2010 SPECIALTY CROP BLOCK GRANT PROGRAM

FINAL REPORT

ALABAMA DEPARTMENT OF AGRICULTURE & INDUSTRIES

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2010 SCBGP – ALABAMA PROJECTS:

Please allow this document to serve as the 2010 SCBGP Final Report. Below please find a listing of approved projects for the Alabama Department of Agriculture & Industries.

Enhancing the Blueberry Packing Facility (Food Safety)
Sylacauga Grows (SAFE)
Auburn University Pest Management Peach
Industry
Auburn Horticulture Dept. Dev. Kiwifruit Growing Recommendations
AU Teaching & Demonstration Gardens
Building Farmer to Consumer Mkts. Black Belt
Alabama Pecan Growers Ed. Program
Plasticulture/Wholesale Production to Increase
Production and Consumption of Alabama Specialty
Crops

Alabama Watermelon Assoc. Promotions
Campaign
CFIC
Alabama Extension (Spec. Crop Prod. for Employment and Healthy Living)

Project 1

Project: Enhancing the blueberry packing facility to meet 'Food Safety' requirements

Final Report

Project Summary

The blueberry industry in southwest Alabama has been part of the specialty crop market since 1977. Early on most of the berries were sold locally. As the industry grew and production increased the local market could not utilize all the production. In 1998, the Escambia Blueberry Growers was incorporated into a formal organization to facilitate the sale of the blueberry crop and assist producers in the area. Consequently, a collection and shipping facility was built to meet the needs of the industry. The existing building size is 9,440 sq ft including the cooler. The existing cooler is 1,170 sq ft being 30' x 39' inside dimensions. Due to the tremendous focus on 'food safety' the aforementioned facility must be updated to meet requirements of buyers, i.e. C.H. Robinson, Walmart etc.

Food Safety is an important part of producing a quality food product. One of the issues we are faced with is the insulation on the walls and the ceiling of the building. The plastic covering the fiberglass insulation tears very easily and the seams are starting to come apart. Exposed fiberglass insulation has become loose, is falling and sometimes mixes with the blueberries causing a food safety issue. We have been taping the plastic to temporary fix the issue.

Construction of an area inside of the existing building to cool the blueberries as they were brought in from the fields assisted in a better quality packaged berry and protected the berries from the insulation problem in the aforementioned paragraph. Blueberries are extremely perishable and need proper postharvest handling and cooling to ensure high quality.

The packing facility has a cooler that is kept at 34 degrees for the packaged blueberries. The fresh picked berries from the fields cannot be placed in this cooler until they are packaged. The Constructed area cooled the berries down to a temperature of 65 degrees until they can be packed and placed in the 34 degree cooler. The upgrades to the existing facility provided a higher quality berry to be packed and shipped to our buyers. We retained the same buyer as used in past years because of improvements to food safety by packing in an environment that is more conducive to food safety.

Project Approach

Once funds were received improvements began immediately. The construction of the new cooling room was finished in time for the 2011 blueberry harvest. Immediate improvement was noticed in the berry quality and no longer was concern about food safety involving fiberglass insulation. The Denester was purchased and installed improving berry container sanitation.

Goals and Outcomes Achieved

The Association shipped 52,000 pounds of berries in the 2010 season and 99,415 pounds of berries in the 2011 season. This increase is due to the ability to cool the berries better which extended the season. The blueberry buyers were pleased with the food safety improvements. The increase of gross sales from 2010 to 2011 was $71122.50.

With the addition of the cooling area the Association is able to maintain the quality of the berries for a longer period and thus have an increased amount of marketable berries. The Association's cull rate has been decreasing since the improvements. The cull berry, mainly soft berries do to field heat, versus the total field picked percent for 2010 was 14.21%, 2011 was 13.53% and 2012 was 12.67%. Being able to cool the berries faster has decrease the amount of the cull berries and extended our season.

The association increased their members during the 2011 season by one grower. The 2012 season membership increased by two members and one member returned to the association after previously leaving. With collaboration from Brewton's Agricultural Research and Experiment Station, the Alabama Farmers Market Authority, Food Safety advisers, existing customers and existing members we have grown your membership and will continue to grow. The Association has three growers looking at joining the membership for the 2013 season. They would not have been interested if the project would not have been implemented.

The Association conducted outreach to solicit new growers by calling local growers and receiving grower names from current buyer. In 2011 the Association though receiving phone calls from buyers used more than one buyer for fresh berries. These buyers paid less than current buyers, we no longer are looking for additional buyers.

Beneficiaries

The benefits with the project are many. The members of the Association shipping more produce than previous years. The quality of the produce benefiting the consumer, we are providing a better product. . We retained the same buyer as used in past years because of improvements to food safety by packing in an environment that is more conducive to food safety. The blueberry buyers were very pleased with the food safety improvements and are committed to purchasing the Association's future crops. The harvest season was extended giving the labor pool at the packing facility longer employment. All the members pickers were also employed longer.

The blueberry season in 2010 Escambia Blueberry Growers, Inc has 7 active growers. In the 2011 season seven growers were active. Out of the seven the association lost two growers and gained two growers. The 2012 season active growers increased to eight growers, losing three from 2011 and gaining four. The 2012 gain was from three new growers and one returning.

Lessons Learned

The results of the project were all positive.

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Project 2

PROJECT TITLE: Sylacauga GROWS/Community Garden

PROJECT SUMMARY:

In January 2009, based on the results of the community needs assessment, a group of community leaders and concerned citizens came together to address food access. Thus, Sylacauga GROWS was created in response to the identified need. The goal of the Sylacauga GROWS Community Garden project is to enhance the competitiveness of US specialty crops, by increasing child and adult nutrition knowledge and consumption of these crops through a community-based initiative. The objectives of this initiative are: to provide specialty crops to the families and community of Talladega County; to create comprehensive educational opportunities about sustainable agriculture and nutrition through outdoor experiential education; and to provide instructional opportunities for 100 students in the BRIDGES afterschool programs related to entrepreneurialship, employability, healthy life choices, gardening, nutrition and healthy food preparation. Sylacauga GROWS is a community project that encourages community members and leaders to work together during economically challenging times toward a common mission to grow specialty crops and healthy communities through farming and education. Sylacauga GROWS serves as a model for Talladega County and other rural communities in sustainable agriculture and nutrition through outdoor experiential education. Sylacauga GROWS reaches out to the community through the creation of community gardens (raised beds for lease), where families farm their own plots on garden sites leased from Sylacauga GROWS. Educational opportunities have included workshops and in-school training on gardening skills, healthy diets, and entrepreneurship at the garden sites and in targeted school and afterschool sites across the county. Production garden sites have expanded to five school sites across the county to educate and promote healthy life choices and the prevention of obesity. Garden tours are available to promote the community garden model and to generate support for these efforts.

PROJECT APPROACH:

Activities Performed:

- Expanded the existing 5 acre production garden to include 40 fruit trees in the Sylacauga GROWS Fruit Orchard.
- Built and planted school gardens at 5 elementary schools across Talladega County.
- Provided 26 families with the opportunity to farm their own plots on Sylacauga GROWS garden sites by creating 26 raised beds for lease at $5.00/year.
- Constructed a greenhouse to further expand the capacity of Sylacauga GROWS to provide food and educational opportunities to the community.
- Expanded existing partnerships with community partners to provide hands-on activities, workshops, and educational tours of the community garden.

- Provided volunteer opportunities for the community to serve in the garden and through court ordered community service.
- Increased production of the garden by planting a greater number of specialty crops.

Outcomes for FY 2010-2011:

- 325 individuals accessed produce through the Sylacauga GROWS Community production garden and school site gardens.
- 3,009.52 lbs. of produce was distributed through the Sylacauga GROWS production garden.
- 158 participated in the Sylacauga GROWS education activities in the production garden.
- 9 families participated in the training sessions for the community garden plots with a minimum of five (5) hours per month during the growing season of instructional opportunities.
- 9 families leased and farmed a total of 26 raised beds plots.
- 249 plants were germinated in the greenhouse.
- 1,701 students participated in educational/prevention activities to promote wellness through the implementation of an evidenced-based curriculum (Wellness Academics in Youth or WAY) in five pilot schools in the county and with targeted students enrolled in the BRIDGES afterschool programs.
- 87% of students in the BRIDGES afterschool program demonstrated an increase in knowledge about healthy lifestyle choices related to nutrition, exercise, gardening, farming, and entrepreneurial skills based on pre and post testing.
- 360 individuals participated in promoting wellness, gardening, farming, food and nutrition through hands-on outdoor experiential learning.
- The Youth Service Employees' program was not funded through the Alabama Career Link Centers. However, 26 community services workers provided services in the Sylacauga GROWS production garden.
- 60 volunteers provided 1,052.50 hours of services to the Sylacauga GROWS Community production garden.

- Reported a 32% increase in production through the Sylacauga GROWS Community production garden.
- 14 garden tours were provided in the Sylacauga GROWS production garden.
- Five (5) school-level production garden plots were built and planted at five pilot schools across Talladega County.
- Due to a lack of funding, the proposed addition of 5 new pilot school sites and additional 25 community plots was not accomplished.
- Program staff were unable to track students identified with risk factors for obesity to determine if they demonstrated a 5% decrease in BMI and/or height or weight indicators. School level personnel were not available to provide this data. This project component is currently being developed through a grant with the University of Alabama at Birmingham targeting 4th grade students at Pinecrest Elementary in Sylacauga City Schools.

Community Partners and Contributions:

City of Sylacauga	- Land for raised beds - Labor to construct raised beds - Water supply at raised beds
Sylacauga Housing Authority	- Land for community garden - Grass cutting and tree clearing at community garden - Water and utilities needed at community garden
Chamber of Commerce	- Press and media relations for Sylacauga GROWS Community Garden
Talladega County Extension Agency	- Support and educational materials
United Way of South Talladega	- Labor related to construction of the green house
Care House	- Distribution of vouchers and produce from the community garden
First United Methodist Church, Saint Jude Catholic Church, and Christ Point Community Church	-assists in managing and farming the Sylacauga GROWS Community production garden.

BENEFICIARIES:

- Unemployed or disadvantaged citizens of Sylacauga that were in need of fresh fruit and vegetables.
  - **For FY 2011 & 2012, 3009.52 lbs. of vegetables were produced from the production garden.**
- Elementary school students who had access to the school gardens that were built, cultivated, and maintained at 5 elementary schools across Talladega County.
  - **Those schools were Graham Elementary, Salter Elementary, Indian Valley Elementary, Sycamore Elementary, and Fayetteville School.**
  - **Approximately 3,500 students were impacted by this project.**
- Citizens of Sylacauga, service clubs, and other organizations that were seeking a meaningful project and opportunities to volunteer in our community.
  - **For FY 2011 & 2012, 2533.25 volunteer hours have been logged in the gardens.**

LESSONS LEARNED:

The Sylacauga GROWS Community Garden has been a successful project for the entire community of Sylacauga and surrounding areas. It has proven to be a sustainable project that provides food, service, and opportunities to serve. Youth groups from 5 different states have traveled hundreds of miles over the past two summers have provided service to the garden with the mission of assisting those in need in rural, poor communities such as Talladega County, Alabama.

One of the challenges we faced and have addressed relates to garden maintenance during seasons of high production. With limited paid staff and a dependence on individual volunteer assistance on a daily basis, maintaining for full production of five acres of a production garden along with 26 raised beds and five school gardens presented challenges. In the summer of 2010, the garden was at full capacity. Managing and maintaining the garden was difficult and production suffered as a result. To further add to that complication, a severe drought hit the area and production suffered. Those issues have been addressed through the development of a cultivation plan that assigns segments of the garden to groups of volunteers, primarily the faith-based community churches, who are responsible for their garden sections. They prepare the plots, select the specialty crops to be cultivated and manage and maintain their designated areas throughout the year. In addition, two acres of the community gardens has now been dedicated to a fruit orchard. Individuals may purchase fruit trees in honor or in memory of a loved one. To date, 40 fruit trees have been planted in the Sylacauga GROWS community gardens. The orchard is low maintenance and will yield a high production over time of healthy fruits for distribution in the community.

Another challenge concerns entrepreneurial classes we had hoped to implement. Our original plan was to engage our County Extension office staff to conduct classes to participants for participants from across the community who were interested in learning about the business development process. However, the County Extension office was faced with drastic cuts to their programs and were non-funded through the Department of Agriculture for the programs they had operated that we had depended on utilizing. Therefore, the classes were not available. Garden staff and community volunteers have provided educational opportunities in the garden and across the community.

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Project 3

PROJECT TITLE:
Participatory Implementation of Cost-Effective Pest Management Practices to Enhance Profitability and Competitiveness of the Alabama Peach Industry

PROJECT SUMMARY

Provide a background for the initial purpose of the project, which includes the specific issue, problem, or need that was addressed by this project. Establish the motivation for this project by presenting the importance and timeliness of the project. If the project built on a previous funded project with the SCBGP or SCBGP-FB describe how this project complimented and enhanced previously completed work. Present the significant contributions and role of project partners in the project

The Alabama peach industry contributes about 30% of the annual fruit crop production in the State with an estimated total market value of over $12 million (Alabama Agricultural Statistics Service, 2002). Most of the harvested fruit is devoted to extensive wholesale shipping and fresh market industry. Like most other parts of the US, fruit crops in the State are attacked by numerous species of insect and mite pests. Intense pressure from these pests can severely reduce yield and profitability. Fruits are high value crops which must meet high quality production standards, including being free from insect damage. Traditionally, conventional growers have achieved pest control in their farms through applications of broadspectrum pesticides. In many cases, repeated use of pesticides has resulted in development of pest resistance, as well as concerns over food safety, human health, and the environment. The passage of the Food Quality Protection Act in 1996 (FQPA, 1996), which has resulted in cancellations or restrictions (by the US Environmental Protection Agency) of many major pesticides, has negatively impacted fruit production and pest management. The removal/reduction of key conventional insecticides, which historically have been used by fruit growers to control their major pests, has created a dire need for alternative management tactics for the major pests. In addition, removal of key conventional insecticides has also created serious concerns regarding emergence of new pests and increasing status of some minor pests in fruit production. These impacts heighten the need to develop effective and ecologically based integrated pest management strategies (IPM) for pests of fruit crops.

This grant, obtained from ADAI, was to implement cost-effective pest management practices to enhance profitability and competitiveness of the Alabama Peach industry. Specific objectives are; 1) On-farm evaluation of reduced and well-timed/targeted insecticide sprays programs based on pest phenology model to reduce indiscriminate use of insecticides; 2) Develop a trap crop system for managing stink bug damage in peaches; 3) Demonstrate pest management tactics to fruit growers through workshops, on-farm training and other outreach activities to facilitate grower adoption of IPM. We have demonstrated and confirmed in this study that four applications of imidan (2 sprays) and Actara (2 sprays) and imidan and rimon significantly reduced the damage due to plum curculio and stink bugs compared to the

control of no spray. However, the damage levels in most of the programs were in all cases above the threshold of 1% which is usually accepted by peaches grown for the fresh market. The importance of rimon, a reduced risk insecticide and OP alternative requires although marginally significant could not be effectively confirmed in this study. We have also shown that trap crops comprising of winter wheat can be used to manage stink bugs in peaches particularly, the overwintering populations of leaf-footed and stink bugs. Sunflower, grain sorghum, and pearl millet can also be used to manage summer populations of leaf-footed and stink bugs. This study has also shown that leaf-footed bugs (mainly *Leptoglossus phyllopus*) is the most abundant (>70% of total insects) plant bug with brown stink bugs a distant second in the trap crops. Most of the insects appeared in the trap crops during the period when the trap crops were in their reproductive stage and numbers continued until the plants senesced.

PROJECT APPROACH

Briefly summarize activities performed and the tasks performed during the grant period. Whenever possible, describe the work accomplished in both quantitative and qualitative terms. Include the significant results, accomplishments, conclusions and recommendations. Include favorable and unusual developments

Objective 1: On-farm evaluation of reduced and well-timed/targeted insecticide sprays programs based on pest phenology model to reduce indiscriminate use of insecticides.

