vibrant pink color flowers on vigorously-grown 16- to 24-inch plants spreading to 36 inches
- Flower earlier, grow taller and spread wider than the other petunias
- Plant under full sun conditions for best performance, fertilize and water well for best flower performance

**2012 MISSISSIPPI MEDALLION WINNER**  
program sponsored by  
Mississippi Nursery and Landscape Association  
Mississippi State University Extension Service  
Mississippi Agricultural and Forestry Experiment Station  
Mississippi Plant Selections Committee

Funds for this project were provided through the Mississippi Department of Agriculture and Commerce USDA Specialty Crop Grant program.

# ENHANCING REVENUES FOR FARMERS THROUGH PRODUCTION AND SELLING OF VALUE-ADDED NON-POTENTIALLY HAZARDOUS FOODS

## Project Summary

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This project implemented by Mississippi State University (MSU) educated farmers market managers and sellers to ensure the safety of the buying public. The State of Mississippi does not have a food safety manual or guidelines for farmers market managers and sellers. This is needed in order to educate the sellers to insure the safety of the buying public. Consideration should be given to what products can be sold and under what conditions (whole vs. fresh-cut produce), which products cannot be sold (i.e. canned vegetables), how the product is to be presented to the public (i.e. cut in the open), hygienic standards for food handlers, minimum sanitary requirements, and other guidelines that minimize the possibility of food-borne illness by the ever increasing clientele. The aim of this work was not to impose restrictions to managers and sellers, but to educate and train, as well as provide a simple yet thorough guide for handling food for sale at these markets.

The purpose of this project is to 1) Develop a manual for farmers market managers and sellers in Mississippi; and 2) Develop a training class/module for farmers market managers and sellers in Mississippi and to deliver this in four sites across the state.

This project does not build upon previously funded SCBGP projects.

## Project Approach

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### Food Safety Manual for Farmers Markets Managers and Sellers

A draft of the Food Safety Manual was sent to the Mississippi Department of Agriculture and Commerce (MDAC) and the Mississippi State Department of Health (MSDH) for review. A follow-up meeting between MDAC and MSU authors of the manual was conducted on December 10, 2010. A meeting of MSDH, MDAC and MSU on October 1, 2012 followed to discuss where regulations, guidelines and agreements are between the MSDH and the MDAC. This meeting brought to light new information key to the food safety manual for the Mississippi Certified Farmers Markets. As a result, the manual is being revised and edited by the parties to reflect these new changes. The manual is also being revised in light of the addition of certain acidified canned foods to the list of acceptable products for sale at certified farmers markets. In addition, a training program and manual was developed for processors of acidified canned foods that will be able to sell at certified farmers markets. This project, developed after this proposal was accepted, will enhance the safety of canned foods that are sold at farmers markets, in addition to allowing farmers to add value to their product.

### Food Safety Training for Farmers Markets Managers and Sellers

A total of 13 training sessions (see appendix A) were conducted on farmer market safety training. A total of 398 participants consisting of farmer's market managers, vendors, and others have attended and trained in these sessions. Instructors/speakers from MSU, MDAC, and MSDH were part of the program. The training consisted of basic food safety, examples of high risk foods, do's and don'ts at farmers markets, etc (see appendix B). Contact information was given to participants for follow-ups. Evaluations (see appendix C) from the sessions have ranged from 4.45 to 4.65 on a 5-point scale, showing very favorable responses and understanding of the material by the participants.

In addition, five training sessions on Acidified Canned Foods (see Appendix D) for certified farmers markets have been conducted. A total of 141 participants have attended the training thus far, with a passing rate of nearly 90%. Some of the participants that did not pass the first time were given a second chance and achieved 100% passing. All the participants that attended and passed the exam were given certificates. Evaluations of these classes have ranged between 4.4 and 4.6.

The target of the food safety and acidified canned foods workshop was solely specialty crops; the only foods discussed by the staff were fruits and vegetables covered under the list of eligible commodities as defined by USDA. This was emphasized to attendees during registration and during the training. The participants were aware of the aim of the course (to enhance the value of specialty crops) before registration and throughout evaluations. The evaluations proved only specialty crop businesses were in attendance; the trainees were farmers market managers or vendors, of specialty crop (fruits and vegetables) business. There were no participants that benefited from this project except specialty crop producers.

## **Goals and Outcomes Achieved**

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MSU has been delayed in making progress toward project completion of the farmers market manual. This has been in part due to the dynamics of farmers markets, policy, and other setbacks. The farmers market manual will continue to develop and once completed will be distributed to market managers across Mississippi.

Farmers market trainings have proved very successful over the course of this project. A total of 141 participants have attended the acidified canned foods class and 398 participants have attended the farmers market safety trainings. The number of workshops conducted to increase education and deliver educational materials has far surpassed the original goal of four to 19 (13 general food safety classes and six acidified canned foods).

Participants responded to evaluations as to how they could apply what they learned from the training by:

1. Monitoring their production/garden to minimize contamination of produce.

2. Developing their kitchen so they would be able to pass certification to produce value-added specialty crop products to be sold at certified farmers markets.
3. To only process products deemed low-risk and thus safe to be sold in certified farmers markets if the products were processed and handled as taught.
4. To avoid production and sale of certain higher-risk products until further training and/or facilities were secured.
5. Enhancing hygienic practices at home and at the farmers markets to minimize contamination.

## **Beneficiaries**

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MSU plans to complete the Food Safety Manual for Mississippi's Farmers Markets. MSU will incorporate suggested changes from the MDAC and MSDH, and a final review will be done. This will benefit not only all the farmers market across the state, but also the vendors and customers as this will alleviate the potential for food borne illnesses if the practices are correctly followed.

The food safety classes and workshops benefited more than 539 participants; many of the resources given to attendees passed the information to fellow vendors in hopes to reduce the potential for food borne illnesses, therefore increasing awareness of the potential hazards that exist and eliminating them.

## **Lessons Learned**

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The farmers market manual proved a much harder task than originally anticipated. Rules and regulations regarding food and the sale in farmers market changes frequently, therefore establishing an accurate manual that will be useful for years to come, is difficult.

The food safety classes and workshops, on the contrary, was a positive facet of this project. Prior to the 'farmers market busy season,' MDAC, MSU, MDOH receive numerous inquiries regarding upcoming workshops. Managers and vendors look forward to the offering of these classes each year. Not only are farmers markets increasing every year, so are the number of vendors interested in selling value added or acidified canned foods. Therefore, the demand for this workshop increases each year as well. It is anticipated that these workshops and classes will be a continuous effort between the agencies for many years to come.