(March 2011-August 2011 and March 2012-August 2012)

Two experiments were conducted concurrently in large peach blocks at the Chilton Research and Extension Center, Clanton, AL. The first experiment was conducted in an nine-year old mature 'Flameprince', a late-season peach variety covering 0.688 ha (1.7 acres), with fruits maturing in late-July to early-August. In this orchard, we tested a reduced insecticide spray program (Program 3) which was found as a promising treatment for control of plum curculio (PC) in peaches in our small scale trials (Akotsen-Mensah et al. 2011). The second experiment was performed in an experimental mature 'Ruston red', a mid-season peach variety block covering 0.688 ha (1.7 acres) with fruits maturing in early to mid-July. Two new programs in addition to Program 3 above were evaluated in this second peach block. The new programs included one organophosphate (OP) alternative insecticide, Rimon. The following spray programs were evaluated: **1) Reduced Spray Program 3** (Akotsen-Mensah et al. 2011)- Two Imidan 70W (Imid) sprays alternated and targeted with two Actara (Act) sprays according to the schedule below for a total of 4 insecticide sprays: 1st PC peak trap catch (1st spray), larval hatch and post-hand thinning (2nd spray), 1 week after the emergence of summer generation (3rd spray), and greater than 21 days insecticide re-entry interval (REI) of last spray of Imidan (4th spray). The 4th spray was included to cater for late season pests like stink bugs and leaf-footed bugs; **2) Reduced Spray Program (New)** – Two sprays of Rimon (Rim) alternated and targeted with 2 sprays of Actara according to the schedule below for a total of 4 insecticide sprays: 1st Rimon spray @ 1st PC peak trap catch (1st spray), 1st

Actara spray at larval hatch and post-hand thinning (2nd spray), 2nd Rimon spray at 1 week after emergence of summer generation (3rd spray), and 2nd spray of Rimon at greater than 10 days of REI of Rimon; **3 Reduced Spray Program (New) –** Two sprays of Rimon and Imidan tank mixed alternated and targeted with 2 sprays of Actara according to the schedule below for a total of 4 insecticide sprays: 1st Rimon spray @ 1st PC peak trap catch (1st spray), 1st Actara spray at larval hatch and post-hand thinning (2nd spray), 2nd Rimon and Imidan spray at 1 week after emergence of summer generation (3rd spray), and 2nd spray of Actara at more than 7 days of REI of Actara (4th spray) and 4). Untreated control; spray was done with only water.

Each insecticide treatment was applied as a foliar spray using an air-blast sprayer mounted on a tractor and delivering at 2.25 lb/a Imidan, 3.4 fl.oz/a of Actara, Arctic 3.2 EC @ 8.0 oz./a and Rimon @ 30fl.oz/a. Each spray treatment was applied to ensure full coverage of the materials, while ensuring that drift is reasonably minimized. To further minimize drift, spraying was done in the early hours of the day or late afternoons when wind speed and other climatic factors are near optimum for application. Fruit damage assessment was done at harvest by picking 600 fruit per plot (1800 per treatment). Percent damage data was transformed and analyzed by ANOVA followed by Tukey-Kramer HSD test ($P < 0.05$; JMP version 7.0, SAS 2007).

RESULTS

In 2011, the results showed significant difference among the treatment at harvest (7 July) ($F_{3, 6} = 2.03$, $P = 0.211$). However, no significant difference was recorded among the treatments during harvest (6 June) ($F_{3, 6} = 2.03$, $P = 0.2110$) in 2012 in controlling plum curculio. Comparing the means, the results showed that spraying of 2 imidan and 2 actara can reduce the damage due to plum curculio. The results confirm previous results that it is possible to reduce the current spray schedule from 16 to 4, if the timing of the applications is made to coincide with specific stages of plum curculio and stink bugs. All the spray programs did significantly better than the control at harvest in reducing the damage due to plum curculio (Figure 1) and stink bugs (Figure 2). The promise of Rimon, an OP-alternative and also a reduced risk insecticide could not be well demonstrated in this study because of the two different results obtained. Although damage due to plum curculio is usually concentrated around the border row, our results suggest that this is not always the case since our results showed no significant difference among the different sections of the Flameprince orchard (Figure 3). Similar results were obtained for stink bugs (Figure 3).

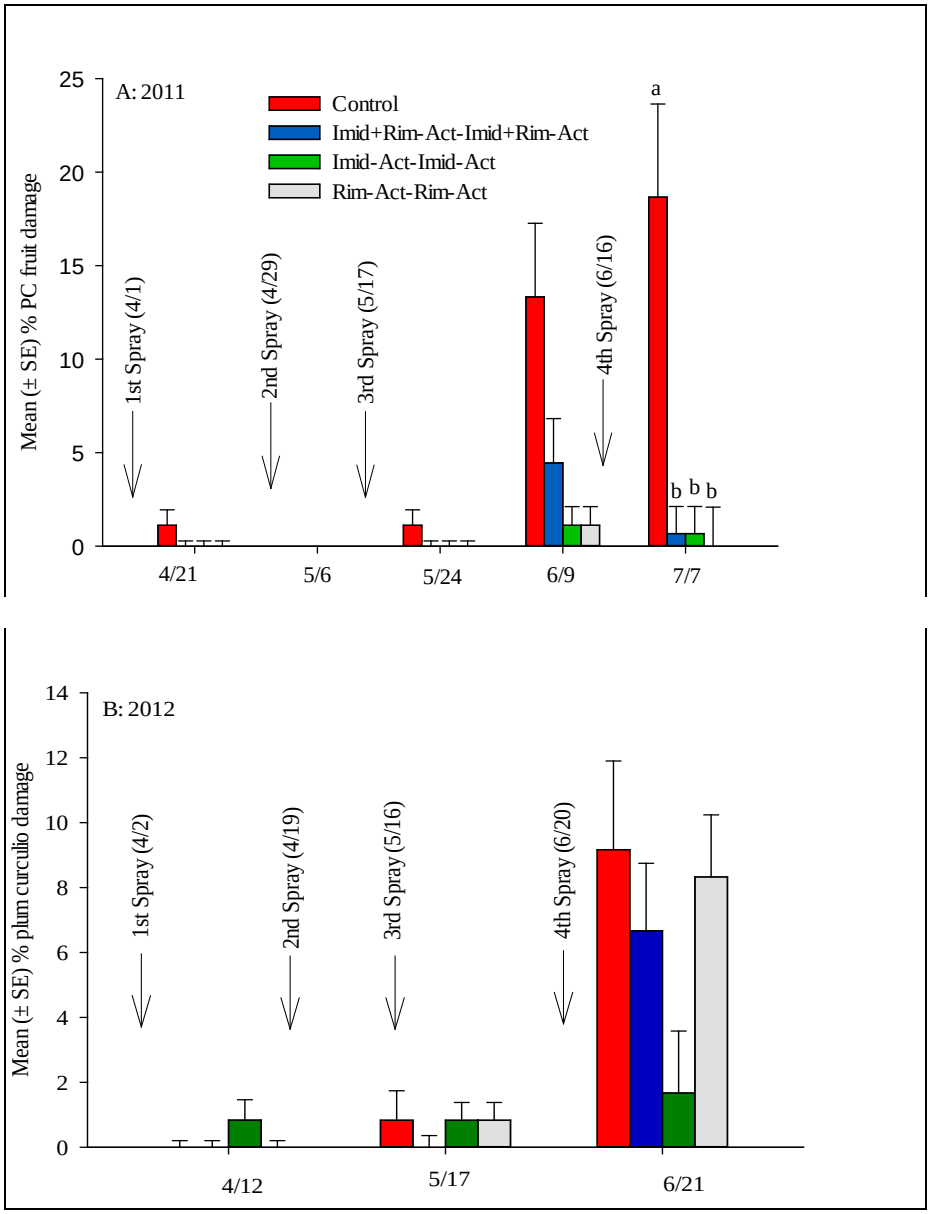

Figure 1. Plum curculio damage recorded on fruits harvested from Ruston red peach block managed with three targeted spray programs in (A) 2011 and (B) 2012. Means in each sampling followed by different letters are significantly different (ANOVA, Tukey-Kramer HSD, $P < 0.05$). Arrows indicate time of spray. Imid = Imidan, Act = Actara and Rim = Rimon

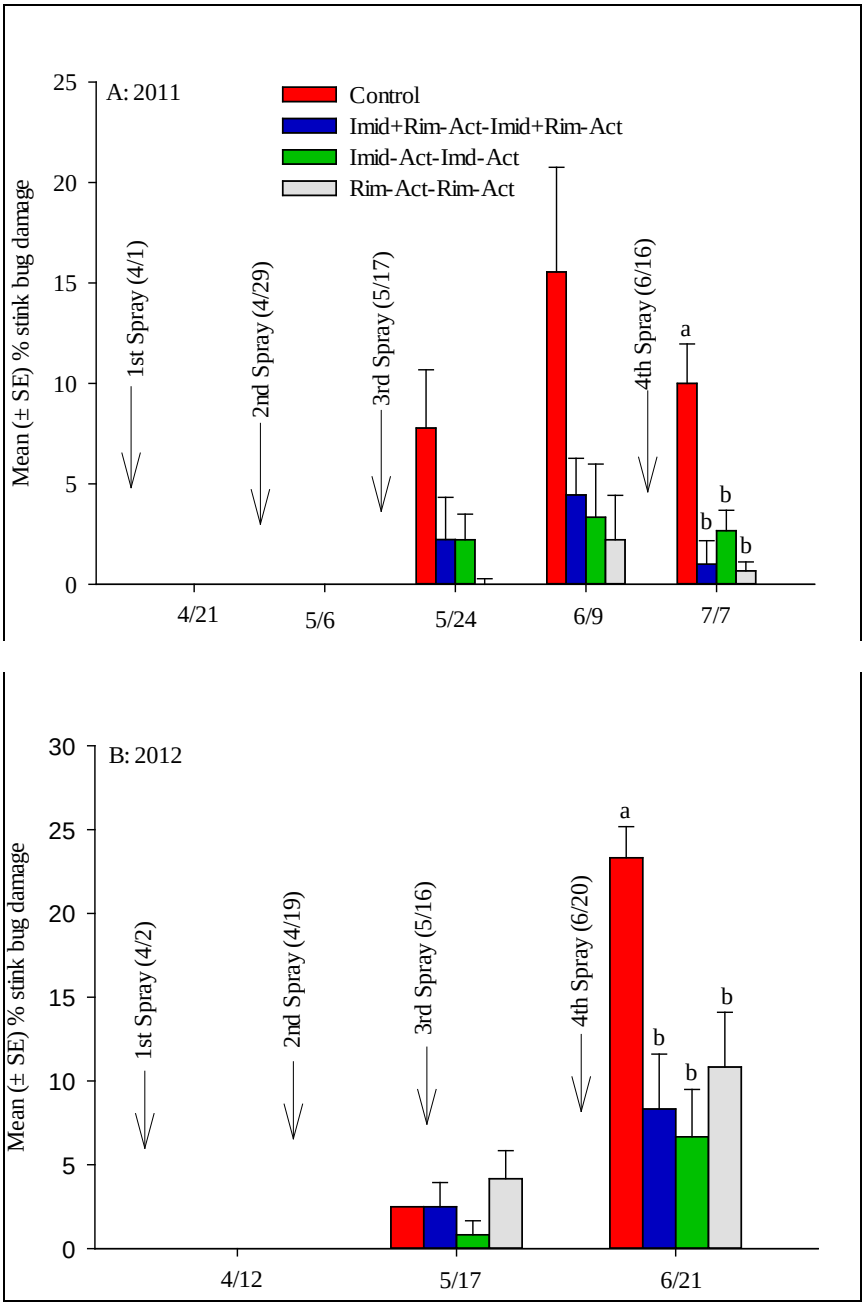

Figure 2. Stink bug damage recorded on fruits harvested from Ruston red peach block managed with four targeted spray programs in (A) 2011 and (B) 2012. Means in each sampling followed by different letters are significantly different (ANOVA, Tukey-Kramer HSD, $P < 0.05$). Arrows indicate time of spray. Imid = Imidan, Act = Actara and Rim = Rimon

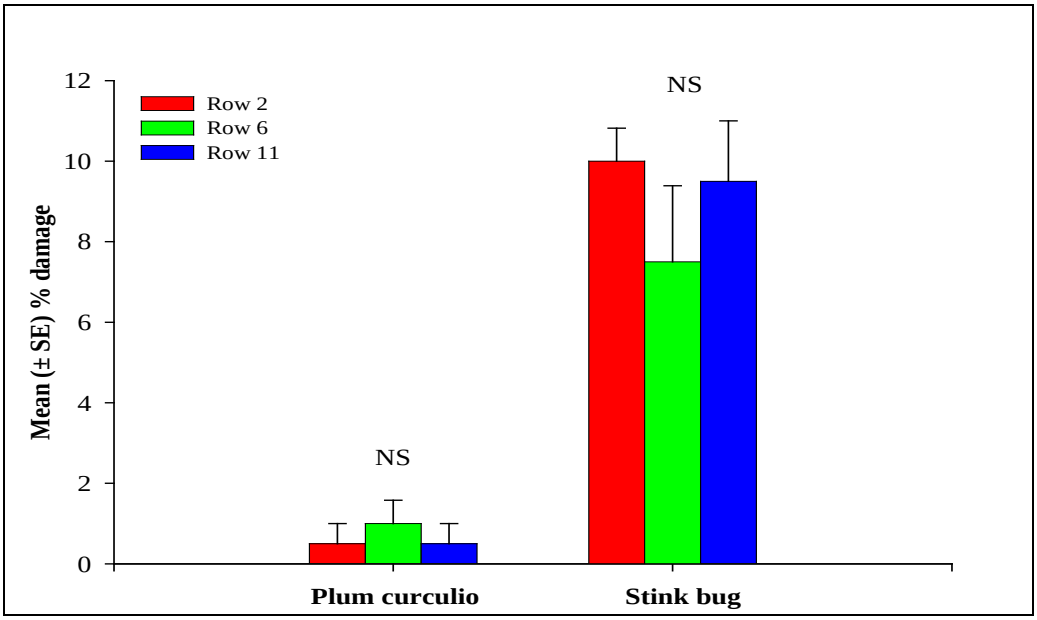

Figure 3. Plum curculio and stink bugs damage recorded on fruits harvested from different sections of Flame prince peach block managed with targeted spray using program 3 in 2011. NS means no significant difference found among the treatments (ANOVA, Tukey-Kramer HSD, P > 0.05).

Objective 2. Develop a trap crop system for managing stink bug damage in peaches

i) Evaluation of different trap crops for monitoring stink bugs (January 2011-June 2012)

The experiments were conducted in two seasons: winter season (October-April) and summer season (May-September) during 2011 and 2012 at the Auburn University's E.V. Smith Research Center, Tallassee, AL. The plants evaluated as trap crops were established around the four borders of a 5-year old mature 'Flameprince' peach variety orchard covering about 0.688 ha (2.0 acres). In winter and summer 2011, trap crop seeds purchased from Kelly Ag of Hartford, LLC, Hartford, Alabama and Adams-Briscoe Seed Company, Jackson, Georgia were sown directly on experimental plots measuring 6 m wide by 10 m long with ~1.5 m spacing between plots and ~10 m away from the border rows of the peach orchard. Plot size was however, increased in winter and summer 2012 because few trap crops which did well in the 2011 trials were selected for further evaluation. In both winter and summer 2012, the size of each plot was 12 m wide and 15 m long and ~10 m away from the border rows of the peach orchard. Seeding rates used for each trap crop was increased by ~2-5% than those recommended for commercial production of each crop. This served as insurance against poor germination. During winter 2011, all the trap crops established well with the exception of triticale. The few plants that could establish on the triticale plot were sampled.

In all the seasons, the experimental plots were laid out in a randomized complete block design replicated around the four sections (east, west, south, and north) of the orchard. During each season, the trap crop plants were maintained using recommended agronomic practices such as weeding; fertilizer application and irrigation were carried out as needed. No disease management program was applied to the trap crops because there was very little evidence of disease incidence on some of the trap crop plants, particularly, smut disease on oats. The peach orchard was managed using standard disease (fungicides) and weed management (herbicides) practices throughout the study period. In all years, fruits were not harvested but allowed to remain on the trees until they all dropped.

Three sampling methods were used to determine the number and abundance of leaf-footed bugs (mainly *L. phyllopus* and *L. zonatus*), brown stink bug (mainly *Euchistus spp*) and green stink bug (mainly *Nezara viridula* and *Acrosternum spp*.). The sampling methods used were unbaited yellow pyramid trap (Mizell et al., 1997; Yonce and Mizell, 1997), visual observation and sweep net. This was done for all seasons except in summer 2012 when the unbaited yellow pyramid traps were excluded because the results from the previous seasons showed that the trap did not do well in capturing the target insects although several other insects such as yellow jackets, lady beetles, white-fringed beetles etc. were found in the traps. Trap deployment and data collection for the winter seasons started when temperatures warmed up in early spring and this continued until all the trap crop plants have senesced or several weeks after all the peach fruits had dropped naturally (mainly during the summer seasons). Sampling was done in the morning except a few days that weather conditions did not permit this which the samplings were done in late afternoon. During each sampling date, 10 plants were randomly selected and visually inspected for the presence of leaf-footed bugs, brown and green stink bugs. In addition, ten sweeps were made in random directions in the plots and the number of adults were counted and recorded. The use of the sweep net was therefore limited after some of the plants like rye, grain sorghum and sunflower had grown to full maturity size. During this period more time was spent on visual observation. The phenology of the trap crop plants was recorded until maturity of each plant species.

Assessment of attractiveness of trap crops

Winter trap crops were evaluated from 15 October, 2010 (sowing of seeds) to 26 April, 2011 and from 20 October, 2011(sowing of seeds) to 10 May, 2012. Beginning 28 February, 2011, unbaited pyramid traps were installed in the trap crop plots (Fig. 4) and sampling started on 1 March until 26 April, 2011 when all the trap crops had reached maturity and were replaced with summer trap crops. Six annual crops namely oats, peas, rye, triticale, hairy vetch and wheat in addition to a control of only natural weeds were evaluated. These crops were evaluated with the aim of identifying a single species or combination of species which will be effective in attracting early migration of overwintering populations of leaf-footed bugs, brown stink bugs and green stink bugs and at the same time being easy to establish and manage agronomically by growers since they will be the ultimate users of the trap crop. Also, the trap crops were selected based on their ability to be at the right phenological stages at the time that the insects were ready to colonize the peach orchard. The outcome of the winter 2011 study allowed us to select three of the trap crops for further evaluation in winter 2012. The trap crops selected for further evaluation were oats, rye and wheat. Although these trap crops were not the most

attractive plants, they were selected based on easiness to manage agronomically, unsuitability for it to be fed upon by deer, and the potential to provide some economic value to growers. For example, hairy vetch did well in terms of total number of insects recorded in winter 2011 but it was not selected because hairy vetch is usually considered as weed by most growers and therefore recommending it for trap crop may not be acceptable to grower. Winter peas on the other did well but were voraciously consumed by deer thus made it difficult to maintain a good stand to serve the purpose for which they were planted.

Similar procedures were used to establish the summer trap crops. The summer trap crops were evaluated from May18 (sowing of seed) to September 15, 2011 and from May 27 (sowing of seeds) to August 5, 2012 (fruit drop). The trap crops evaluated in summer 2011 were buckwheat, brown top millet, grain sorghum, southern pea, sunflower, and pearl millet. A control of only natural weeds was also included to the treatments. Sunflower, grain sorghum and pearl millet were selected in summer 2012 for further evaluation. These plant species were selected because they have been reported to be host of several leaf-footed bugs, stink bugs and other plant bug species (McPherson 1982, McPherson et al. 2000). Another reason for selecting these plants is because previous work in Florida showed that some of them can attract leaf-footed bugs and other stink bugs in the field, particularly, in home grown fruit and vegetable crops (Mizell et al. 2008). Buckwheat was included because apart from being able to attract stink bugs, studies in Georgia found that the flowers can also attract natural enemies.

In all seasons, the data were pooled and a one-way ANOVA was used to determine treatment effect. For all analyses resulting in significant differences of the number of leaf-footed bug, brown and green stink bugs a multiple comparisons of the means were carried out by the Tukey-Kramer HSD comparison test ($P < 0.05$; JMP® 7.0.1, SAS Institute 2007).

RESULTS

Trap crops performance. The results from both the winter study wheat can be used to detect the early migration of leaf-footed bugs, and stink bugs because it recorded numerically (winter 2011) and significantly (winter 2012) more insects per week compared with other treatments (Fig. 5A). Although wheat did well in attracting most of the insects and also was easy to grown in terms of its agronomic requirements, oats and rye could equally be used provided the planting is done to ensure that the most attractive stage (seed development) is present in the field by early spring when migrations of the stink bugs begin. Although sampling began at the early development stages (vegetative) of the trap crops (1 March), the insects only appeared in the trap crops during the reproductive stages (12 April) and the time that the peach fruit had developed to an average size of 3/8 inch which is typically the time that most damage begin in the orchard. On the whole, 227 insects were collected in all the trap crops using different sampling methods. Among all the species recorded, leaf-footed bugs (mainly *L. phyllopus*) was predominant (79.7%) followed by brown stink bugs (14.9%) and green stink bugs (5.4%). Among the sampling methods used, 71.8% of all the insects were recorded by visual means, whiles 28.2 and 0.0% were recorded by sweep net and unbaited pyramid traps, respectively. Similarly, a total of

eleven orchard visits were made from February 28 to May 10. Out of the eleven visits, leaf-footed bugs were encountered on seven occasions whiles brown stink bugs and stink bugs (data not shown) were found in six occasions. Leaf-footed bugs were the most abundant (79.7%) followed by brown stink bugs (14.9%) and green stink bugs (5.4%). Among the sampling methods, 51.2% of all the insects were recorded by visual means, whiles 48.8 and < 0.0% were recorded by sweep net and unbaited pyramid traps, respectively.

For the summer trials, the results showed that sunflower had more insects compared with the other treatments in 2011. However, there no significant difference was obtained between sunflower, pearl millet and grain sorghum in 2012 (Fig. 5B). On the whole, 14 visits were made from 16 June to 19 September. Out of the 14 visits, leaf-footed bugs were found on 10 occasions (7/8-9/9 and 9/16) whiles brown and green stink bugs were found on only two occasions (7/21, 9/9 and 9/16). Overall 71.3%, 26.8 and 1.9% were recorded by visual, sweep net and pyramid trap, respectively. This indicates that visual observation was the most effective sampling of the insects in the trap crops.

In summary, the results from this study can move us towards the use of wheat and sunflower as trap crops for the management of these plant bugs in peaches. Trap cropping may have impacts on leaf-footed and stink bug pest and beneficial arthropods. Peach growers in Alabama are yet to apply the concept of trap cropping. Much of the current use of trap crops in Alabama appears intended to improve biological control of insect pests. However, future studies are needed because there have been no definitive results from critical experiments that has incorporated trap crop to the overall management of leaf-footed bugs and stink bugs. There is a clear need for large scale, well-replicated studies in this area of pest management.

Figure. 4. Layout of trap crop plots around a peach orchard at E.V. Smith Research Center, Tallassee.

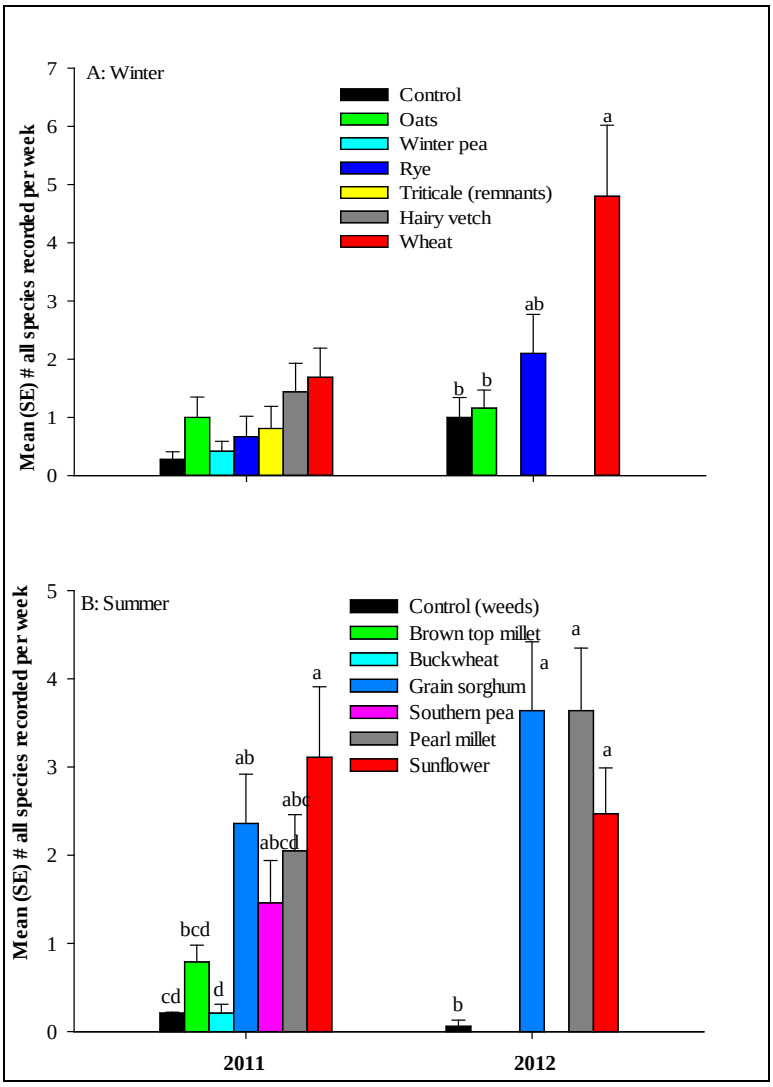

Figure. 5. Mean (± SE) of total number of leaf-footed bugs, brown and green stink bugs recorded in different trap crops around a peach orchard at E.V. Smith, Tallassee, AL during winter (A) and summer (B) in 2011 and 2012. Means in the bars with different letters are significantly different (ANOVA, Tukey-Kramer HSD, P < 0.05).

ii) Evaluation of baited and unbaited traps for monitoring stink bugs in trap crop plots (March 2011-June 2011 and March 2012-July 2012)

We evaluated three sampling methods including jarring, sweep net and visual in addition to two trap types to determine which of them could be used to determine the population of leaf-footed and stink bugs in the field. The two trap types evaluated were yellow pyramid (Fig. 6A) and DEAD Inn (Fig. 6B). Yellow pyramid traps were constructed from yellow corrugated sheets using the design of Mizell and

Tedders (1995). DEAD Inn traps sold together with brown marmorated stink bug (BMSB) pheromones were purchased from AgBio, Inc (Westminster, CO).

The orchard was divided into four blocks (rows) where the experiment was replicated. The following four treatments consisting of different trap types and the single lure were deployed in each block: 1) yellow pyramid trap baited with BMSB pheromone, 2) yellow pyramid trap unbaited with BMSB pheromone, 3) DEAD Inn trap baited with BMSB lure and 4) DEAD Inn trap unbaited with BMSB lure. These were compared with (5) jarring on to a drop cloth, 6) visual observation on the trees and 7) sweeping over the vegetation under the orchard using a sweep net. In each block, traps were randomly placed along a single peach tree in a row at 0.5 m from the tree trunk and spaced apart by at least 3 trees.

In 2011 sampling began in 16 June and continued weekly until 14 July. For beat cloth samples, a white 1m^2 beat cloth (71 by 71 cm; BioQuip) was held under a randomly selected tree limb. Each tree limb was tapped sharply three times with a rubber bat to dislodge insects into a canvas beat sheet. All dislodged pentatomid species were collected immediately and identified in the field and those that we could not were taken to the laboratory for species identification and life stage determination. All sampling methods were performed on the selected trees. For the visual observation an observer searched visually through a tree for insects for 3 minutes. Thus, a one 3-minute observation period was counted as a sample. In addition to active sampling in the field, two trap types, the yellow pyramid trap and DEAD Inn traps were evaluated. Insects were sampled weekly from 16 June until 14 July. Fungicide treatment was the only pesticide spray used to maintain for other fruit pests. The peach orchard around which the treatments were placed did not receive any insecticide application since its establishment in 2007 and during the study period; thus high insect populations have been recorded at the orchard. The orchard was, however, managed using standard disease (fungicides) and weed management (herbicides) practices throughout the study period. In all years, fruits were not harvested but allowed to remain on the trees until they dropped.

Traps were checked weekly and leaf-footed bugs, and stink bugs found were counted and recorded. Captures of other insects were also counted and recorded per trap to determine trap and lure specificity. The position of each trap was re-randomized every 2 weeks to minimize potential effect of trap position on capture. Pheromone lures were replaced every 30-d in accordance with manufacturer recommendation. For all the methods of sampling, all adults and juveniles of leaf-footed bugs (LFB) and stink bugs (green and brown) that were encountered were recorded. When possible, we identified adults to species and reared juveniles to adulthood in the lab so that they could be identified to species. Similar sampling methods were used in 2012.

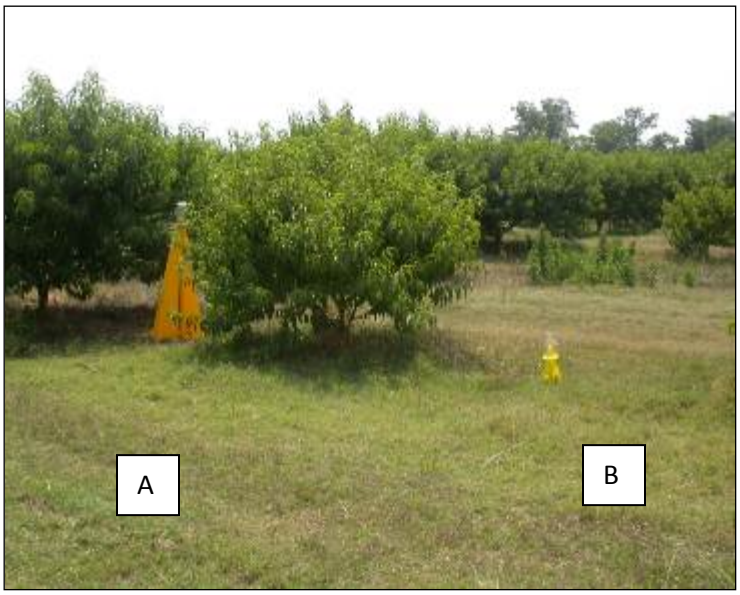

Figure. 6. Placement of baited and unbaited traps. (A) Yellow pyramid trap and (B) Dead Inn trap installed to monitor stink bugs in a peach orchard at E.V. Smith Research Center, Tallassee

B

RESULTS. The results from this work in 2011 and 2012 (data not shown) indicate that both trap types (baited or unbaited) were not effective in capturing leaf-footed and stink bugs. Jarring using drop cloths, sweeping over the vegetation under the orchard visual were the most reliable sampling method for leaf-footed bugs and stink bugs in peach orchards in Alabama. Although the pheromone used the traps were supposed to capture brown marmorated stink bugs (BMSB), none was recorded in any of the sampling methods used. This indicates that contrary to reports in the State in 2010 that the brown marmorated was present in some orchards, our results suggest that the insect was not present in the orchard used.

The presence of other insects like lady beetles, white-fringed beetles, wasps belonging to several families (data not shown) in the traps suggests that the performance of the traps was not because of any weakness (size, color, height etc) of the trap but rather they could not just capture the insects of interest (LFB, stink bugs and BMSB).

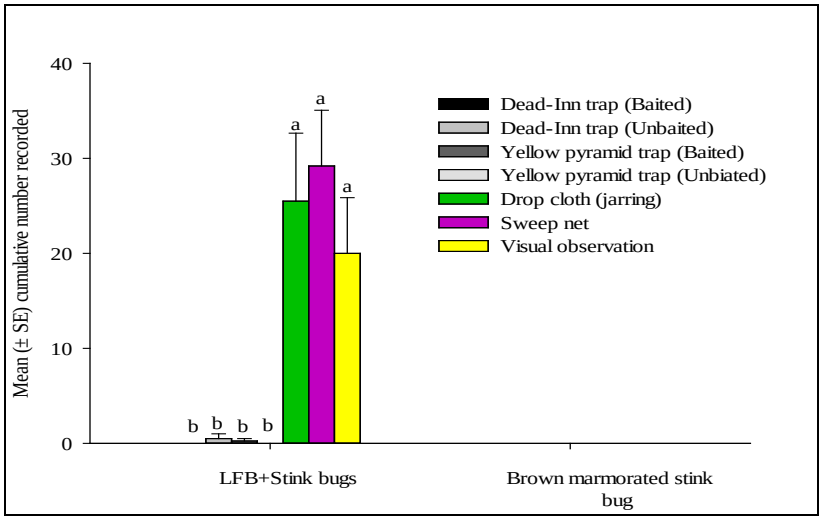

Figure. 7. Mean cumulative total (± SE) number of all species of plant bugs (LFB + stink bugs) and brown marmorated bugs recorded by the different sampling methods in 2011. Means in the bars with different letters are significantly different (ANOVA, Tukey-Kramer HSD, P < 0.05). LFB represents leaf-footed bugs.

Objective 3. **Demonstrate pest management tactics to fruit growers through workshops, on-farm training and other outreach activities to facilitate grower adoption of IPM.**

Activities Performed

- We will conduct surveys of participating growers at the beginning and end of the project to compare level of IPM knowledge and adoption. We expect a gradual transition of Alabama peach growers to effective IPM systems during and after the project period culminating in a significant increase in the percentage of total peach acreage under IPM. ***A survey conducted around the beginning of the project showed that only about 24% of surveyed Alabama peach growers (n = 37) utilize IPM practices such as monitoring and scouting. A similar survey proposed for 2014 will determine level of increase in IPM adoption.*** ***See Appendix 3 for details***
- We will establish a database of peach growers in Alabama to track IPM implementation and changes in behavior of growers, and to estimate percentage increase in IPM-managed acreage. ***Some information about AL peach growers is available through some of the survey we conducted at conference. However, the database base is yet to be established.***
- The following project tracking measures will be used to determine project success and grower participation: number of growers attending proposed field days (to demonstrate IPM case studies) and IPM workshops (to be held at grower conferences), grower evaluation of organized workshops and field days, number of growers showing interest in the project, and involvement of other stakeholder groups. ***We have communicated some of our results to growers through publications in the Alabama IPM Communicator issues 2 and 3 (available online: https://store.aces.edu/ListItems.aspx?CategoryID=180). The results were also presented at the Southeastern Professional Fruit Workers Conference in Manchester, Tennessee (Akotsen-Mensah et al. 2011). The work was presented at the 2012 Alabama Fruit and Vegetable***

Conference on February 10th and 11th at Auburn University. More than 20 peach farmers were present at the presentation and several questions regarding effectiveness of the trap crop were asked. Many farmers showed interest in adopting trap crops in addition to targeted insecticide programs in the management of stink bugs and plum curculio.