## **Contact Person**

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Juan Silva  
662-325-3200  
[jls@ra.msstate.edu](mailto:jls@ra.msstate.edu)

## Additional Information

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### A. LIST OF COURSES DELIVERED (# PARTICIPANTS)

#### Value-added Food Safety

##### 1. General Food Safety Course

- Silva, JL, Anderson, J.2011. Food Safety for MS Farmers Market Vendors. . Gale Community Ctr., Hernando, MS, March 7th (30).
- Silva, JL. 2011. Food Safety for MS Farmers Market Vendors. . Alcorn State University Value-Added Conference, Lorman, MS. July 7th (14).
- Silva, JL.2011. Food Safety for MS Farmers Market Vendors.. MS Ag Museum, Jackson, MS. July 28th (45).
- Silva, JL.2011. Food Safety for MS Farmers Market Vendors. . Gale Community Ctr., Hernando, MS, August 8th (39).
- Silva, JL. And Hodd, A. 2012. Food Safety for MS certified Farmers Market Vendors. Pontotoc Cty,. Ext. Office, Pontotoc, MS. March 13th (38).
- Silva, JL. And Hood, A. 2012. Food Safety for MS certified Farmers Market Vendors. Harrison Cty. Ext. Off., Gulfport, MS. March 15th (18).
- Silva, JL. 2011. Food Safety for MS Farmers Market Vendors. Brookhaven Methodist Church Conference Rm., Brookhaven, MS. March 20th (35).
- Silva, JL. Hood, A. Clark, B. 2012. Food Safety for MS Farmers Market Vendors. Batesville Extension office, Batesville, MS. July 16 (26)
- Silva, JL., Hood, A. 2012. Food Safety for MS Farmers Market Vendors. CAPPS Center, Indianola, MS. July 16<sup>th</sup> (29).
- Silva, JL. Hood, A., Swayze, Queen. 2012. Food Safety for MS Farmers Market Vendors. Miss. Ag. Museum, Jackson, MS. July 18<sup>th</sup> March 20th (34).
- Silva, JL., Hood, A., Luke, J. 2012. Food Safety for MS Farmers Market Vendors. Neshoba County Extension Office, Philadelphia, MS. July 18<sup>th</sup> (35).
- Silva, JL., Hood, A., . 2012. Food Safety for MS Farmers Market Vendors. Forrest County Multipurpose Center, Hattiesburg, MS. July 20<sup>th</sup> (24).
- Silva, JL. Hood, A., 2012. Food Safety for MS Farmers Market Vendors. MSU NEMREC, Verona, MS. July 26 (31).

**Total # participants: 398**

##### 2. Acidified Canned Foods for MS FM

- Silva, JL, Hood, A, Luke, J.2011. Acidified Canned Foods for MS Farmers Markets. MS Ag Museum, Jackson, MS. July 28th (42).
- Silva, JL, Hood, A, Luke, J.2011. Acidified Canned Foods for MS Farmers Markets. Gale Community Ctr., Hernando, MS. August 6th (37).

- Silva, JL, Hood, A, Luke, J.2011. Acidified Canned Foods for MS Farmers Markets. MSU Bost Extension Center, Miss. State, MS. November 29th (30).
- Silva, JL, Hood, B. Clark. 2012. Acidified Canned Foods for MS certified Farmers Markets. Pontotoc Cty,. Ext. Office, Pontotoc, MS. March 13<sup>th</sup> (10).
- Silva, JL, Hood, A, Luke, J. 2012. Acidified Canned Foods for MS certified Farmers Markets. . Harrison Cty. Ext. Off., Gulfport, MS. March 15<sup>th</sup> (10).
- Silva, JL, Hood, A, Luke, J.2012. Acidified Canned Foods for MS Farmers Markets. Brookhaven Methodist Church Conference Rm., Brookhaven, MS. March 20<sup>th</sup> (12).

**Total # participants: 141**

## **B. Food Safety Training on Safe Handling of Foods for Commercial and Farmers Market Sales Example Agenda**

### Outline

1. Introduction- MDAC/host
2. Our food supply- potential problems- Silva
3. Safe Preparation and Handling of Foods for Farmers Markets- Silva
  - a. Liability
  - b. Good Manufacturing Practices and SSOPs
  - c. Health and Hygiene
  - d. Market sanitation, cleaning and sanitation
  - e. Potentially hazardous foods, PHF
  - f. Acidified foods
  - g. Product preparation, packaging and labeling
  - h. Samples for display
  - i. Educating the buyers
  - j. Other issues
4. Labeling and other related issues- Hood
5. Regulations/Certified Food Kitchen- MS State Department of Health representative
6. MS certified Farmers Markets- MDAC representative
7. Discussion, questions, survey

### C. Food Safety Training for MS Certified Farmers Markets evaluation

DATE:

LOCATION:

1. What is your overall evaluation of today's training? (5 – Excellent)

2. How would you rate the instructor in terms of knowledge and presentation style?

J Silva (Safety):

A Hood (Labeling):

S Bass (MSDH Regulations):

3. Various questions regarding your operation:

Do you sell at: Farm – “Roadside Stand”- Farmer’s Market -

Certified Farmer’s Market(cFM) -

Other:

Know or understand safety: Understand – Know - Don’t understand

Grow and sell produce only? YES - NO -

Make jellies/jams for sale at cFM? YES - NO -

Make other products for sale? YES - NO -

Make canned foods (vegs)? YES – NO -

Have certified kitchen? YES – NO -

List products you sell:

4. Please list two examples of how you can apply what you have learned today to your job.

5. Was there enough opportunity for interaction and participation?

YES – NO

6. Was there enough variety of training materials?

YES - NO

7. Were the materials understandable?

YES - NO

8. Would you recommend this training to others?

YES - NO

9. How could your training experience have been improved?

10. What other training topics might help you to do your job better?

## D. Acidified Foods Short Course for Mississippi Entrepreneurs Agenda and Handout

Juan L. Silva and Anna F. Hood  
Mississippi State University

### I. Background

Mississippi as well as the rest of the country is facing a possible food safety crisis with the advent of locally, “home” canned foods for sale in local markets, farmers markets, fairs, and other venues. These canned foods range from low-risk products like preserves (jams, jellies) to high-risk products like low-acid foods (canned green beans, etc). These also include acidified products (pickles, salsas, etc.) that may be or maybe not properly processed. These entrepreneurs are local, have little funding, and only want to expand their earnings by adding value to their fresh produce and other items they grow and/or commercialize. However, the potential for foodborne illnesses from consuming these items is possible, including death from *Clostridium botulinum* toxin. The US FDA has strict regulations (21CFR108, 21CFR113, 21CFR114) that govern the production and commercialization of these products. However, most of these entrepreneurs are local, lack sufficient funding to attend a Better Process Control School course and just need a similar course that is affordable yet complete and adequate to teach them the dangers, the requisites and the limitations they face in producing and selling these products. We acknowledge that a course for these people should be limited to acidified foods, should only be for people selling at certified Farmers Markets. The person may not have more than two employees

The idea of having these courses is to reach these people that are producing risky products with no oversight and in many cases no knowledge or expert assistance.

Other states have begun to do the same, offer a course similar to the BPCS course for local entrepreneurs. The idea is that people have knowledge, be certified, and be registered so as to be permitted to sell these products in local Certified Farmers markets.

The course will integrate the BPCS Acidified Foods course curriculum and some practical demonstrations, as well as state guidelines they face to commercialize these products, including consequences if they go beyond their local market. In this case, it is recommended that they assist and pass a BPCS certified school.

## II. Recommended Syllabus

8:00-8:20 AM Registration, Welcome and Introduction

8:20-9:00 AM Federal Regulations for Acidified Foods and new Draft Guidance

9:00-9:30 AM MS Regulations and Guidance

9:30-10:10 AM What Knowledge You Should Know

(what is acid food? the comparison between acid food and low acid food, including the important laws, the comparison between FDA and USDA regulations, what can or will be improved in the laws, what are the most common mistakes in the processing and what are the risks of these mistakes→ such as under-pressure of the retort)

10:10-10:20 AM Short Break

10:20-10:45 AM Topics on *Clostridium botulinum* and microbiology

(the importance and characteristic of the bacteria, life cycle, symptoms and signs of the toxin, epidemic and case reports, the relative guidelines in the law and their history, prevention by processing)

10:45-11:30 AM Topics on the Plant (Food Plant Sanitation, Process Room Instrumentation)

11:30-11:40 AM Break

11:40-12:30 AM Topics on the Product (Food Container Handling, Closures of glass containers)

12:30-13:30 PM Lunch Break

13:30-14:00 PM Principles of Thermal Processing

14:00-14:20 PM Records and Recordkeeping (including forms)

14:20-14:30 PM Short Break

14:30-15:30 PM pH determination, records, and other demonstrations

15:30-15:50 PM Review and Questions

15:50-16:00 PM Short Final Quiz (participant will need to score 70% or higher to receive certificate of participation)

## III. Handout Content

1. Agenda
2. MS regulations and guidance
3. Federal Regulations
4. Copy of slides for the course
5. Acidified Foods Draft Guidance
6. Forms
7. Other supporting material:
  - a. Acidified foods literature
  - b. Selected analytical laboratories
  - c. Selected vendors of equipment
8. Contact information: MSU, MSDH, MDAC
9. Other

# HEIRLOOM APPLE CULTIVAR PRODUCTION AND QUALITY EVALUATION

## Project Summary

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This project implemented by Mississippi State University was designed to evaluate heirloom apple production possibilities for homeowners use as well as small scale commercial opportunities. Heirloom apples, for this project, are defined as apple cultivars with local production significance but were not major commercial cultivars in 2012. Increasing consumer interest in health benefits of produce consumption, especially locally grown produce for farmer's markets and on-farm sales, was the main motive to conduct this research project.

Specifically, this project identified and collected southern heirloom apple cultivars to plant in replicated trials to identify cultivars with good production potential in the northern Mississippi area using little or no fungicides and insecticides. The harvested apples were then evaluated for fruit quality characteristics. The aim of this project was to develop heirloom apples for homeowners to grow for personal consumption and for small farmers to use for local sales on farm, at a farmers market, or other local sales. Alleviation or reduction of pesticide application is a major environmental benefit from this research.

This project does not build upon previously funded SCBGP projects.

## Project Approach

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Apple rootstocks were purchased in February 2010 in anticipation of purchasing apple scions which would be grafted onto the rootstocks in spring 2010. Dormant scion wood of desirable heirloom cultivars was not available for spring grafting in 2010. Consequently, grafted apple trees of twelve cultivars were purchased from a nursery in winter 2011 and transplanted to the field plots. The grafted trees were grown in research plots during the 2011-2012 growing seasons. The trees were fertilized according to MSU soil test recommendations, weeds were controlled by herbicides and hand weeding, and irrigation water was supplied as needed.

The apple trees did not grow well despite fertilization and irrigation. Following poor growth in 2012, some dying trees were taken to the MSU Plant Pathology Laboratory for analysis and it was determined that a significant infestation of phytophthora crown and root rot was in the soil of the research plot and was causing poor growth of the apples and premature death to some trees. All four trees of 'Buckingham' and 'Hyslop Crab' were still alive on August 28, 2012, but those were the only cultivars with 100% survival. 'Magnum Bonum' had 25% survival.

There was very little fruit produced on apple trees due to the root rot and the few fruit on the trees in May 2012 fell off the trees during the growing season due to the poor growth. There

was an average of 6.0 fruit on 'Virginia Hewes Crab' trees on May 4, 2012; this was the largest number of fruit per tree.

## Goals and Outcomes Achieved

The goal of this research trial, to determine high quality apples that can be grown in Mississippi with minimal pesticide usage, was not achieved. Root rot problems persisting in the soil of the planting site from previous crops severely impaired tree growth and survival. There were no fruit remaining on the trees on August 28, 2012. Reduced foliage canopy resulted from stress to the trees from root rot and resulted in no apples growing to maturity. Apple trees grown in the orchard for two years would not produce much fruit under the best of conditions.

Fire blight is a significant disease in apple production and causes severe problems in many apple orchards worldwide. Trees in this study were rated for the percentage of twigs per tree that were infected with fire blight. Cultivars with the greatest infection from fire blight were 'Shockley', 'Black Gilliflower', and 'Kingston Black'.