- We anticipate a significant reduction in the number of pesticide sprays per season and that participating orchards will be less reliant on calendar-based pest management, potentially resulting in human health and ecological benefits. We will measure this goal by checking the pest management records of participating growers for reductions in the number of applications of conventional pesticides or changes in the types of pesticides being used. ***Most farmers in the Chilton County area have moved from the use of conventional scheduled spray programs to well-targeted sprays based on our recommendations.***
- The major expected outputs of this project are the development of new IPM practices/tools, workshops/seminars, and on-site field training of growers and stakeholders, while the expected outcomes include increased IPM awareness and implementation and reduced use of conventional broadspectrum chemicals. ***We have communicated some of our results to growers through publications in the Alabama IPM Communicator issues 2 and 3. The results were also presented at the Southeastern Professional Fruit Workers Conference in Manchester, Tennessee (Akotsen-Mensah et al. 2011). The work was presented at the 2012 Alabama Fruit and Vegetable Conference on February 10th and 11th at Auburn. More than 20 peach farmers were present at the presentation and several questions regarding effectiveness of the trap crop were asked. Many farmers showed interest in adopting trap crop in the management of stink bugs.***

<u>SPECIFIC RESPONSES TO LAST REVIEW</u>

- **Please provide the results of the survey. (You can do this in the appendix if you'd prefer.) – SUMMARY PROVIDED IN APPENDIX 3**
- **What is the timeline for the completion of the database? WE ARE WORKING WITH EXTENSION TO COMPILE A LIST OF PEACH GROWERS IN THE STATE. HOWEVER, AN ELECTRONIC DATABASE WILL REQUIRE ADDITIONAL FUNDING (POSSIBLY FROM OTHER SOURCES) AS FUNDING WAS NOT SPECIFICALLY EARMARKED FOR A DETAILED ELECTRONIC DATABASE IN THIS GRANT.**
- **How many field days and workshops were held? What field training was conducted? TWO – PARTICIPANTS WERE TRAINED IN FIELD IPM AND TRAP CROPPING TECHNIQUES**
- **How many peach growers were present at the Southeastern Professional Workers Conference? ABOUT 40 FARMERS (ACCURATE DATA NOT AVAILABLE)**
- **How many farmers showed interest in adopting trap crops in addition to targeted insecticide? ACCURATE DATA NOT AVAILABLE**
- **How many is "most farmers in the Chilton County area" who have moved from conventional scheduled spray programs based on the project team's recommendations? CURRENT DATA NOT AVAILABLE (BUT AT LEAST 3 FARMERS).**

GOALS AND OUTCOMES ACHIEVED

Include the activities that were completed in order to achieve the performance goals, and measurable outcomes for the project. If outcomes measures were long term, summarise the progress that has been made towards achievement. Provide a comparison of actual accomplishments with the goals established for the reporting period. Clearly convey completion of achieving outcomes by illustrating baseline data that has been gathered to date and showing the progress achieving set targets.

The results accomplished so far are:

- Targeted spray programs have shown that damage due to plum curculio and stink bugs can be reduced significantly by targeting and alternating spraying of four applications of Imidan/Actara or Rimon /Actara.
- The results showed that trap crops can be used to manage leaf-footed bug and stink bugs particularly, during the migration of the overwintered population in early spring.
- We have found that *L. phyllopus* is the most predominant plant bug in peaches. Also, the brown stink bug *E. servus* and green stink bug were the most abundant species of all stink bugs captured.
- The results showed that yellow pyramid trap and the Dead-Inn trap baited with or without pheromone of the brown marmorated and other stink bugs did not capture more leaf-footed and stink bugs compared with visual observation and jarring.
- Brown marmorated stink bugs were not present in the orchard during both years contrary to the report that the insect was present in the State.
- We have generated a baseline data on participating growers using paper-based Pest Management Transition Gradient Survey. Peach producers in Alabama were surveyed by mail with the cooperation of four Regional Extension Agents (REAs) with the Alabama Cooperative Extension System (ACES). Based on this survey, we know the average acreage of the participating peach growers in the State. Also, we know the average number of participating growers who currently use IPM techniques such as scouting, pest monitoring and forecasting and those who do not use IPM but are interested in learning more about these techniques.

Performance goals achieved during the each project.

- We will conduct another survey at the end of the project to determine the changes made on the initial survey as a result of the implementation of this project. This will help us determine the gradual transition of Alabama peach growers to effective IPM systems after the project and also the significant increase in the percentage of total peach acreage under IPM. *Limited information is available*

- In our annual report we indicated that we will provide information on participating growers who have reduced the number of applications of conventional pesticides or changes in the types of pesticides used as a result of implementation of result from this work. *Limited information is available. This could not be achieved statisfactorily*

- We have prepared a manuscript ready for submission to journals for peer review publication.

SPECIFIC RESPONSES TO LAST REVIEW

- **You indicated that you "will conduct another survey at the end of the project to determine the changes made on the initial survey as a result of the implementation of this project." This leads me to believe that the project is not yet complete and this report should be submitted in Annual Report format, as previously submitted. THE SURVEY IS PLANNED FOR NEXT YEAR AT THE CHITON COUNTY PEACH MEETING AND THE ALABAMA FRUIT & VEGETABLE GROWERS ASSOCIATION MEETING.**

- **You indicated that you were not able to provide information on participating growers who have reduced the number of applications of conventional pesticides and that it "could not be achieved satisfactorily." Please elaborate on the reasons why you were unable to report these data, which constitute the outcome/impact of the project. ACCURATE CURRENT DATA NOT AVAILABLE BECAUSE IT IS DIFFICULT TO TRACK GROWERS' BEHAVIOR REGARDING THEIR PEST MANAGEMENT PRACTICES.**

BENEFICIARIES

Provide a description of the groups and other operations that benefited from the completion of this project accomplishments. Clearly state the quantitative data that concerns the beneficiaries affected by the project's accomplishments and/or the potential economic impact of the project

Peach growers in the State are the major beneficiaries of this project. In our previous report we stated that we will conduct a survey at the end of the project to determine the changes made on the initial survey as a result of the implementation of this project. This we envisaged was going to help determine the gradual transition of Alabama peach growers to effective IPM systems after the project and also the significant increase in the percentage of total peach acreage under IPM.

We also anticipated providing information on participating growers who have reduced the number of applications of conventional pesticides or changes in the types of pesticides used because of implementation of results from this work. We are working to compile a list of peach farmers in Alabama but an actual electronic database will require additional funding. Also, it is to adequately know the exact number of farmers who reduced the number of applications of conventional pesticides or changed the types of pesticide used but the feedback suggests that many farmers are reducing their pesticide sprays.

SPECIFIC RESPONSES TO LAST REVIEW

- **How many peach growers are there who benefited from this project. How did they benefit? AT LEAST FOUR GROWERS BENEFITTED DIRECTLY AS COOPERATORS. OTHER GROWERS BENEFITTED FROM THE RESULTS OF THE PROJECT AND THROUGH PRESENTATIONS. IT IS DIFFICULT TO GIVE AN EXXACT NUMBER BUT IT IS SAFE TO SAY THAT OVER 20 GROWERS BENEFITTED IN GENERAL FROM THE PROJECT.**

- **In this section, you indicate that a database of all peach farmers is available, but earlier in the report (under Objective 3, you indicate that the database is not complete. Please revise your report to make it consistent with itself.. STATEMENT CORRECTED AND REVISED.**

LESSONS LEARNED

Offer insights into the lessons learned by the project staff as a result of completing this project. This section is meant to illustrate the positive and negative results and conclusions for the project. Provide unexpected outcomes or results that were an effect of implementing this project. If goals or outcomes measures were not achieved, identify and share the lessons learned to help others expedite problem-solving

Some of the major positive lessons learned by the project staff as a result of completing this project are the fact that it is possible to reduce the 12-16 spray applications which normally provide the zero damage of peaches sold in the fresh markets to four with about 1-5% damage. This will reinforce the passage of the Food Quality Protection Act in 1996 (FQPA, 1996), which has resulted in cancellations or restrictions (by the US Environmental Protection Agency) of many major pesticides because of the negative effects of the pesticides used to control plum curculio, stink bugs and other insects which attack peaches.

On the other hand, even though we provided regular information to farmers through our publications in the Alabama IPM Communicator (www.aces.edu), our inability to organize a field day for the farmers to demonstrate the results from the project was a major setback in the project. One reason was the difficulty in scheduling meetings due to farmers' schedule. Also, it was difficult to track farmers' behavior from year to year. One lesson learned was that getting farmers to adopt a new tactic or technology is difficult.

SPECIFIC RESPONSES TO LAST REVIEW

- Please elaborate on why you were unable to organize a field day to demonstrate results of the project. What did you learn and how would you do it differently in the future? **ONE REASON WAS THE**

DIFFICULTY IN ARRANGING MEETINGS DUE TO FARMERS' SCHEDULE. ALSO, IT WAS DIFFICULT TO TRACK FARMERS' BEHAVIOR FROM YEAR TO YEAR. ONE LESSON LEARNED WAS THAT GETTING FARMERS TO ADOPT A NEW TACTIC OR TECHNOLOGY IS DIFFICULT.

CONTACT PERSON

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Auburn AL

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Phone: 334-844-5098

ADDITIONAL INFORMATION

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

List of attachment

1. Program of the conference organized by the Alabama Fruit and Vegetable Growers Associations (Appendix 1).
2. The Pest Management Transition Gradient for Alabama Fruit Crop Growers questionnaire used for the survey (Appendix 2).
3. Results of Survey of Alabama Peach Growers

APPENDIX 1

SESSION TITLE: RECENT ADVANCES IN INTEGRATED PEST MANAGEMENT OF INSECTS & DISEASES

February 11th, 2012 (Saturday)

Moderator: Doug Chapman (Extension Agent, ACES)

All participants will be requested to help in the filling a session quality survey before leaving.

9:00-9:05 am	Welcome message to producers	Mr. Doug Chapman	chapmld@aces.edu
9:05 am – 9:30 am	Hoop-house Insect Pest Management	Dr. Ayanava Majumdar	bugdoctor@auburn.edu
9:30 am – 10:00 am	Diseases of Cucurbit Crops	Dr. Jim Jacobi	jacobjc@aces.edu
10:00 am - 10:30 am	BREAK		
10:30 am – 11:00 am	Whitefly Identification & Management	Dr. Alton 'Stormy' Sparks, Jr.	asparks@uga.edu
11:00 am – 11:30 am	Threat of Invasive Insects on Fruit & Vegetable Production in Alabama	Dr. Charles Ray	raychah@auburn.edu
11:30 am – 12 noon	Trap Cropping for Vegetable Insect Pest Management	Dr. Rammohan Balusu	balusrr@auburn.edu
12 noon – 1:30 pm	LUNCH		
1:30 pm – 2:00 pm	Trap Cropping for Fruit Insect Pest Management	Dr. Clement Akotsen-Mensah	akotscl@auburn.edu
2:00 pm –	Sweet Corn Insect Pest Management	Dr. Alton 'Stormy'	flandkl@auburn.edu

2:30 pm		Sparks, Jr.	
2:30 pm – 3:00 pm	Managing Fire Ants in Fruits and Vegetables	Dr. Kathy Flanders	asparks@uga.edu
3:00 pm – 3:05 pm	Session evaluation/conclusion	Mr. Doug Chapman	

APPENDIX 2

The Pest Management Transition Gradient for Alabama Fruit Crop Growers questionnaire used for the survey

Name your crop (only fruit crops):

(0 – 5 Scale) **Circle the number beside the statement that most closely reflects your current pest management program for Peaches and/or other fruit crops.**

Note: The term "pest" refers to insects.

0 I rely almost entirely on preventative pesticide (includes weed and disease management as well as insects) applications with little effort to monitor pest populations through scouting or forecasting. I don't have a strong desire to change my current practices.

1 Although I currently utilize a conventional pest management program, I am interested in learning about reduced risk pest management practices for insects, weeds and diseases.

2 I have initiated some reduced risk pest management practices such as monitoring and scouting on a pilot basis, but I am; at an early stages of implementation and could use more training.

3 I utilize management practices such as scouting, pest identification, knowledge of pest life cycles and monitoring of weather conditions to determine when and what tools to utilize in managing pests.

4 I am fully implementing reduced risk pest management practices with primary reliance on bio-controls such as mating disruption or beneficial insects to manage pest populations when present at economically damaging levels. I utilize cultural practices to manage pest populations.

I serve as a mentor to others interested in moving toward a whole systems approach.

5 I have adopted a whole systems approach, such as Integrated Crop Management (ICM) that integrates pest, soil, water, and crop management practices; incorporates conservation planning and focuses on sustainable agriculture.

Do you use the following pest management practices in your peach or/other fruit crops orchard?

Activity	Yes	No
Scouting (sampling or monitoring)		
Trap crops		
Biological control (use of beneficial organisms such as predators and parasites to control pests)		
Microbial pesticides (such as Bt, Spinosad)		
Insect growth regulators		
Conventional insecticides		
Petroleum oils		
Natural products (such as neem, nicotin sulfate, pyrethrin)		
On-farm weather monitoring		
Others (please specify)		

APPENDIX 3

Summary of the Alabama Peach Producers Survey

A survey of Alabama Peach Growers was conducted in 2009/2010 to determine their pest management practices. Peach producers in Alabama were surveyed by mail with the cooperation of Regional Extension Agents (REAs) with the Alabama Cooperative Extension System. The survey was sent to producers in the following peach-producing Alabama counties: Autaga, Baldwin, Blount, Chilton, Jackson, Limestone, Madison, Mobile, Lawrence, Randolph and Tallapoosa. A total of 37 useable responses were returned by peach producers. Among the respondents, 30% indicated that their peach orchard was between 1-20 acres, 8% between 21 and 40 acres, while ~ 14% had over 50 acres.

About 24% of respondents reported using IPM techniques such as scouting, pest monitoring and forecasting, while 32% indicated interest in learning more about these techniques. Specifically, 22% of respondents reported using pest scouting and trapping techniques.. Majority of respondents (95%)

indicated that they use conventional insecticides or petroleum oils, while 19% indicated using on-farm weather monitoring. Only 5% and 8% indicated that they use trap crops and biological control, respectively.

Project 4

Development of Kiwifruit Growing Recommendations for Alabama

a. Project Investigator: Dr. James D. Spiers
b. Co-Project Investigators: Dr. William Dozier, Dr. Elina Coneva, Dr. Floyd Woods

Project Summary

Three new kiwifruit varieties ('AU Golden Dragon', 'AU Golden Sunshine', and 'AU Fitzgerald') have been patented by Auburn University that have great potential for commercial and home garden production in the Southeastern U.S. The golden-fleshed varieties, 'AU Golden Dragon' and 'AU Golden Sunshine', have great potential for commercialization. The release of these new kiwifruit varieties is a result of over twenty years of evaluation at the Chilton Research and Extension Center in Clanton, AL. Currently, Auburn University is the only university in the southeast U.S. pursuing kiwifruit development. By controlling plant material through the patenting process, Auburn has the ability to allow the industry to grow in the state, leading to a return on investment to the state of Alabama. Due to the economic potential of kiwifruit production within the southeast, there is great interest in establishing a kiwifruit industry within Alabama that utilizes these new varieties. Previously, attempts to introduce kiwifruit as a commercial crop have failed in the southeast. Lack of climatic and cultural research, and the lack of a breeding program led to a failure of an attempted industry centered around one variety. Currently, there is no commercial kiwifruit production in the Southeast, and sustainable growing practices have not been established. The goals of this project are to determine best management practices for the new kiwifruit varieties. By determining which grower practices are the most beneficial, we can assess the yield potential for these new varieties, develop grower recommendations, and determine the economic potential of kiwifruit production in Alabama.