Cultivar	Fire blight infection % on May 4, 2012	Number of fruit per tree on May 4, 2012	Percentage survival on August 28, 2012
Hyslop Crab	0	1.25	100
Buckingham	0.25	1.0	100
Baldwin	2.75	0	75
Esopus Spitzenburg	3.3	0	50
Ashmeads Kernel	3.3	1.7	75
Kandil Synap	5.0	1.5	50
Virginia Hewes Crab	6.25	6.0	75
Magnum Bonum	6.7	2.0	25
Tompkins County King	6.7	0	75
Kingston Black	12.5	0.5	75
Black Gilliflower	23.3	3.3	75
Shockley	40.0	1.0	75

## Beneficiaries

Due to the phytophthora root rot problem, the researchers involved in this project benefited the most from this project. The prevailing thought was that the site of the apple trial that had not been planted in apples previously would be exempt from root rot problems, so to have a

significant number of trees die due to root rot was surprising. Phytophthora exists in many sites and proliferates when the right combination of plant host and environmental conditions exist.

Potential apple growers will benefit from the information concerning both the root rot and fire blight. Soil applied fungicide could be beneficial for new and established apple orchards to reduce root rot problems. One of the supported benefits of heirloom apple cultivars is resistance to fire blight. Two cultivars in this study experienced severe fire blight infection.

## Lessons Learned

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The data from this project confirmed that fire blight is a major disease problem in apple production. In spite of being recognized heirloom cultivars, hopefully resistant to fire blight, the apples in this research project were susceptible to the disease. An unexpected problem was phytophthora root rot. Potential apple producers should check the cropping history of orchard sites to try to determine the risks of phytophthora infections. Drip irrigation was used to supply water to the apple trees during dry weather. The combination of irrigation and clay soil, albeit well drained, probably contributed to the root rot infections.

Both fire blight and phytophthora root rot can be controlled with pesticides, but the intent of this study was to evaluate the disease resistance of the apple cultivars without using pesticides. Dormant copper sprays and antibacterial sprays during bloom are routinely employed by apple growers to reduce, not eliminate, fire blight damage. Phytophthora root rot can be reduced with the application of soil fungicide drenches. The trees still surviving at the conclusion of the time allotted for the study could have been protected from future root rot problems with the proper fungicides. If root rot is suspected in an orchard site, routine fungicide applications would reduce tree damage and loss.

Results from this project have been presented as posters at recent growers meetings and conferences with an estimated attendance of 300. Posters will continue to be presented and a Mississippi Agricultural & Forestry Experiment Station (MAFES) research report will be published later in the 2013 year.

## Contact Person

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R. Crofton Sloan  
662-566-2201  
[rcsloan@ext.msstate.edu](mailto:rcsloan@ext.msstate.edu)

# SMALL HIVE BEETLE TRAP EVALUATION STUDY

## Project Summary

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The small hive beetle is considered a major nuisance to beekeepers in Mississippi. This exotic pest is ubiquitous in the state and is particularly troublesome in queen-rearing and package bee operations. Prior to this project, there were frequent reports of small hive beetles ruining honey crops and driving out bees. There was no effective methodology or product available for the suppression of this pest. Trapping the adult beetle with in-hive, insecticide-free traps are currently the safest means of removing beetles from the hive.

The project was designed to first evaluate the Freeman bottom board trap for efficacy in reducing the numbers of small hive beetles in a hive, then to use the trap as a beetle collection tool in hive beetle field assays. At the time that this project was initiated, the bottom board trap design was a new addition to the arsenal of small hive beetle traps; since that time, it has become almost standard paraphernalia to small-scale beekeeping operations. In relation to this project, it has proven to be a most effective tool for varying hive treatments without having to manipulate the hive, and for recovering a good proportion of experimentally released hive beetles.

The small hive beetle is still a relatively new pest to the beekeeping industry in North America. Consequently, there is a very limited understanding of the small hive beetle's biology and behavior, and until some of the holes in our knowledge are filled and a better form of control is established, it is imperative that beekeepers have a means of managing beetle infestations that will not compromise the health of their bees or the quality of their honey crop.

This project does not build upon previously funded SCBGP projects.

## Project Approach

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In the first phase of the study, conducted in 2009, the investigator determined the rate of beetle removal that one could expect to see from using the Freeman beetle trap alone, with no other traps used. Pairs of similar hives receiving two different trapping treatments were compared to determine if the "catch rate" of small hive beetles differed between a hive from which beetles were continuously removed, and one from which beetles were removed for only 48 consecutive hours per week. The test hypothesis stated that the catch rate of hives with continuous trapping would be lower than the catch rate of hives with 48-hour trapping. The five pairs of hives were distributed among 4 different apiary locations, which proved to be an unnecessary factor for the data analysis. The results from phase one showed no significant difference in catch rates of the two trapping treatments.

During the second phase of the project, conducted in 2010, the investigator compared the invasion rate of small hive beetles in hives with a screened bottom and hives with a solid bottom, once again a paired experiment. The Freeman bottom board was used in both treatments, but the catch tray was removed for the screened bottom board treatment. All 6 pairs of hives were located in the same apiary to simplify the data analysis. Marked adult beetles (unsexed) were released from two points equidistant to the 12 hives; approximately 100 beetles were released per trial and recovered 24 hours later. There were several weather complications that interrupted the trial schedule during this phase, including extreme heat and drought, which caused considerable field mortality of hive beetles. The data from this phase has not yet been analyzed.

Unfavorable weather conditions during the summer of 2011 prevented the generation of meaningful data, so the study was postponed.

Phase three, conducted in 2012, was basically a field bioassay; a choice test that allowed beetles only four options of host hives to invade. The baseline data, using no treatments, was established to determine whether there is a hive “position preference” or a preexisting predilection for any one hive among the majority of released beetles. Experimental trials consisted of the removal of one queen from the four hives, 48 hours prior to a beetle release. The trials will continue until all hives have been queenless twice. The test hypothesis is that there is an effect of short-term queenlessness on hive beetle host choice. Phase three is ongoing and will terminate this fall, temporarily, and pick up again in the spring.

## **Goals and Outcomes Achieved**

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The field experiments designed for this project were scaled down to fit the limited capacity of manpower and the project budget. Phase three incorporated the use of a screen tent enclosure, which helped to contain the released hive beetles and greatly improved the recovery rate of hive beetles from hives. Unfortunately, the tent was destroyed in a storm. The investigator is looking into purchasing a permanent screen tent, with which will allow continuation of data collection for the completion of phase three next year.