The purpose of this project is to evaluate and determine best management practices for golden-fleshed kiwifruit production in Alabama. Kiwifruit is a high value and high input crop. Based on production and marketing practices in New Zealand, Alabama kiwifruit growers have the potential to generate revenues of approximately $36,000 per acre (at wholesale prices) with a cost average of $24,000/acre. Kiwifruit production contains significant risk, with costs of nearly $10,000 per acre incurred before fruit set. In addition to the risk of frosts, per acre establishment costs are close to $25,000. However, there are many growing practices employed by commercial growers that have not been evaluated, and may not be beneficial for production in Alabama. In order to successfully develop a kiwifruit industry in Alabama, sustainable growing practices need to be established that minimize costs of production while maximizing yield and quality. This two-year project proposes to determine optimum growing practices, and the subsequent yield potential and quality of golden-fleshed kiwifruit in central Alabama. Specific objectives are as follows:

1. Identify male pollinators with bloom periods that coincide with the three patented female kiwifruit plants
2. Determine the benefit and/or need for supplemental pollen application
3. Determine the yield potential of gold kiwifruit varieties when properly trained and pruned
4. Assess the benefit of plant growth regulator application on fruit size and quality

Project Approach

Year 1.

In January 2011, an experiment was initiated to determine the effects of fruit thinning and a commonly used commercial product derived from natural plant extract, BenefitKiwi®, on fruit size, number of marketable fruit, and fruit quality. The following treatments were assigned to three varieties of golden-fleshed kiwifruit (*Actinidia chinensis*): 1) minimal fruit thinning, 2) fruit thinning, 3) minimal fruit thinning and Benefit® application, and 4) fruit thinning and BenefitKiwi® application. The three varieties are 'AU Golden Dragon', 'AU Golden Sunshine', and 'Hort 16A' (also known as Zespri Gold®), all located at the Chilton County Research and Extension Center, Thornsby, AL. Results indicate that fruit thinning increased the marketable fruit number for 'AU Golden Sunshine' (Table 1), but did not affect marketable fruit number for 'AU Golden Dragon' (Table 2) or 'Hort 16A'. Application of BenefitKiwi® increased the number of marketable fruit on 'Hort 16A', but not on 'AU Golden Dragon' or 'AU Golden Sunshine'. 'AU Golden Dragon' was not affected by the treatments. The treatments had no effect on fruit quality of any of the varieties tested (Table 3). The variation in results due to cultivar differences was unexpected and interesting, and might warrant different production practices depending on the variety.

Bloom dates, flower and fruit development has been monitored since early spring 2011 to determine the flowering periods for the male and female kiwifruit vines, and ultimately to determine proper male and female "partners". Kiwifruit vines are dioecious and therefore require both male and female plants with coinciding bloom dates for successful pollination and fruit set. The female 'AU Fitzgerald', a green-fleshed variety with low chilling requirement, has a bloom period that coincides nicely with 'AU Authur'. Many years of data support this, in addition to this past year. Bloom period of 'AU Authur' coincided with the bloom period of 'AU Fitzgerald' better than any of the other 11 male selections and cultivars evaluated. The first flowers on 'AU Authur' are normally present one or two days after the first appearance of flowers on 'AU Fitzgerald'. The bloom period of 'AU Authur' usually lasts two to three days after the bloom period of 'AU Fitzgerald' has ended. The average beginning bloom date for 'AU Authur' was April 29 (range April 26 to May 8) and the average end bloom date was May 9 (range May 4 to May 18). The average bloom period of 'AU Fitzgerald' began on April 27 (range April 24 to May 9) and the average end bloom date was May 6 (range May 1 to May 14). The golden-fleshed 'AU Golden Dragon' bloom period appears to coincide quite nicely with the male plant 'Meteor', also known as 'CK3'. 'AU Golden Dragon' flowering commences around March 30, and petal fall occurs April 16-18 in central Alabama. The first blooms are open on

‘AU Golden Sunshine’ vines around April 20 and petal fall normally occurs around April 29 to May 1. The high growing degree hour requirement of ‘AU Golden Sunshine’ delays bud break and flowering until the danger of late spring frost has normally past. ‘AU Golden Tiger’ (*A. chinensis*) is the only male kiwi plant that has been tested in Alabama that blooms with and overlaps ‘AU Golden Sunshine’ bloom period. Therefore, ‘AU Golden Tiger’ is the male plant used as the pollinizer cultivar for ‘AU Golden Sunshine’.

Year 2.

Previous research indicated that the new golden-fleshed kiwifruit have different flowering and fruit set habits. The marketable yield of ‘AU Golden Dragon’ kiwifruit was not affected by fruit thinning 28 days after fruit set in 2010 or 2011 experiments. However, the marketable yield of ‘AU Golden Sunshine’ was increased due to fruit thinning due to its prolific flowering and fruit set. The experiments were altered in the 2011-2012 season to reflect these results.

1. **Effects of early fruit thinning and BenefitKiwi® application on marketable fruit yield of ‘AU Golden Dragon’ *Actinidia chinensis*.**

This experiment was arranged as a 2 x 2 factorial to test the effects of ± fruit thinning approximately 7 days after initial fruit set and ± BenefitKiwi® application. Fruit thinning treatments were implemented on March 28, 2012. BenefitKiwi® applications were applied 28 d and 42 d after initial fruit set, which consisted of 5 mL □$^{-1}$□H_2O for 16 sec per vine. Results indicate that early fruit thinning did not increase marketable fruit number or yield. There were no significant differences among treatments (Table 4). These results are consistent with previous results that indicate that ‘AU Golden Dragon’ does not benefit from fruit thinning applications. Fruit thinning of ‘AU Golden Dragon’ likely reduces profitability and is not recommended. Similarly, BenefitKiwi® applied at the rates used in this study does not appear to be effective. Fruit thinning and BenefitKiwi® applications are costly management techniques used in kiwifruit production systems. These management techniques do not appear to be beneficial for ‘AU Golden Dragon’ kiwifruit production and are not recommended.

2. **Effects of flower bud removal and BenefitKiwi® application on marketable yield of ‘AU Golden Sunshine’ *Actinidia chinensis*.**

Due to previous research findings that indicated that fruit thinning was beneficial for ‘AU Golden Sunshine’, we tested the effects of flower thinning and BenefitKiwi® application this year. Vines were randomly assigned to one of four treatments: 1) fruit thinning, 2) flower bud thinning, 3) fruit thinning + BenefitKiwi® application, and 4) flower bud thinning + BenefitKiwi® application. Flower bud thinning treatments were implemented on March 28, 2012. Flower bud thinning consisted of reducing flower bud number to 450-500 buds/vine remaining. Fruit thinning treatments were implemented on April 25, 2012. Fruit numbers were reduced to approximately 300-350 fruit/vine. Results indicate that flower thinning at this rate was not beneficial for marketable yield. There were no significant differences among treatments (Table 5). In summary, fruit thinning is beneficial for ‘AU Golden Sunshine’ production. Flower bud

removal at the rates used in this study is not recommended. Flower bud removal and/or flower thinning is utilized in many fruit production systems to maximize fruit size potential. Flower bud removal is likely beneficial for prolific fruiting cultivars, such as 'AU Golden Sunshine', if the correct rate is determined and subsequent pollination and fruit set is adequate. Determining the proper flower bud removal rate will require more research, as the rate is influenced by pollination, fruit set, and natural fruit drop (~3-4 weeks after fruit set).

Goals and Outcomes Achieved

- Identify male pollinators with bloom periods that coincide with the three patented female kiwifruit plants.
  - Bloom dates, flower and fruit development has been monitored since early spring 2011 to determine the flowering periods for the male and female kiwifruit vines, and ultimately to determine proper male and female "partners". The female 'AU Fitzgerald', a green-fleshed variety with low chilling requirement, has a bloom period that coincides nicely with 'AU Arthur'. Many years of data support this, in addition to this past year. The golden-fleshed 'AU Golden Dragon' bloom period appears to coincide quite nicely with the male plant 'Meteor', also known as 'CK3'. The bloom dates of the new golden-fleshed variety 'AU Golden Sunshine' overlaps very nicely with the male 'AU Tiger'.
- Determine the benefit and/or need for supplemental pollen application
  - Pollination has been an issue for us, as the vines that are available for research do not have adequate male pollinizers spaced properly for pollination efforts. We have worked to correct this by grafting available vines with male plants to have an adequate distribution of pollinizers. We also have a new planting that will bear fruit this year, and pollination experiments will be conducted on these new vines. We applied supplemental pollen daily during the bloom periods for each year of this study, but pollination was still not optimum.
- Determine yield potential of gold kiwifruit varieties when properly trained and pruned.
  - This was not definitively achieved, and was admittedly an unreasonable goal. The vines were properly trained and pruned and yield was monitored in several ways including: total yield, marketable yield, and fruit number. Due to weather conditions, pollination, and unexpected fruit drop, the yields have been variable. Also, it is expected that fruit thinning rates and pollination can be optimized to improve yields. Marketable yield (only fruit $\geq$ 64 grams) peaked at 3.5 kg/m^2 of canopy for 'AU Golden Dragon'. This is based on 4 reps (vines) from one of the implemented treatments. 'AU Golden Sunshine' has experienced fruit drop just prior to harvest during this 2-yr study that has reduced yield. This is an issue that requires further investigation. Marketable yield has been approximately 1.8 kg/m^2 for the vines that experienced fruit drop and 2.9 kg/m^2 for vines that did not experience fruit drop. The yield potential is likely higher for these kiwifruit plants, as additional recommended growing practices are identified.
- Assess the benefit of the plant growth regulator (BenefitKiwi®) and fruit thinning.
  - BenefitKiwi® application has not been effective for increasing marketable yield in 'AU Golden Dragon' at the rates used in these studies. Future research using

different rates and application times may prove to be beneficial. BenefitKiwi® application did not affect marketable yield for 'AU Golden Sunshine' in 2011, but did appear to positively influence marketable yield in 2012. Fruit thinning does not appear to increase marketable yield for 'AU Golden Dragon'. 'AU Golden Sunshine' is a prolific fruiting cultivar and fruit thinning is recommended to increase fruit size and subsequently marketable yield.

The results of this study have been presented at the Southern Region American Society of Horticultural Sciences (SR-ASHS) meeting in Birmingham, AL on February 5, 2012. The reference is:
Influence of Fruit Thinning and BenefitKiwi® on Fruit Size and Quality of 'AU Golden Dragon', 'AU Golden Sunshine', and 'Hort16A' Kiwifruit. Jonathan Malone*, James D. Spiers, William A. Dozier, Floyd M. Woods, Elina Coneva, Bryan S. Wilkins, 101 Funchess Hall, Department of Horticulture, Auburn University, Auburn, AL 36849.

(http://srashs.org/MeetingPrograms/MeetingPrograms.html)

Results of the research pertaining to kiwifruit male and female bloom times, and appropriate "partners" were presented at the Small Fruit Working Group workshop at the SR-ASHS meeting in Birmingham, 2012 (36 participants). This research was also presented in-state at the 2012 AL Fruit and Vegetable Meeting (230 participants) and the AL Farmers Association meeting (37 participants) in 2012.

Beneficiaries

The interest in this research project has led to collaborative research efforts in other states. Since this project was initiated, we have established replicated plantings of the new AU kiwifruit cultivars in Virginia (Virginia Tech U), Texas (Stephen F. Austin), and Mississippi (USDA). Representatives from Zespri Inc. have visited twice to discuss the potential of a kiwifruit industry in the southeast U.S. The Gold Kiwi Group, LLC. was formed to market these cultivars and are in the planning stages of implementing a kiwifruit industry (http://growaukiwi.info/index.html). Our research efforts have been shared with these groups to allow for sound decision-making on management practices for growing these cultivars commercially.

Lessons Learned

Significant fruit drop experienced by 'AU Golden Sunshine' vines was not anticipated, and has negatively influenced yield results from 'AU Golden Sunshine'. However, this is an important finding that may be alleviated by altering management practices. This fruit drop was influenced by drought conditions in 2011, but appears to be a characteristic of this cultivar. Altering harvest times and/or management practices can likely be employed to alleviate losses

due to fruit drop. Future research will be focused on management strategies to avoid fruit drop losses.

Optimal pollination of these new cultivars needs to be further explored. We got ahead of ourselves by including this goal in the proposal. We did not have adequate research plots to implement this study in the desired time frame, and just now have plants with adequate pollinizers that are mature enough to implement this study.

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Table 1. Effect of Benefit®Kiwi[z] and fruit thinning on total fruit number, marketable fruit number, cull fruit number, total yield, and marketable yield[y] of *A. chinensis* 'AU Golden Sunshine'.

	Benefit®Kiwi	No Benefit®Kiwi	Min. Thin	Thin
Total fruit number	102ns[x]	69	115a	56b
Marketable fruit number[w]	19ns	14	11a	21b
Cull fruit number[v]	84ns	56	104a	35b
Total yield (kg)	4.7ns	3.3	4.6ns	3.4
Marketable yield (kg)	1.4ns	1.1	0.8a	1.7b

[z]Benefit®Kiwi applied at $5mL \cdot L^{-1}$.
[y]All response data were recorded per square meter of canopy.
[x]Means within rows for Benefit® Kiwi and thinning followed by different letters are significantly different based on single degree of freedom contrasts at $\alpha = 0.05$. Not significant = ns.
[w]Marketable fruit = ≥ 65g.
[v]Cull fruit = < 65g.

Table 2. Effect of Benefit®Kiwi[z] and fruit thinning on total fruit number, marketable fruit number, cull fruit number, total yield, and marketable yield[y] of *Actinidia chinensis* 'AU Golden Dragon'.

	Benefit®Kiwi	No Benefit®Kiwi	Min Thin	Thin
Total fruit number	89ns[x]	102	122a	70b
Marketable fruit number[w]	34ns	40	36ns	38
Cull fruit number[v]	56ns	62	86a	32b
Total yield (kg)	5.2ns	5.9	6.4a	4.8b
Marketable yield (kg)	2.8ns	3.3	2.9ns	3.2

[z]Benefit®Kiwi applied at $5mL \cdot L^{-1}$.
[y]All response data were recorded per square meter of canopy.
[x]Means within rows for Benefit® Kiwi and thinning followed by different letters are significantly different based on single degree of freedom contrasts at $\alpha = 0.05$. Not significant = ns.
[w]Marketable fruit = ≥ 65g.
[v]Cull fruit = < 65g.

Table 3. Effect of Benefit®Kiwi[z] and fruit thinning on fruit quality parameters[y] of *A. chinensis* 'AU Golden Sunshine'

	Benefit®Kiwi	No Benefit®Kiwi	Min. Thin	Thin
Firmness (kg)	9.8ns[x]	7.0	8.7ns	8.0
SSC (%)	11.6ns	12.6	12.2ns	12.1
IC (Hue°)	104.7ns	103.7	104.8ns	103.6
DMC (%)	19.3ns	18.6	19.3ns	18.7
TA (%)	1.2ns	1.2	1.3ns	1.1
SSC:TA (ratio)	9.9ns	11.2	10.0ns	11.0

[z]Benefit®Kiwi applied at $5mL \cdot L^{-1}$.
[y]SSC = Soluble solids content, IC = Internal color, DMC = Dry matter content, TA = Titratable acidity, SSC:TA = Soluble solids content: titratable acidity.

[x]Means within rows for Benefit® Kiwi and thinning followed by different letters are significantly different based on single degree of freedom contrasts at $\alpha = 0.05$. Not significant = ns.

Table 4. Effect of Benefit®Kiwi[z], fruit thinning and flower thinning on total fruit number, marketable fruit number, cull fruit number, total yield, and marketable yield[y] of *Actinidia chinensis* 'AU Golden Dragon'.

	Total fruit number	Marketable[x] fruit number	Cull[w] fruit number	Total yield (kg)	Marketable yield (kg)
Fruit thin	17.4	5.6	11.8	0.96	0.53
Flower thin	20.5	7.8	12.8	1.19	0.74
Fruit thin + Benefit®	33.1	15.6	17.5	2.31	1.61
Flower thin + Benefit®	17.7	7.3	10.5	1.15	0.75

[z]Benefit®Kiwi applied at $5mL \cdot L^{-1}$.
[y]All response data were recorded per square meter of canopy.
[x]Marketable fruit = ≥ 65g.
[w]Cull fruit = < 65g.

Means within rows for Benefit® Kiwi and thinning followed by different letters are significantly different based on single degree of freedom contrasts at α = 0.05. There were no significant differences.

Table 5. Effect of Benefit®Kiwi[z], fruit thinning and flower thinning on total fruit number, marketable fruit number, cull fruit number, total yield, and marketable yield[y] of *Actinidia chinensis* 'AU Golden Sunshine'.