The final phase of this project is behind schedule due to complications of the screen tent, experiments are currently ongoing as originally outlined until weather no longer permits. The investigator is already making plans to continue this field research next spring.

Data from phases one and two are currently undergoing analysis. A preliminary analysis of means and interactions for phase one shows no significant difference in trapping intervals on the removal rate of small hive beetles, but due to the small size of the dataset, the investigator has to run the analysis several ways to find the most representative model. No significant difference in the first experiment would merit a further investigation of the carrying capacity of hives for small hive beetle.

## **Beneficiaries**

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This project was initiated per request of the Mississippi Beekeeper's Association, and the raw data and initial interpretation has been presented for two of the three phases of the project at MBA annual meetings. Small hive beetle research is very relevant to Mississippi beekeepers, who are heavily impacted by this pest and are continually seeking a better management practice or trapping strategy for the beetle. The topic of small hive beetle management has been presented at every MBA meeting and workshop for the past four years and continues to be a highly requested presentation. Presentations have impacted at least 400 persons. The information generated by this project will benefit beekeepers in the state that are choosing to employ a Freeman-type bottom board trap in their small hive beetle management practice. Results from the third phase of this project will tell beekeepers whether or not a queenless hive is a preferred host and potentially a magnet for beetle invasion in an apiary.

## **Lessons Learned**

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This project was the first of its kind carried out by the investigator, and like many weather-related projects, experienced some pitfalls. Weather complications and a relatively small number of hives were among the biggest obstacles. A low number of participating hives made the analysis very difficult. In the end, the goals were met and two of the three experiments were completed. Field studies by nature have many complications built into them, but these experiments are all repeatable, and now that the research hives have been moved to a single location, these experiments can be repeated with improvements if necessary.

The investigator found this field work to be very enlightening about the behavior and biology of her subject, the small hive beetle. Such factors as release time, ambient temperature and beetle marking techniques were all adjusted to improve data collection in the second and third phase of the experiment after weeks of observation and failed attempts. Also, recovery techniques and recovery period were adjusted to maximize the number of marked beetles reclaimed. The investigator has concluded that minimizing the number of variables, both controlled and experimental, greatly improves the data and simplifies the data analysis. This means that increasing the number of experiments and decreasing the complexity of each experiment is the best strategy for these small hive beetle field studies.

## **Contact Person**

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Audrey B. Sheridan  
(662) 325-2975  
[asheridan@entomology.msstate.edu](mailto:asheridan@entomology.msstate.edu)

## **Additional Information**

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Information generated from this project was used in the publication, “Small Hive Beetle Management in Mississippi”, a booklet that was developed by Audrey Sheridan, Harry Fulton and Jon Zawislak (University of Arkansas Extension Service) and published this year. The booklet is distributed at MBA meetings and through extension offices statewide.

# MISSISSIPPI FALL CROPS EDUCATIONAL INITIATIVE

## Project Summary

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The educational initiative managed by the Mississippi Department of Agriculture and Commerce was an informative effort to teach consumers about fall crops produced in Mississippi to enhance healthy eating. Many consumers misconceive fall as the end to local fresh produce availability. In order to educate consumers on the produce grown and harvested in the fall season, visual aids featured the appropriate produce availability and should increase attendance at farmers markets during the fall season.

In order to address the misconceptions, vertical signs were designed featuring fall produce that will be displayed on the corner of High Street and Jefferson Street, a popular intersection in downtown Jackson, MS up the hill from the Mississippi Farmers Market. In addition, retractable banners were also designed to feature fall produce to display at the Mississippi Farmers Market. These banners are versatile and will be used at other events where the Mississippi Department of Agriculture and Commerce is present. Temporary advertising in the form of chloroplast signs featuring specialty crops offered at the farmers market on that particular market day were designed to entice commuters to stop, shop, and support local producers by purchasing fall specialty crops that they otherwise wouldn't have known was available to purchase this time of the year. Recipe cards featured seven fall specialty crops were designed and printed to educate consumers of their nutritional benefits and featured a recipe on the back to entice purchasing of healthy produce. In order to educate our younger generation, bookmarks were designed that featured pictures of fall specialty crops grown in Mississippi and their nutritional facts.

Specialty crops were also promoted through the Mississippi Farmers Market Fall Harvest Fest Celebration and Food Day Event that was held on October 20, 2012. Food Day is a national campaign dedicated to encouraging healthy and nutritional eating. Newspaper and radio ads were purchased to publicize the event that featured local chefs hosting cooking demonstrations using fall produce from farmers market vendors.

This project does not build on previously funded SCBGP projects.

## Project Approach

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This project was created by the Marketing Division of the Mississippi Department of Agriculture and Commerce in the fall of 2012, after funds from other subgrantees determined they would be unable to encumber the entire amount of allocated funds that was originally awarded during the project

period. Due to the short amount of time left in the 2009 Specialty Crop Block Grant time period, this project was quickly enacted.

The Fall Harvest Festival Celebration and Food Day Event on October 20, 2012 was advertised heavily through radio, newspaper, and Facebook to attract consumers to the Mississippi Farmers Market. Print ads placed in the *Jackson Free Press* and *Northside Sun* had the potential to reach 69,500 and 25,000 readers, respectively. Radio ads ran on two popular Jackson radio stations that had the potential to reach more than 488,827 listeners; the population of the metro-Jackson area including Hinds, Madison, and Rankin counties. While the focus of the event was to educate consumers of the availability of fresh produce in the fall months, MDAC covered costs for 10% of the advertisement costs for any ineligible crops that may have benefited.

Three chef demonstrations were held during the Fall Harvest Fest/Food Day Celebration event. The cooking demonstrations not only featured fall produce but also showed customers how to prepare the produce in a healthy and delicious way. The first demonstration began at 10:00 a.m. with Alex Eaton, Chef de Cuisine from Table 100 restaurant. He prepared a simple broccolini dish with everyday seasonings and lemon zest. At 11:00 a.m., Josh Marks, runner-up of Season 3 MasterChef, prepared Cauliflower Couscous. Besides cauliflower, the dish also featured fall produce of radishes and Satsumas as the fall produce. The last chef began preparing at 12:00 p.m., Chef James Roache' of Ro'Chez restaurant made his signature Stone Soup which featured cabbage, eggplant, mustard greens, radish, sweet potatoes, tatsoi, and daikon radishes. Attendance for the event day was estimated around 1,500 customers. MDAC staff was in attendance to take note of the increase of sales from the produce used in the chef demonstrations.