	Total fruit number	Marketable[x] fruit number	Cull[w] fruit number	Total yield (kg)	Marketable yield (kg)
Fruit thin	20.8	14.3	6.5	1.68	1.37
Flower thin	14.0	7.1	6.9	0.92	0.64
Fruit thin + Benefit®	23.8	20.1	3.7	2.20	2.00
Flower thin + Benefit®	29.7	17.1	12.6	2.31	1.69

[z]Benefit®Kiwi applied at $5 mL \cdot L^{-1}$.
[y]All response data were recorded per square meter of canopy.
[x]Marketable fruit = ≥ 65g.
[w]Cull fruit = < 65g.
Means within rows for Benefit® Kiwi and thinning followed by different letters are significantly different based on single degree of freedom contrasts at α = 0.05. There were no significant differences.

Project 5

PROJECT TITLE: "AU Teaching and Demonstration Gardens"

PROJECT SUMMARY

Students, faculty, staff and visitors need a site where conventional and specialty crops can be displayed, studied, and evaluated for potential use. The purpose of this project was to establish a highly visible and accessible site to demonstrate and research crops that could be produced in Alabama and to provide a venue for their display, marketing and use. The Teaching and Demonstration Gardens encompassed all crops, both specialty and conventional. The site chosen was on the campus of Auburn University adjacent to the existing Davis Arboretum and the historic "Old Rotation" experiment (circa 1896). The site has been known as the old agronomy farm. THIS REPORT WILL FOCUS ONLY ON THE SPECIALTY CROPS INCLUDED IN THE TEACHING AND DEMONSTRATION GARDENS AND RELATED ACTIVITIES.

A goal was for all projects to be enclosed in an area designated the "AU Teaching and Demonstration Gardens" , "Sustainability Park" or some other similar term and connected via a series of interpretive trails and signs for self-guided tours as well as formal tours for special visitors and field days. This has not developed as University administrators have not fully committed to the project. Plans to enclose the remaining site in an attractive fence, erect appropriate signs, and control access to the site by vehicles was not realized because of a failure by University administrators to commit to this concept and approve physical improvements. Even though this project was successful, the overall concept and long-term goals has been effectively destroyed by a lack of vision by Auburn University administrators.

PROJECT APPROACH

The purpose of this project was to establish a highly visible and accessible site to demonstrate and research specialty crops that could be produced in Alabama and to provide a venue for their display, marketing and use. There has been a groundswell of interest among consumers for locally produced food. Local restaurants have difficulty obtaining locally grown produce because there are few local farmers willing to devote the resources needed to produce it. This garden which was already a part of the campus landscape was to be used by faculty to teach students and demonstrate to the public specifics of specialty crop production. Individual faculty could teach classes and collect data from those projects related to their research and classes. The public would have access to the site and a nearby Market at Ag. Heritage Park on Thursday afternoons during the production season would be available to market product.

Following the "Work Plan" as descripbed in the proposal, the following venues were developed and are describe4d in greater detail under "GOALS AND OUTCOMES ACHIEVED".

Crops Garden. A 1-acre garden of familiar and exotic field crops from all over the world was developed and showcased (see details in next section).

Demonstration orchard. A small, backyard orchard featuring muscadines, blueberries, persimmons was developed; most attention was received by a new planting of semi-tropical bananas that are being evaluated for potential use in Central Alabama.

Organic production. A special garden featured all organically produced produce.

Community Gardens. A garden of traditional and exotic vegetables was produced by students and faculty for the local food bank in 2010-2011. It was discontinued in 2012 because of a lack of interest from students but led to a new Community Gardens managed by the Auburn Real Food Challenge, a student-run organization providing locally grown food for the community.

Marketing. Plans were to utilize the new Market at Ag. Heritage Park to sell specialty crops and products produced from them. With the help of one faculty member, some horticulture students were able to make jams and jellies and specialty products produced in the gardens to sell in the Market.

Other gardens. Several other gardens featuring specialty crops were developed. See "Goals and Outcomes Achieved.

GOALS AND OUTCOMES ACHIEVED

Number of visitors in 2010-2013 ~11,000
A conservative estimate of visitors over the past year include:
Students enrolled in agriculturally related courses: 1000
Students visiting gardens on their own: 5,000
Off-campus visitors on guided tours: 300
Off-campus visitors on their own: 4,000
In-service or related training during campus events: 500
International visitors: 200

An unexpected benefit of having this site was the opportunity to host the 2012 and 2013 Alabama Fruit and Vegetable Conference (~600 specialty crop producers and vendors). The site was used for tours and field demonstrations of new equipment. It was also used for in-service training of 30 area and county extension agents and specialists in addition to the student teaching.

Specialty crops produced: (see appendix)

How crops were marketed
There has been pressure on project leaders to grow crops for on-campus food services and local restaurants. However, at this time, there is no system in place to mass produce crops for these markets neither is it the goal of the College of Agriculture and the AAES to compete with local producers. The adjacent "Market at Ag. Heritage Park" operated only once a week June-August and did not offer a sufficient market for the diversity and quantity of produce grown in the Teaching and Demonstration gardens. Most of the marketable produce was used by the project leaders, the students who grew it, or it was donated to the local food bank. In 2013, tours of the

"Herb and Medicinal Plant Garden", were held in conjunction with the Thursday Market at Ag. Heritage Park.

Market outcome of specific crops

This was not evaluated on a large scale. However, a consequence of the teaching and demonstration effort on campus of growing alternative crops was demonstrated by the creation of a campus student organization known as "Real Food Challenge". "The Auburn Real Food Challenge is a group of students dedicated to helping Auburn become more aware of world food issues and improve our local food system. The goal was to achieve the Real Food Challenge of 20% local, ecologically sound, fair, and humane food in our university's system by the year 2020. Plans were to do this with several projects: a food Co-op, working with existing dining services, improving the farmers market, and by creating a community garden on our campus." https://fp.auburn.edu/stuorgs/orgPage.aspx?ID=474

Using resources from the "AU Teaching and Demonstration Gardens", the "Real Food Challenge" was able to establish nearby student garden plots so students on campus would have a place to grow their own food. These plots were mostly managed according to organic techniques.

A senior undergraduate student, Mr. Cameron Ingrum, was hired on a special intern project during the summer and fall of 2012. As part of his undergraduate "Capstone Project", he has developed long-range plans for the Teaching and Demonstration Gardens to evolve into a "Sustainability Park" with more student involvement in local food production. His final report is included as an attachment to this report.

Estimate of profitability based upon yield and potential market:

Based on results in the Medicinal Plant Garden, Dr. Dennis Shannon estimates that an Alabama grower can produce as much as 13 US tons of turmeric (*Curcuma longa*) root per acre. This is worth at least $2 per pound wholesale for a potential gross of $52,000 an acre. Skullcap (Scutellaria sp.) is native to Alabama and can produce 2500 lb./acre of dried leaves and stem that can sell for as much as $3 per pound or a gross of $7,500 per acre over a 2-yr period. However, it must be grown under shade with irrigation for consistent production. However, marketing is based upon individual growers and their contacts with buyers.

Venues Developed for Specialty Crops

The following venues were included in the "AU Teaching and Demonstration Gardens" during 2010-2013.

Medicinal Plant Garden

This garden was developed in 2010 and grew out of several statewide projects involving the commercial

production of herbs and medicinal plants as alternative crops for Alabama farms. This garden has received attention from several groups including the Alabama Medicinal Plant Growers Association, and was a featured attraction for guided tours on Thursday afternoons as part of the "Market at Ag. Heritage Park". Project leader is Dr. Dennis Shannon, Dep. Agronomy & Soils. Ms. Tia Gonzales, a local authority on herbs and medicinal plants, was hired part time to help develop this garden and conduct tours in 2013.

Landscape Construction. (HORT 3280---Landscape Construction)
This area supported teaching and some research projects. Landscape construction used the area for lab projects including: installation of pavestone, irrigation, landscape installation and design, and for the building projects that include arbor benches, corn hole games and storage sheds. This is included because some specialty crops may require specific structures to support their production. Project Leader is Dr. Joe Eakes in Horticulture Department.

Crops Garden
This large garden contained familiar and exotic crops from around the world. It has areas for a grass nursery, traditional field crops, sun hemp, tropical plants, sugarcane, , blueberry bushes, crape myrtles and a variety of other plant material. Both a summer garden and a cool-season garden are planted to accommodate more than 100 different species of crops. Use includes teaching, demonstration and outreach to the community including Master Gardeners. Project Leaders are Dr. Dennis Delaney, Dr. Dennis Shannon, and Dr. Charles Mitchell, Dep. of Agronomy & Soils.

Banana Research and Demonstration
As part of a larger project in several Southeastern states, a potentially new crop for the southeast, bananas, were replicated from an original test at the Tifton Ga. (UGA) experiment station. These varieties have the potential to yield fruit in the southeast. This planting has received

widespread public attention and has survived 3 winters in Central Alabama. Project leader is Dr. Elina Coneva, Horticulture Dept.

Nematode Research

This site has a severe infestation of root knot nematodes from more than a century of continuous cultivation and cropping. It is being used for research on alternative treatments for control/eradication of nematodes. Included in the project are extensive plantings of castor bean (*Ricinus communis*). Project leader is Dr. Rodrigo Rodriguez-Kabana, Dep. of Entomology/Plant Pathology.

Phenology Garden

Three identical gardens were installed across the state in the early 2000s to track insect movement of aphids on various plants. It has been used by Master Gardeners as a training site. Research funding for the project has ended but Dr. David Held, Dept. Entomology and Plant Pathology, is holding the area in case he receives more funding.

Community Garden.

This area was active through 2010 as an outside funded Community Garden used to produce spring and fall vegetable crops that were donated to the East Alabama Food Bank. It was not funded in 2011 and 2012. The original project leader was Dr. Beth Guertal, Agronomy & Soils. All work was done by campus volunteers. This project was inactive in 2012 but renewed interest by students on campus planted a limited garden in 2013.

Vegetable Teaching Gardens and Organic Teaching Gardens

These gardens were used primarily for teaching the following courses on campus.
HORT 2030---Vegetable Production,
HORT5130/6130---Sustainable Vegetable Production
HORT 4000---Pesticide Management in Horticulture
Students gained practical experience growing alternative crops on a small scale. Crops include but are not limited to tomatoes, squash, pepper, & sweet potato. Dr. Wheeler Foshee, Horticulture, is project leader.

Tumeric Variety Tests

Several varieties of turmeric were cultivated in comparative tests and plants are used to provide

commercial producers with a source of organically produced turmeric starts. This study was adjacent to the Medicinal Plant Garden. Dr. Dennis Shannon is project leader.

Fruit and Vegetable Gardens

(HORT 4250 Intermediate Fruit and Vegetable Production AND HORT 7960 Special Problems) This site was used for vegetable production classes and graduate level classes, directed studies and special problems.. Area included a vegetable garden, Asian persimmons, blueberries, tree fruits and nuts, kiwi, herbs, muscadines, etc. Dr. Raymond Kessler is project leader.

Tree and Ornamental Nursery

This area was previously used as a tree study. It included a collection of donated plant materials including natives, chestnut trees, and one Live Oak. Forestry has used this area for research in the past and the past two years, the live oak has had air layering grafts taken from it. Project leader was Dr. Ken Tilt who recently retired. The future of this project is uncertain.

Lotus Research

Aquatic lotus (*Nelumbo sp*.) research in above ground, portable "ponds" was terminated in 2012. Project leader was Dr. Ken Tilt who retired.

Weed Nursery

(AGRN 5200/6200 Applied Weed Science) Various crops were grown and several herbicides applied to teach classes what specific herbicide damage looks like on various crops and weeds. Project Leader is Dr. Scott McElroy, Agronomy & Soils.

Irrigation Demonstration

(HORT 7010 Experimental Methods in Horticulture
HORT 7040 Advanced Growth and Development of Horticultural Crops) This area consisted of 2 shade structures with various woody ornamentals and multiple irrigation systems. Project leader is Dr. Amy Wright, Horticulture.

Other Horticultural Venues.

Other small areas are being used to teach classes or conduct research such as
HORT 5230 Nursery Management
HORT 6230 Advanced Nursery Management
HORT 2020 Horticultural Crop Production
This site contained an assortment of ornamentals that weree changed out often---grasses, small trees, perennials, woody shrubs, knock-out roses etc. This was used by several teachers and project leaders including Dr. Raymond Kessler, Dr. Charles Gillam, Dr. Amy Wright, Dr. Jeff Sibley, etc., Horticulture Department.

BENEFICIARIES

Undergraduate and Graduate Students. These were the primary beneficiaries of this project as planned because it was to provide a permanent place for both student-initiated and faculty-initiated projects related to specialty crops. Around 1,000 students were involved in classes or projects on the site and an estimated 5,000 additional students visited the site out of curiosity or professional interest in the crops being grown and techniques used.

Faculty and staff. Faculty taught around 30 classes annually using the site for teaching or for Extension demonstration purposes. Proximity to classes and ease of access were the primary reasons given by the faculty who used this site.

Outside campus visitors. One of the purposes of establishing this site was the opportunity to showcase the specialty crops to visitors on the A.U. campus. We estimate that around 5,000 outside quests visited the site over a 2-yr period. Some of these were farmers and gardeners with a particular interest in certain crops.

Farmers. A long-term goal of having the gardens was to reach both small-scale and large-scale producers in the state and region. This was not possible in the short-term and will likely not occur because of the long-term plans of the University administrators for the site. However, the site did host the 2012 and 2013 Alabama Fruit and Vegetable Conference (~600 specialty crop producers and vendors). The site was used for tours and field demonstrations of new equipment. It was also used for in-service training of 30 area and county extension agents and specialists in addition to the student teaching.

LESSONS LEARNED

This new and innovative, faculty-driven concept for a University campus has never been funded before. Problems have existed both administratively and logistically in initiating this project. Regardless of these obstacles, progress has been made toward a fully functional, unified plan for long-term support of this project.

Some specialty crops simply do not perform well in Alabama's climate. After several years of study, we had to give up on growing *Astragalus* root commercially even though the potential profit would have been high. It just simply does not stand up to Alabama's insect and disease pressure. Skullcap (*Scutellaria sp.)*, on the other hand, does show some promise but requires irrigation and production under shade. These perennial specialty crops require several years of evaluation in order to make reliable recommendations.

University faculty have great ideas and innovative ways of developing and funding their ideas in spite of administrative obstacles. However, most faculty/project leaders are fiercely independent and do not want others interfering with their projects in spite of efforts to improve team work. The concept of the "AU Teaching and Demonstration Gardens" requires strong administrative leadership and support which was lacking during this project because of administrative changes. Regardless, individual project leaders made great strides in promoting their own venues (see Venues Developed).

A change in University and College administration created unforeseen difficulties in instituting some of the originally planned activities on the site. Some of the original land (~45 acres) planned for this project was used by University administrators for other purposes (e.g. parking and RV camping). About half of the land apparently has been lost to agricultural use. A campus long-term plan released in the fall of 2012 indicated that most of the land being used for the AU Teaching and Demonstration Gardens will be taken for other purposes (buildings, athletic fields, and parking lots).

A goal was for all projects to be enclosed in an area designated the "AU Teaching and Demonstration Gardens" , "Sustainability Park" or some other similar term and connected via a series of interpretive trails and signs for self-guided tours as well as formal tours for special visitors and field days.

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Wheeler Foshee, Associate Professor, Horticulture
Joe Eakes, Professor, Horticulture
Jane Hoehaver Farr, Director, Plant Sciences Research Center
Rodrigo Rodriguez-Kabana, Distinguished University Professor, Plant Pathology
Danita Smith, Curator, Davis Arboretum, College of Sciences and Mathematics
Jim Bannon, AAES Assoc. Director for Outlying Units
Auburn University College of Agriculture, Alabama Agricultural Experiment Station, and Alabama Cooperative Extension System

Project 6

Project Title - Building Farmer to Consumer Markets in the Alabama Black Belt

According to records the report information submitted below was approved by USDA-AMS and submitted 2/16/2012.

Contact Person

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Project Summary

Background – In 2010, the unemployment rate for the state of Alabama was 11.4%. However, in Marengo and Perry counties have rates of 14.1% and 18.2% respectively.

The initial purpose of this project was to facilitate a process to create employment opportunities through the development of sustainable small scale agriculture production and marketing.

Although the unemployment rate in Perry and Marengo counties are above the state and national average TUCCA goal was to decrease the unemployment rate by:

- Activating the farmers markets in Uniontown and Thomaston Alabama
- Providing outreach and technical assistance to the cities of Thomaston and Uniontown, local farmers, and consumers concerning the win/win benefits of activating and promoting their local farmers markets.
- Promote community based organizations to develop value added agricultural enterprises through entrepreneurship and direct marketing through the local farmers market and other direct sales.
- Encourage backyard agricultural producers to grade, package and sell their produce at the farmers market to encourage residents to eat healthier by buying locally.

As a result of this project effort both farmers markets in Thomaston and Uniontown were open in June and remain open until October. Both markets were reopen in November to sell leafy greens.