In addition to the chef demonstrations at the Fall Harvest Fest to show customers how easy it is to cook fresh fall produce, other promotional visual displays were created to showcase fall produce by ways of vertical signs, retractable banners, bookmarks, and recipe cards. These materials were to educate consumers that the fall season does not mean the end to fresh local produce, rather a change in the fresh produce. Other materials included nutritional facts and/or recipes featuring the fall specialty crops produced in MS for the public to take home for their own records.

Due to the large supply of bookmarks and recipe cards, distribution will continue in the future. The bookmarks are popular with school-aged children and will be given to school groups and classrooms to educate them on the fall specialty crop produce available and their nutritional benefits. The seven recipe cards have yet to be distributed. The produce featured on the recipe cards included pecans, sweet potatoes, broccoli, carrots, cabbage, Brussels sprouts, and radishes.

## Goals and Outcomes Achieved

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The goals of this project were achieved as the public was educationally enhanced on the fall specialty crops and appeared to learn a thing or two from the chef demonstrations. When the event day was coming to a close, a member of the MDAC staff went around to the vendors at

the Mississippi Farmers Market to discuss the sales from that day. The target was to increase sales of 10%, some vendors saw an increase much greater of the produce that was featured in the chef demonstrations.

The vendor that supplied the broccolini, cabbage, and Satsumas for the chef demonstrations mentioned that sales definitely increased, with the fall crops featured increasing by an estimated 50%. The vendor also noticed a difference in the shoppers; they tended to be large spenders buying higher quantities of produce at once.

The vendor that supplied the radishes and tatsoi on the other hand, did not notice a difference in the crowd compared to other market days. This particular vendor typically sells out of produce most weeks and this event was no different.

Another vendor that supplied the greens, bokchoy, daikon radishes, and eggplants typically brings plenty of produce, and on this particular event day the vendor completely sold out and traveled back home to bring additional produce to the market.

## **Beneficiaries**

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This rather fast pace project proved beneficial to many. Consumers were directly benefited by increasing their knowledge of fall specialty crops through visual displays and nutritional information supplied on recipe cards and bookmarks. In addition, customers at the Mississippi Farmers Market on the day of the Fall Harvest Fest benefited by increasing their knowledge of cooking techniques of the fresh fall produce. The vendors at the market also benefited, as the overall feeling of sales increased due to chefs' demonstrations of easy to make dishes of produce that was healthy and delicious. The strategy was that market shoppers would come to the market and the first thing they would see were the chefs, from there they would stop, observe, and taste the produce that was fixed. This was the perfect way to increase sales of the fall crops because they learned various ways to prepare the dish and the produce was available immediately after the visual demonstration.

So far the shoppers at the Mississippi Farmers Market on the Fall Harvest Fest (1,500) have directly been impacted by this project. This project will continue on into the future to impact Mississippi citizens as all 27,000 recipe cards have yet to be distributed, and the banners and signs will hopefully have a long useful life to educate customers well into the future.

## **Lessons Learned**

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The Fall Harvest Fest was a successful event enticing a slightly larger crowd than a normal fall market day. Radio, newspaper, and social media advertisements really escalated attendance for fall kickoff event. Chef demonstrations were a popular attraction for the shoppers and their children, as this

was a marketing scheme that attracted everyone as they walked in the market. Because the demonstrations featured fall specialty crops available at the market, shoppers were able to learn how to prepare the dishes and go right to the source to purchase the produce, while it was still fresh in their minds. MDAC plans to add chef demonstrations in future market days to attract and enhance the shoppers' experience.

## Contact Person

Susan Head  
 601-359-1196  
[susan@mdac.ms.gov](mailto:susan@mdac.ms.gov)

## Additional Information

Bookmarks:

 <p><b>MISSISSIPPI FARMERS MARKET</b></p>	<p style="text-align: center;"><b>Produce Nutrition Facts</b></p> <p><b>TURNIPS:</b></p> <ul style="list-style-type: none"> <li>• Both the root and leaves can be consumed</li> <li>• Fat free</li> <li>• Cholesterol free</li> <li>• Low sodium</li> <li>• Excellent source of Vitamin C (needed for normal growth and development)</li> <li>• Greens are also high in Vitamin A, C, folate, fiber, and calcium</li> </ul> <p><b>CARROTS:</b></p> <ul style="list-style-type: none"> <li>• Loaded with Beta-Carotene and Vitamin A to promote good vision and maintain healthy skin and teeth</li> <li>• Fat free</li> <li>• Cholesterol free</li> <li>• Good source of fiber</li> </ul>  <p style="text-align: center;"><small>MISSISSIPPI FARMERS MARKET      929 High Street • Jackson, MS 39202      (601) 354-6573 • www.msfarmersmarket.com      Mississippi Department of Agriculture and Commerce      Cindy Hyde-Smith, Commissioner</small></p>
 <p><b>MISSISSIPPI FARMERS MARKET</b></p>	<p style="text-align: center;"><b>Produce Nutrition Facts</b></p> <p><b>SWEET POTATOES:</b></p> <ul style="list-style-type: none"> <li>• Fat free</li> <li>• Cholesterol free</li> <li>• Low in sodium</li> <li>• High in Vitamin A (provides more than twice recommended daily allowance)</li> <li>• High in Vitamin C (provides more than 1/3 recommended daily allowance)</li> <li>• Important source of Vitamin B6, iron</li> <li>• Good source of calcium and potassium</li> <li>• Excellent source of fiber to promote healthy digestive tract</li> </ul> <p><b>EGGPLANTS:</b></p> <ul style="list-style-type: none"> <li>• Fat free</li> <li>• Cholesterol free</li> <li>• Sodium free</li> <li>• Low in calories and good source of fiber</li> <li>• Can be various shades of purple, green, white, striped, and often used as a meat substitute</li> <li>• Made mostly of water</li> </ul>  <p style="text-align: center;"><small>MISSISSIPPI FARMERS MARKET      929 High Street • Jackson, MS 39202      (601) 354-6573 • www.msfarmersmarket.com      Mississippi Department of Agriculture and Commerce      Cindy Hyde-Smith, Commissioner</small></p>

Recipe Cards:

## Brussels Sprouts



### Nutrition Facts:

- Member of the cabbage family
- Fat-free, high in potassium, good source of Vitamins A and C and good source of vegetable protein



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## *Roasted Brussels Sprouts*

- 1½ pounds Brussels sprouts
- 3 tablespoons extra virgin olive oil
- ½ teaspoon garlic powder
- ½ teaspoon black pepper
- ½ teaspoon salt
- ½ dried sage

Preheat oven to 400°. Rinse and trim Brussels sprouts and cut larger ones in half lengthwise. Toss with olive oil and mix with spices. Place in a single layer in large oblong baking pan, allowing room to shake and turn sprouts during roasting process. Roast for about 25–35 minutes until slightly browned and tender throughout. Spice can vary to suit individual taste.