Project Approach

Thomaston, Alabama is the home of the Alabama Rural Heritage Foundation (ARHF). The United Christian Community Association (TUCCA) partnered with this Foundation to complete the following during the project period:

- Engaged students of color in the production of starter plants in the green house at A.L. Johnson High School, such starter plants were used by local farmers in their vegetable operations.
- TUCCA provided the management and day-to-day operation of Rural Heritage Center Demonstration Farm. This farm contain a FDA approved kitchen, produce grading tables, produce receiving shed, walk-in cooler and demonstration farm plots. In this effort TUCCA would purchase produce from small farmers on a weekly basis at wholesale and sell at retail at the farmer markets in Uniontown and Thomaston. Many of the backyard producers did not want to come to the farmer markets at 7:00 a.m. and remain until 11:00 a.m. closing time. Over $5,000.00 was generated in this effort at the Thomaston market.
- High School Students were given part-time employment by working with produce to include market sales at the farmers markets. Four students were involved in this process.
- Technical Assistance – Many socially disadvantaged and new and beginning farmers signed up and received cost share funds through the USDA/Natural Resources Conservation Service (NRCS) EQIP program. TUCCA conducted over 20 outreach meetings to encourage such producer to apply for Hoop Houses (High tunnels) so vegetable producers could use them to extend the growing season. TUCCA provided technical assistance to over 25 producers in terms of training on how to erect the hoop house kits according to the owner's manual, lay out of planting bed, and irrigation systems. The funding for the hoop house construction was provided by the farmers, cost share from EQIP program, the Ala-Tom RC&D Council and "Green Job Grant" from EPA. Project funds were used for personnel involved in direct technical assistance, helping small producers with the following aspects:
    - ✓ Coordinating the ordering of hoop house kits and having them shipped to one location to save farmer on shipping cost.
    - ✓ Transporting hoop house kits to farmers that did not have trailers for transportation.
    - ✓ Assisting landowners with site selection, layout of structure, and provide guidance to ensure that the structure meet standards.
    - ✓ With management of cost share payments

The purpose of this effort was to enhance the possibility of small farmers being able to supply the local farmers markets with vegetables as well as other direct sales. This process would also extend the growing season and provide sales for the farmers market.

The existing farmers market shed in Uniontown, Alabama was constructed without electricity, bathrooms, running water or storage. The Perry County Commission and the city of Uniontown requested the" Green Team" to supervise the expansion of the market 12' X 30' to include men and women restrooms, electrical system, plumbing, climate control system, and waste disposal. Funding in the amount of over $15,000.00 was provided by the Perry County Commission. TUCCA provided project funds for personnel to provide guidance with the design, layout and provide project over site and management. Funds for materials and construction labor were provided by the Perry County Commission.

- Agro tourism was enhanced in the towns of Uniontown and Thomaston because the farmers market was open and doing business. This concept increased traffic flow and generated extra business for the towns.

- Outreach work was conducted in Marengo, Perry and surrounding counties concerning locally grown food production systems and the following barriers need to be looked at in terms of increasing production and marketing produce in the Alabama blackbelt:
  - ✓ Promotion and encouragement of young people to learn the produce business and become actively involved. Most young people don't like the hard and hot work to include long hours with minimum profits.
  - ✓ Access to capital to start up a farming operation. In this effort training is needed in showing potential new and beginning producers how to produce by the square foot rather than by the acre. This concept will facilitate the use of hand and walk behind tools in their start up operations.
  - ✓ Access to staple markets, the farmers markets in Thomaston and Uniontown can only bare so much purchasing pressure. When the customer purchasing power is reached, farmers need other markets that they can sell too.

The following partnerships made contributions to the project in 2011:

- ✓ **Alabama Rural Heritage Foundation** – Provided walk-in cooler space, grading shed, grading tables, land for demonstration site, meeting space and hoop house for the project.
- ✓ **Town of Thomaston** – Provide water, electricity, and grass cutting assistance for the project
- ✓ **Ala-Tom RC&D Council** – Provided over $20,000.00 in project funds to assist with hoop house demonstration and educational work to include the management of the farmers market in Uniontown and Thomaston.
- ✓ **Perry County Commission** – Provided funds to expand the farmers market in Uniontown and assisted with the grand opening celebration of the market in 2011.
- ✓ **Town of Uniontown** – Provided heavy equipment in the expansion of farmers market in Uniontown and provided water and sewage hook-up to include electricity.
- ✓ **Perry County Economic Development Center (PCCED)** – Assisted with the publicity of grand opening of the farmers market in Uniontown. Also, this organization purchased hoop house kits to assist limited resource farmers that could not afford to pay the company over $5,000.00 up front. All of the farmers have EQIP contracts for hoop houses that will reimburse them after the hoop house has been installed and inspected by NRCS.

Goals and Outcomes Achieved

1. **Activation of farmers markets in Uniontown and Thomaston**
   - The farmers market in Thomaston is open and during well. The market open the second Saturday in June of each year and remain open until the 1st Saturday in October. The Thomaston market serves as a gathering place of fellowship on Saturday mornings for travelers and Thomaston residents. The race relationship appears to be better because the people get a chance to talk to each other about their food. Since we open the market other people utilize the market to sell food and crafts. Two adults and four youth receive part-time employment at the market.

- The Uniontown market has been open for business to include the additions of restrooms, electrical system, waste disposal system, climate control system and multi-purpose storage. This market is also used for other events by the town such as town festivals. Several farmers within the blackbelt area utilize this market up until the month of December.

2. The Uniontown Farmers market is managed by Jacob Waddy, a local producer in Perry County. The Thomaston market is managed by Andrew Williams, an organic producer and retired NRCS employee. At this point only manager are needed until the market grows and more producers are committed to selling at the market.

3. In terms of business plan development, many of the small farmers that we worked with in this project were not in a position to develop business plans as such. This project component will take time and will be considered as a long term goal.

4. The availability of fresh fruits and vegetable were improved in Thomaston and Uniontown. TUCCA facilitated a process to ensure that both markets had enough produce to keep both markets open two half days. Produce not sold on market days were stored in the walk in cooler at the Rural Heritage Center.

5. This project increased the number of jobs in the area as listed below:
   - Seven (7) part time jobs were created by the establishment of the "Green Team" that erected hoop houses for landowners. **Two adult and four young** adults received part time jobs at the farmers markets and at the Alabama Rural Heritage Center. It is estimated that no new jobs were created at the farm level as a result of this project but the farm incomes were enhanced.

6. The following activities were enhanced at the Rural Heritage Center as a result of this project:
   - ✓ The demonstration farm was activated to include a hoop house system, hydroponic system and organize production of produce.
   - ✓ Educational workshops were conducted on various subjects
   - ✓ Outreach to small farmers in terms of marketing fresh produce was one of the main focus of this project. As a result TUCCA were able to market local fruits and vegetables during the seasons.
   - ✓ TUCCA assist the Rural Heritage Center receive several grants to enhance their pepper Jelly operation. Also, youth from the A.L. Johnson High School received training at the Rural Heritage Center.

7. Over 40 small scale and backyard producers became active in this process and they are producing at various capacity levels.

Beneficiaries

Limited Resource, Socially Disadvantage and small scale farmers – benefited from this project because it provided another market outlet for their product. Also, they were able in some

case to sell at wholesale to TUCCA. In addition, they were able to sell in some of the urban markets in the Birmingham area.

- Over eleven (11) unemployed person from the Perry and Marengo County area received part time employment from this project to include seven (7) adults and four youth. The adults are still working part time in the construction of hoop houses for landowners in Alabama and Florida with request from other states.
- Local citizens from the Thomaston and Uniontown communities benefited because they had access to locally grown and fresh fruits and vegetables. Also, people passing by the market enjoyed the produce as well.

Lesson Learned

1. Small farmers like to farm and some of them are good at it but they do not like to grade, package and market their produce at the farmers market.

2. Many small farmers do not have access to enough financial capital to operate from one year to the next.

3. Most small farmers do not keep adequate records in terms of business profits and losses.

4. Many small farmers in Marengo and Perry Counties only plant what their parents planted, not according to what the customer want, that need to change.

5. Young people don’t like farming as a career or avocation because the hours are long, the pay is slow and the profit margin is narrow.

Project 7

Educational Program for Consumers and Producers of Alabama Pecans

PROJECT SUMMARY

The initial purpose was to develop better educational programs about pecans for both growers and consumers. As a small group we were limited to where and what we could do for growers and wanted to start promoting pecans to the consumer.

For growers we wanted to get them to areas where they could see other orchards and talk with other growers to learn their orchard management styles. Each year we have a summer tour for growers to visit and learn how other orchards are managed. Sometimes these tours are out of state and attendance is low. By providing transportation to these out of town tours our attendance doubled.

With all the new information coming out about the health benefits of pecans were want to make sure this information was getting out to the consumer.

PROJECT APPROACH

One of the most important things accomplished was the redesigning of the APGA's web site. The web site was redesigned to be easier to use for both growers and consumers. For the growers we post information presented at our summer tour and annual educational conference. We also post about upcoming meetings and results from ongoing research. In the development of a new web site we also updated our logo.

We develop a consumer side to our web page that provides information about where you can buy and sell pecans with in the state. There is also a section where someone can find information on the benefits of pecans and a recipe section. Traffic to our web site has increased on both the growers and consumers side. Our web hosting company can break down a report to which pages were visit each month. This gives us a general idea of who is visiting and using our web site.

We also had 3 new travel banners made that are displayed at meeting and festivals. Banner #1 has general information about the pecan growers association. Banner #2 has general fun facts about pecans and Banner #3 has nutritional information for pecans.

We were able to bring in more speakers for our annual meeting.

GOALS AND OUTCOMES ACHIEVED

Three summer tours and three annual meetings were completed, where over 150 growers were reached at each. We also have attended or spoke at 25 different garden clubs and service clubs meetings, and outdoor festivals. Anywhere from 50 to 1000 people were reached and given information about pecans. Attendance at our annual meet was about 200. This is average for our annual meeting. Our board has discussed several things that will help us increase the number of growers coming to the annual meeting. We averaged 1500 visits/hits to our website each month. We did not have a way to know how many visits/hits we had to the old site. Our new hosting

company can access monthly report telling us how many people visited our site. The number of visits increased greatly when we first launched our new site, but now they have leveled off. Visits to our site have increase at least 75%.

BENEFICIARIES

Pecan growers in the state are the primary beneficiary from our summer tour and annual meeting. When determining the topics for our summer tour and annual meeting we keep pecan growers in mind. We try to focus on two or three topics so growers attending will not be overwhelmed with information. Growers attending these meeting will then incorporate the new information into their orchard management practices. Consumers would be the beneficiary of information that we present at garden club talks and outdoor festivals. We provide information on the health benefits of pecans, what to look for when buying pecans, how to store pecans and anything else they might have a question about.

LESSONS LEARNED

This was the first time the APGA had ever applied for this grant. It was a new process for us and with a staff change in 2010 and some miscommunication about the grant we had a slow start to implementing the project. Once we found someone to manage the project and keep things organized, we were able to complete things in a timely manner.

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ADDITIONAL INFORMATION

alabamapecangrowers.com

Alabama Pecan Growers Association

Summer Tour 2012

Annual Meeting 2013

Summer Tour 2013

Travel Banners

Project 8

Project Title –

Plasticulture/Wholesale Production to Increase Production
and Consumption of Alabama Specialty Crops

Project Summary

There is very little commercial fruit and vegetable farming in Alabama. There are many historical reasons for this situation, but the reasons of today are due to lack of producer knowledge in wholesale requirements, lack of communication between fellow producers, lack of communication between producers and wholesale buyers, and (horticultural wise) a lack of plasticulture for high quality and volume production. This project met those problems by selecting seven farmers in a 30 mile radius that received wholesale requirement instructions, including GHP/GAP where applicable, that worked toward cooperative actions between the farmers at monthly meetings, and opened communication channels between farmers and fruit and vegetable buyers. These actions were set in motion by **the project putting all seven farmers in one acre of plasticulture that grew collard greens for wholesale market sales to two different processors.**

Alabama is an importer of food with over 50% of all fruit and vegetables coming from California with practically all the rest (40%) coming from Georgia, Florida and Hispanic countries. California's water shortages are forcing a change in their production of vegetables. Import laws are making shipping fruits and vegetables into the USA harder to qualify and, of course, fuel prices are raising the price of these products. Alabama has a great opportunity to fill voids that California and foreign suppliers will no longer be able to supply. But it will take wholesale knowledge in growing techniques, quantities needed to enter the markets, and how to present the product to the buyers for wholesale shipment. This grant with its new participates and producers who participated in our 2011 Specialty Crop Grant that involved wholesaling to our two greens processors, dealt with these problems in learning new farm techniques in plasticulture and the demands of wholesaling.

Project Approach

The basic approach to the project was to grow and sell collard greens to two participating processors of greens. At the seven selected farms, each farmer participated in laying their acre of plastic and learned about the practices of watering and fertilization techniques of plasticulture. Each farm planted 10,000 Top Bunch collard seedlings (Top Bunch is a commercial variety not normally used in local production). **All seven farms planted their greens in their grant's one acre of plasticulture.** Each farm had to harvest and deliver greens to the processors to the specifications of the processors needs. *Plasticulture was used in the project instead of conventional farming methods for two reasons: One Alabama specialty crop producers lag*

behind other Southeastern states in the use of plasticulture and, two, plasticulture will produce quicker and make more product than conventional farming. Florida fruit and vegetable producers have approximately 70,000 acres in plasticulture. Georgia utilizes approximately 35,000 acres where the Carolinas have approximately 15,000 acres in each of their states. Alabama though has only 2,200 acres in plasticulture. With the production attributes of plasticulture, the lack of plasticulture production in Alabama verses other states puts us at a competitive disadvantage. By exposing these project farmers and area farmers to the method of plasticulture…the equipment, supplies, plug plants, drip irrigation….there is a possibility some will continue on with plastic and increase acreage of plasticulture in Alabama. The competitive advantages to plasticulture are time and increased production. The black plastic heats the ground up in the spring making seed or root germination and growth much faster. The same goes for using black plastic in early fall, as this project did, by keeping the ground warmer as the days got cooler. In most cases this would equate to two weeks. That means the farmer will get to market two weeks sooner than conventional farmers. That two weeks could mean a big difference in price windows (i.e. watermelons before the 4th of July are $3 wholesale while after the 4th about $1.75). The two weeks could also give the farmers advantages in establishing markets without competition from conventional growers. The plastic also increases the production of the crop. In most cases this increase is two to three times of conventional farming.

Examples would be with squash conventional acre would generate 250 bushels. Plasticulture squash makes between 800 and 900 bushels. Other crops such as tomatoes and bell peppers also double or triple production compared to conventional farming.

Though there are no records on collard poundage on plasticulture verses conventional, it is evident that with plasticulture the plant continues to grow in the cooler months as conventional farmed plants "shut down" in the cool weather. This continued growth produces more poundage per plant. This could mean on traditional sales of collard greens by the "bunch" it could take two plants instead of the normal three. In our case the project is looking for leaf pounds. Conventional farming would look for 1 pound of leaf per plant. With plasticulture our farms could look for 1 ½ pounds per plant. With 10,000 plants per acre that ½ pound means substantial more profit to the farmer.

Starting in July and ending in late September, all seven plasticulture projects were put in three central Alabama counties: Montgomery (2 farms), Elmore (3 farms), and Macon (2 farms). Two of the Montgomery farmers and one of the Elmore County farmers sold their greens to the Montgomery processor, Howell Produce. The other four sold to Hooks Produce in Macon County for processing who in turn sold the bulk to Patrick Farms. Two participating farmers from the 2011 grant, Leo-Bell and Al Hooks, sold their crop to Patrick Farms and Hooks Produce.

The method of harvest for Howell Produce was for the workers to cut leaf only from the collard (not the whole plant or a "bunch") and put them into cardboard boxes provided for free by Howell. The producer would then deliver these greens to Howell's in Montgomery County or sometimes Howell would pick them up at the farm. The farmer's were paid by the processed pound. That is after the greens were cut and bagged the producer would get .33 cents a pound or .66 cents for each two pound bag. On some occasions the producers would harvest the whole collard plant and deliver to Howell where he would trim the leaves for chopping at his processing building. One Montgomery farmer, Handey Farms, provided four weeks or approximately 8000 lbs of leaf ($2640), the Elmore farm, Oakview Farms, provided approximately 6000 lbs ($1980) to supply Howell Produce with product for October and half of November heading into Thanksgiving. The other Montgomery farm, Blake Farm, provided Howell with two weeks or 4000 lbs ($1320) in mid-December. Handey and Oakview had normal production and harvested before any freezes. Blake Farm was planted late September and was hampered by freezes causing a red leaf and freeze burn making them mainly unmarketable for chopping and bagging. Blake Farm did salvage some more of the crop with direct farm sales of approximately $300.