*Recipe courtesy of Mississippi Farmers Market Cookbook*

## Cabbage



### Nutrition Facts:

- Fat-free, cholesterol-free, sodium-free
- Rich in Vitamin C



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## *Pork Tenderloin with Cabbage and Carrots*

- 12 ounce pork tenderloin, may use seasoned pork, but will have more salt
- 6 cups of shredded cabbage
- 1 large onion, sliced
- 1 cup of shredded carrots
- ½ cup water
- 2 tablespoons of apple cider vinegar, or any flavor desired
- 1 teaspoon of dill weed or rosemary, crushed
- ½ teaspoon of black pepper

Place pork tenderloin on a rack in a shallow roasting pan. Insert a meat thermometer. Roast in a 425 degree F oven for 25 to 35 minutes or until thermometer registers 160 degrees F.

While meat is cooking, in a large saucepan combine cabbage, onion, carrots, water, vinegar, dill weed or rosemary, and pepper. Bring to boiling; reduce heat. Cover and simmer for 8 to 10 minutes or until vegetables are just tender. Slice pork and serve with vegetables.

Makes 4 servings.

Nutrition: 1 serving—156 calories

*Recipe Courtesy of Mississippi Department of Health and Mississippi State Extension*

## Broccoli



### Nutrition Facts:

- Member of the cabbage family
- Has as much calcium per ounce as milk
- Fat-free, cholesterol-free, sodium-free, good source of Vitamin A, folate, iron, calcium, and fiber



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## *Broccoli Salad*

- 2 bunches fresh broccoli—chopped
- ¼ cup sweet onion—chopped
- ½ pound bacon—fried and crumbled
- ½ cup pecans—chopped
- 1 cup mayonnaise
- 1 tablespoon apple cider vinegar
- ½ cup sugar

Mix together broccoli, onion, bacon, and pecans; set aside. In separate bowl, combine mayonnaise, vinegar and sugar; pour over vegetables. Mix thoroughly. Refrigerate for several hours before serving.

*Recipe courtesy of Mississippi Farmers Market Cookbook*

## Radishes



### Nutrition Facts:

- Both the root and leaf are edible
- Fat-free, saturated fat-free, low sodium, cholesterol-free, low calorie, high in Vitamin C (needed for normal growth and development)



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## *Radish and Cucumber Salad*

- 12 radishes with tops
- 1 English cucumber
- ¼ teaspoon of salt
- ½ cup of rice or balsamic vinegar
- 2 tablespoons of olive oil
- 2 tablespoons of lime juice

Slice radishes thinly, reserve tops and cut finely for use later. Cut cucumber thinly in rounds. In a large bowl toss the radish and cucumber slices with salt. Toss with vinegar, olive oil, and lime juice. Let stand at room temperature for 1 hour. Just before serving, fold radish tops into salad.

Makes 8 servings.  
Nutrition: 1 serving—40 calories

*Recipe Courtesy of Mississippi Department of Health and Mississippi State Extension*

# BEEKEEPING EDUCATIONAL WORKSHOPS

## Project Summary

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The purpose of this project was to conduct beekeeping workshops for beginner and advanced beekeepers and to provide educational opportunities children at schools and libraries. The Mississippi Beekeepers Association (MBA) identified the growing interest in beekeeping in the state. The public continues to become aware of the shortage of bees (both wild and domestic) due to diseases such as Colony Collapse Disorder and parasites. This increased awareness has led to the public wanting bees to pollinate their gardens and orchards. With the decline in wild and managed honey bee colonies, it is important that populations of honey bees be maintained to meet pollination needs. Honeybees are the most economically valuable pollinators of agricultural crops worldwide. They pollinate approximately 130 agricultural crops including fruit, vegetable, fiber, and nut crops.

This project is a continuation of several Specialty Crop Grant Program projects. The project was needed and timely in continuing and expanding upon the efforts of these projects. The MBA received FY-07 Specialty Crop Block Grant Funding to conduct beekeeping workshops across the state. The MBA conducted four successful workshops with a total of 317 participants in 2008. Of these participants, approximately 15 to 20 percent reported they were beginner beekeepers wanting to learn how to get started. While the workshops laid a foundation for beginner beekeepers, those interested in beekeeping needed further assistance to help them get started in honey bee production. SCBGP-Farm Bill funds were received to implement a cost-share program for beginning beekeepers along with conducting workshops. FY2008 SCBGP funds were received to expand the cost-share program. Through this program, 110 eligible beginning beekeepers were reimbursed for 50 percent of the cost incurred to purchase honey bee boxes, honey bees, and supplies necessary for two colonies. FY2010 SCBGP funds were sought and awarded to continue with the beekeeping workshops after the closing of this particular grant. Accounting for all Specialty Crop Block Grant funding allotted to the MBA for Beekeeping Workshops, a total of 20 workshops have been completed with a total attendance of 2,021 from 2008 to 2011.

## Project Approach

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The MBA held a total of six workshops educating 737 beekeepers with the SCBGP-FY2009 funding. The workshops had in-class presentations as well as field exercises which provided hands-on exercises. The MBA purchased educational materials to be used for the workshops and to distribute to the students.

The dates, location, attendance, and topics covered at the workshops are as follows:

Date/ Location	Attendance	Topics
May 7-8, 2010 Verona, MS	85	Some of the topics included: basic bee biology, honey flow and food sources, spring management, how and when to get started, handling/harvesting/processing honey, queen management, swarm prevention and control, basic review of brood diseases, mite control, feeding/nutrition for bees, and small beetle hive management. Hands-on field exercise topics included: how to work bees, types of equipment for bee hives, basics of bee rearing, splitting, surveying and treating for mites, finding the queen and requeening, queen rearing-the final steps, and honey bee trapping.
June 2-3, 2010 Hattiesburg, MS	115	Some of the topics included: basic bee biology, honey flow and food sources, spring management, how and when to get started, handling/harvesting/processing honey, queen management, swarm prevention and control, basic review of brood diseases, mite control, feeding/nutrition for bees, and small beetle hive management. Hands-on field exercise topics included: how to work bees, types of equipment for bee hives, basics of bee rearing, splitting, surveying and treating for mites, finding the queen and requeening, queen rearing-the final steps, and honey bee trapping.
October 29-30, 2010 Ellisville, MS	160	Some of the topics included: basic beekeeping needs, selecting and setting up an apiary site, fall/winter management, spring management, plant importance to honey bees, marketing honey, and when & what is involved in purchasing, picking up and/or delivering a hive of bees, a nuc a queen or package of bees.
April 7, 2011 Jackson, MS	175	<u>Beginners workshop.</u> Some of the topics included: managing hives to optimize small hive beetle damage, low budget beekeeping, bee management 101, the beekeepers calendar, how and when to get bees. Field exercise topics included: the art of beekeeping, importance of honey bee population control in the hive and how to judge a colony's

		strength, feeding bees, and finding queens/making splits.
May 13-14, 2011 Jackson, MS	130	Some of the topics included: basic bee biology, honey plants and honey flows, getting started in beekeeping, swarm management, nucs vs. packages, keeping bees alive, managing small hive beetles, and diseases of concern. Hands-on field exercise topics included: how to work bees, types of equipment for bee hives, basics of bee rearing, and honey harvesting and processing, requeening/how to find queens, queen rearing-final steps, finding the queen and requeening.
June 3-4, 2011* Verona, MS	72	Some of the topics included: basic bee biology, nectar flows and food sources for bees, getting started in beekeeping, spring management/swarm prevention, small hive management, harvesting, handling, and processing honey, honey marketing, fall/winter management, hive pest and diseases, IPM for beekeeping, and feeding/nutrition for bees. Hands-on field exercise topics included: how to work bees, types of equipment for bee hives, basics of queen rearing, making splits and requeening, how to start new hives, surveying and treating for mites, and queen rearing-final steps.
<b>6 Total Workshops</b>	<b>737</b>	

\* Workshop partially funded by Specialty Crop Block Grant Program – FY2010.

The MBA initially proposed conducting twelve workshops (four workshops per year for three years). Through this grant, the MBA was able to conduct six workshops in two years. Four workshops were actually held during each calendar year of 2010 and 2011. One workshop during each year was funded through separate SCBGP grants. As more and more workshops were held and as interest in beekeeping grew, it became apparent that presenters with an expertise in various subject matters were needed to conduct the workshops. This required seeking out-of-state speakers which costs more and limited the number of workshops that could be held.

In addition to the workshops, MBA members also educated children about honeybees and beekeeping through educational activities at schools and libraries. Women and children were educated about beekeeping at a meeting of the Ripley Garden Club in Ripley, MS, in March 2010. An exhibit booth was set up at the Union County Fair to educate students and children during July/August 2010. An observation hive was displayed at Blue Mountain College in August 2010 for students. Around 500 students were educated about beekeeping by a member of the MBA on October 9 and October 16, 2010. Another beekeeper made a presentation to 15 students in Choctaw County in November 2010.

## **Goals and Outcomes Achieved**

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The goal of this project was to continue to see the number of beekeepers in the state by a minimum of 5 percent annually. The MBA estimated that the number of beekeepers in Mississippi in 2009 was 1,000. Using data collected at workshops and the participants in the MBA's cost-share program, they estimate the number of new beekeepers annually to be 100 (10% increase). The MBA membership has risen from 467 in 2009 to a current membership of 518, up 11 percent over the past two years.

The attendance at workshops has increased annually. Workshop attendance each calendar year has been as follows:

2008 - 317 attendees

2009 - 522 attendees

2010 - 565 attendees

2011 - 617 attendees

Total attendance = 2,021 (This includes attendance for all workshops funded through the Specialty Crop Grant Program (FY2007, FY-Farm Bill, FY-2009, and FY2010).

One expected possible outcome of the program was that a few of the beekeepers would expand into commercial beekeeping. According to USDA's latest estimates, the number of colonies in Mississippi has increased. In 2009, there were 14,000 colonies, and that increased to 16,000 in 2010. Data from 2011 is not available currently. The yield per colony has also seen an increase. The yield per colony was 98 pounds per colony in 2008, 104 pounds in 2009, and 98 pounds in 2010. The average price per pound has increased over time at \$1.30, \$1.32, and \$1.47 in 2008, 2009, and 2010 respectively.

## **Beneficiaries**

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The direct, immediate beneficiaries of the project were 737 workshop attendees. Their knowledge of beekeeping should have increased with the exposure to information about beekeeping. In the long-run, the beekeeping industry in the state should be positively impacted. Honey bees are important to the state of Mississippi for both its pollination and

honey production. In Mississippi, the annual pollination value is estimated to be over \$250 million. They pollinate approximately 130 agricultural crops including fruit, vegetable, fiber, and nut crops. In 2010, Mississippi produced 1.5 million pounds of honey with a value of production of \$2.3 million. State beekeepers also produce queens and packaged bees worth more than \$750,000 annually. Among states, Mississippi ranks from 23rd to 25th in honey production.

## **Lessons Learned**

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The MBA learned several lessons through this project. In order to ensure that the workshops are providing the participants with the best information possible that will have the largest impact on their beekeeping operations, whether hobbyists or commercial operators, the best speakers must be secured. Securing the best speakers often require more funding especially if the speakers are coming from out-of-state. Although the costs may be more, it is imperative to give the participants the information that will benefit them the most.

In addition, the MBA learned just how important these workshops have been to those individuals who are interested in getting into beekeeping. Several workshop participants attend in order to learn more information prior to actually getting started into beekeeping. For some, once they learn more about what is involved, they decide that beekeeping is not something they would like to pursue. The hands-on field exercises are a great way to get a glimpse of what is truly involved in the maintenance and upkeep of beehives. The workshops have provided a great opportunity for those who are considering getting involved with beekeeping to see if it is something that they want to invest in before they invest money into it.

## **Contact Information**

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Harry Fulton  
662-738-4611  
[bigbee.valley.bees@att.net](mailto:bigbee.valley.bees@att.net)