The four farms that sold to Hooks Produce had a more strict method for wholesaling. The original plan of the grant was to sell the bulk of the collards to Howell Produce, but situations changed when Tuskegee University made arrangements with Wal-Mart to sell them collard greens. The grant's four remaining farmers had connections with Tuskegee Extension, and with the promise of more money by selling to Wal-Mart, it made the decision to move to the Tuskegee/Wal-Mart Initiative plan an easy one. Tuskegee's plan, like this grant's plan, was to create a co-op of farmers for collards and other products.

The situation arose that Wal-Mart would not take the greens unless the collard fields and Al Hooks processing building was certified International GHP-GAP approved. Tuskegee Extension and Mr. Hooks thought only the greens processing area need be approved since all the greens would go through the processing facility. The processing area was not GHP/GAP approved till mid-November and none of the 14 to 20 farms (including this project's four farms) in the Tuskegee plan ever got GHP-GAP approved (The process to get International GHP/GAP approved is expensive and time consuming. None of the farms had enough products to justify the expense and the time to be approved.) This pushed these crops in the field past best harvest times (before Thanksgiving) and put them in danger of cold weather problems that causes red leaves and freeze burn making the product unmarketable. These cold weather problems happened to this grant's farmer, Mr. Foster, who sold to Mr. Hooks and also, as mentioned, on the Blake farm who sold to Howell.

Mr. Hooks relieved the situation by making arrangements with Patrick Farms in Georgia. Patrick is a large grower who sells collard leaf to Glory Food's canning plant in Michigan. Patrick's wholesale demands were to cut leaf in the field and trim them (take out the bulk of the

stem). The crop was then put in hard plastic boxes provided by Patrick then delivered to Hooks' processing facility where they would to be examined, re-weighed, iced down and placed in a refrigerated truck for shipping to Glory Foods (each box contained 30lbs of leaf). This method was done at this grant's Macon County farm of Mr. Lee and at several of Tuskegee Extension's Selma farms. But due to time and quality concerns Patrick Farms sent their own crew to harvest the fields. Patrick Farm's crews cut Mr. Lee's second cutting, Elmore County's Foster Farm and Leo Farm's grant acre and the Leo/Bell Farm partnership from last year's grant. The other Macon County farm of Demetrius Hooks sold his entire crop to Hooks' Produce. Al Hooks of last year's grant sold his entire crop to Hooks' Produce.

Due to the crop's quality (good and bad) and the timing of the harvest (before freezes and after) the gross incomes varied at each farm. Mr. Lee's farm sold 423 boxes to Hooks Produce who then sold to Patrick Farms. Mr. Lee harvested 34 of these boxes himself at a gross of $11 per box ($374). The other 389 were harvested by the Patrick Farm crew. After expenses Mr. Lee received $7 per box ($2630). Mr. Lee's wholesale gross was $3006. Elmore County's Foster Farms planted in late September and were only harvested by Patrick Farms crew in late December after 2 hard freezes had hit his fields. Patrick Farms crew could only harvest 103 boxes at Foster's Farm at $7 per box ($721).

Demetrius Hooks' farm had worm damage which, though he sprayed, he could not control. That made the bulk of his crop unmarketable to Patrick Farms. But he was able to sell to Hooks Produce for chopping. He harvested 2800 lbs at .33 cents a pound for a gross of $860.

Leo Farms, using Patrick Farms' crew, harvested 487 boxes at $7 for a gross of $3409.There had been three farms from the 2011 grant, Leo/Bell Farms, Al Hooks, and Joe Summerlin that were to participate in the grant with their own funds. Mr. Summerlin had to leave the program due to a crop failure, but Leo/Bell continued as did Al Hooks. The Leo/Bell partnership planted 5 acres on dirt with drip tape for sale to Hooks Produce. The Patrick Farms crew harvested 2200 boxes at $7 dollars a box ($15,400). The crew harvested and boxed the collards in the field and put crushed ice in each box with ice brought from Patrick Farm in Georgia. The boxes were loaded directly to 3 refrigerated trucks which held 900 boxes per trailer. Mr. Hooks harvested his entire crop for his collard green chopping operation which delivers to restaurants in Tuskegee, Montgomery and Birmingham. He totaled approximately 3000 lbs of greens at .33 cents a pound is $990 grossed. The total gross for all seven grant farms is $14,206. The total with last years participating farmer's $16,390 makes $30,596 for the year.

2012 Farm Participates

Handey Farms…..8000 lbs…...$2640 sold to Howell (.33 per pound)
Oakview Farms….6000 lbs…... 1980 sold to Howell (.33 per pound)
Blake farm……..4000 lbs…... 1320 sold to Howell (.33 per pound)
$ 600 sold direct sales

W.Lee Farm…….12,690 lbs……$2961. sold to Hooks/Patrick ($7 per box)
1020 lbs…….374. sold to Hooks/ Patrick ($11 per box)
Foster Farms…….3090 lbs…….. 721. sold to Hooks/Patrick ($7 per box)
Leo Farms…….14,610 lbs…….3409 sold to Hooks/Patrick ($7 per box)
Dem. Hooks…….2800……...860 sold to Al Hooks (.33 per pound)

2012 totals 50,210 lbs $14,265 $300 direct sales

2011 Farm Participates in 2012

Leo/Bell Farms….66,000 lbs …….$15,400 sold to Hooks/Patrick ($7 per box)
Al Hooks……3000 lbs……990 sold to Al Hooks (.33 per pound)
J. Summerlin……withdrew……0……

2011 Totals……69,000lbs…….$16,390

All Totals…….119,210 lbs….. $30,655……..…$300 direct sales

2012 Farmers Inputs
Collard plants: $300 ……10,000 plants
planting labor: 242 ……. .36 hrs @$7
Fertilizer: 240 …….. dry and water soluble
Electric pump 210 …….. Power bill $75 month
land 40 …….. Rent
herb/pesticide 50 ……...as needed
general labor 80 ……laying plastic/misc.
Tractor 320 …….. 8 hours @ 40 per
Owner 2400…….2 hrs a day for 80 days @ $15 per hr.

$3882.oo Total output for 2012 farmers

Goals and Outcomes

The goal of this grant was to put seven farmers in plasticulture to grow collard greens for two local processors. The project looked to incorporate 3 farmers from the previous 2011 grant in production. The project looked to produce over 90,000 pounds for processing and gross $30,000. The project also looked to encourage the past and present farmers of the grant to form a co-op to continue growth in growing and marketing produce. Seven local farmers were put in plasticulture, two with white plastic for early plantings, and the other five in black. Three farmers from the previous grant initially participated with one withdrawing. All farmers combined produced 120,000 pounds for wholesale and generated over $30,000 dollars.

Because of plasticulture making a cleaner environment for the crop to grow, no project farm used fungicide on the collards. Only two farms used herbicide and that was in the middles between the plastic rows. No herbicide was used under the plastic rows. Farmers also reported less use of pesticides to control the worms that can cause damage making a crop un-marketable. The Blake and Foster farms did not use pesticide at all. One farm, Hooks, however had extensive worm damage that could not be controlled with pesticides. This farm had been farming collards for years and it was determined that bad agricultural practice in the past had created such a heavy infiltration of moths and worms that they were uncontrollable under any growing conditions.

Meetings were held every second Thursday of each month in Tuskegee in conjunction with the Macon County Farmers Organization where the coordinator and grant farmers met to discuss the project and look for opportunities to organize a collective effort as a cooperative. The three farmers that sold to Patrick/Hooks: Leo Farms, Foster, Lee Farm, all participated with Tuskegee as members of the Selma cooperative, but never joined as active members. The remaining grantees that sold to Howell: Oakview, Handey, and Blake did not see enough income in the future of as a cooperative. Demetrius Hooks will continue to grow and sell to Al Hooks and saw no need to join or participate in a co-op.

Beneficiaries

Beneficiaries include the farmers, in the grant who received instruction on plasticulture and its method of farming through water conservation, limited fertilizer and pesticide usage. The farmers also learned wholesale methods and requirements that will help in their decision making for the future path of their farms. Along with the grant farmers who received instruction, the local economy all so benefited from the grant project.

The added value of the chopped greens by Hooks Produce generated $4200 verses the $924 for the .33 cents per pound raw product. Hooks' numbers were 2800 lbs sold @$1.50 per pound. Howell Produce was 16,000 lbs of chopped greens or 8000 two pound bags sold @ $2.50 per bag. This equals $20,000 verses the $5280 of raw greens at .33 cents per pound.
Though the Tuskegee project did not process the greens as added value, the $24,000 Patrick Farms paid the grant's farmers was a market not available in previous years. The success Leo/Bell Farms and Leo Farms had with Patrick Farms could set a stage for a contract with Patrick Farms in the future.

Lessons Learned

On the surface the promise of selling unlimited produce products to Wal-Mart seemed like a bonanza for our farmers. In reality trying to organize 15 to 20 limited resource farmers to grow in the quantity, quality, and meet the rigors of being GHP/GAP certified proved to be an unreasonable task. For sure, the Tuskegee/Wal-Mart project lacked quantity of collards, and in some cases quality, but the requirements and expense of GHP/GAP standards made the task

undoable. GHP/GAP certification in Alabama cost $1500 per farm and in some cases per-crop. Also, certification may take months to acquire. That $1500 expense coupled with the expense of buying what is needed to meet the certification (i.e., hot water, potable water, toilets, etc) made the Tuskegee/Wal-Mart Initiative cost prohibitive. Any farm or grant project which deals in wholesale fruit and vegetables and plans to sell to an entity that requires GYP/GAP certification must match those expenses to expected income.

Demetrius Hooks and the three grant farmers that looked to sell to Wal-Mart through Tuskegee Extension and Al Hooks, were also anticipating joining the Selma Co-Op. Under the direction of Tuskegee University and with grant monies from USDA, the Selma Co-Op was to construct a vegetable repacking shed to handle collards and other produce to sell to Wal-Mart and other markets. With the drawbacks of the Tuskegee/Wal-Mart Initiative and with the re-packing shed's construction being put on hold, those three farmers never joined the Selma group. All four of the farmers continue to track the Tuskegee program as Extension tries to contact markets more suitable for the Selma Co-Ops production quantities and capabilities. Al Hooks did join the Selma Co-Op.

The three farmers who sold to Howell Produce did not see a financial need to create a co-op to sell to Howell. Nor did the farmers see a need to form a co-op to market their other crops to Montgomery or Birmingham produce brokers. These farmers saw Howell as a way to move extra product, but not as the basis of a co-op. Farm co-ops are established out of a need of mutual survival or that a co-op presents a situation toward more individual income for its members. None of the grant's farmers were in a survival situation and all had direct markets or small wholesale outlets for their products. The failed aspect of the grant was by not providing a situation where the farmer's pooled resources could generate more individual income. In this case Wal-Mart represented too much volume and expenses for a co-op effort to succeed. Whereas Howell Produce and Hooks Produce do not generate enough volume of product needed to make a four to seven farm co-op profitable to each individual farm. The GHP/GAP regulations required by large buyers, and in time smaller wholesale buyers of fruit and vegetables, will eventually drive the small farmer out of the wholesale markets. These farmers will be left with niche markets of direct farm sales, farm markets, Community Supported Agriculture and other marketing plans that require only small quantities or do not need regulation expenses. The majority of Alabama's fruit and vegetable farmers are small, but they are quickly coming to a cross road of staying small or make massive upgrades to meet the wholesale market demands if they want to expand.

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Project 9

Project Title: Watermelon Promotional Campaign, Alabama Watermelon Association

Project Summary
The purpose of the Watermelon Promotional Campaign is to inform consumers of the health benefits of eating watermelon and highlight the economic benefits of supporting local farm agriculture.

Objective 1-Provide information on the best methods to employ when purchasing a watermelon. In the past five years, there has been an increase in awareness of fruit and vegetable contamination. It is necessary to make consumers aware of food safety practices for watermelon. This is a necessary activity to maintain consumer confidence in the healthy and safe profile that watermelons have. If consumer confidence declines, it will have devastating effects on the industry.

Objective 2-Provide information on the continued health benefits of including watermelons in their diet. Alabama is facing an obesity epidemic. A person who is overweight is considered to have a Body Mass Index (BMI) of 25 or greater and an obese person has a BMI of 30 or greater. According to the CDC, 69% of adults in Alabama were overweight and 32.2% were obese. Furthermore, 15.2% of children 2-5years were overweight and 14.1% were obese. (Source: http://www.cdc.gov/obesity/stateprograms/fundedstates/pdf/Alabama-State-Profile.pdf)

This project was awarded for the period of October 2010-September 2011; however, an extension was granted to extend the project until August 2012. The project was completed successfully on time and accomplished the desired goals with positive results.

Project Approach
The promotional campaign has been lead by the appearances and promotions performed by the Alabama Watermelon Queen. The Alabama Watermelon Queen is an ambassador and public relations representative for the Alabama Watermelon Association. Her mission is to inform the general public on the health benefits of eating watermelon, educate consumers on food safety when handling and eating watermelon, increase consumption of watermelon, and highlight the economic benefits of supporting local farm agriculture.

From 2009 to 2011 the Alabama watermelon crop has averaged nine million pounds annually in turn contributing roughly $1,275,000 annually to the local economy. (Source: AMS Market News Portal Shipping Point and Movement Databases). Public awareness of the statewide economic benefits of the production and consumption of watermelons in Alabama is crucial to the success of local family farms.

Goals and Outcomes Achieved
Goal 1- Inform public of the health benefits of eating watermelon.

According to the CDC, one in five children and 30% of adults are considered obese in Alabama. We found consumers did not realize the health benefits of watermelon. Watermelon contains vitamins A, B6, and C. Watermelon is the lycopene leader among fresh produce. Watermelon is a great hydrator since it is 92% water.

Throughout the marketing plan we had the opportunity to interact with consumers of various ages, ethnicities, and education levels. Our overall experience with consumers allowed us to make the conclusion that the population of Alabama was not aware of the health benefits of watermelon. Through verbal communication, we learned many people believe watermelon is just sugar water. The most common comment we received was that a person could not try a sample of watermelon or purchase it due to their restrictive diabetes diet. However, the American Diabetes Association states that watermelon is an acceptable food when eaten in moderation. The second most common comment was women stating they were watching their diet. However, watermelon is fat free and cholesterol free. Furthermore, when discussing the nutritional benefits watermelon has to offer about 80% of the consumers were surprised to hear about all the vitamins found in watermelon. Watermelon is rich in vitamin A, B6, and C, magnesium and potassium, as well as lycopene. In fact, it delivers more nutrients per calorie than most other fruits.

Goal 2- Provide information to consumers on the best methods when purchasing a watermelon.

This marketing campaign has taught consumers how to choose a watermelon and how to prevent food borne illnesses when handling watermelon. We promote the practice of washing all fruits and vegetables and using sanitary cutting boards and knives. Furthermore, we were able to teach consumers how to slice watermelon in triangles and cubes. We found many people chose to purchase watermelon once they learned how easy it was to cut, use, and handle.

Based on verbal communication with consumers during promotions we learned that it watermelon is seen as an inconvenience fruit due to its size. For example, someone who chooses a basket to carry during a grocery store visit would probably not choose to purchase a watermelon; however, they might purchase the precut watermelon if available. Once a watermelon is taken home, consumers have mentioned the issue on how to cut and store it. Once we mentioned that slices can be stores in gallon zip lock bags and cubs can be stored in containers; consumers were more willing to purchase the product. The recipe cards are very useful when marketing watermelon. The provide detail on many different ways to use watermelon. We estimate, based on experience, about 1 in 3 people who would not have purchased watermelon due to the inconvenience did purchase watermelon once explained how to cut, handle, use, and store the product.

Goal3- Develop publications to be distributed to local and regional markets to inform consumers of health benefits and economic value of watermelon.

We developed publications and revised our website to inform the public of our goals of marketing watermelon. The Alabama Watermelon Association is a non-profit organization that works to promote the state's watermelon industry. The AWA represents every industry member, from production to consumption.

The Alabama Watermelon Association created brochures to distribute at all promotions that include information about the Alabama Watermelon Queen and the goals of promoting the watermelon industry in Alabama. We had approximately 2,000 brochures printed and have given out approximately 1,600. Furthermore, the National Watermelon Promotion Board provided us with free materials including coloring books, stickers, recipe cards, and much more. These items totaled together were approximately 5,000 pieces of material. These we all used by August of 2012.

Goal 4- Inform consumers of the economic value the watermelon industry has on Alabama, and increase revenues and sales of watermelon in Alabama.

We know that watermelon is sold in grocery stores all over Alabama, but what we did not realize was how much watermelon is sold in farmer's markets. There are over 40 farmer's markets in Alabama. When the Alabama Watermelon Queen was present at the farmer's markets most farmers sold out of their product. The increase of sales in the store is somewhat hard to track, as we promote selling watermelon as a whole, as well as, push the fresh cut product.

From 2009 to 2011 the Alabama watermelon crop has averaged nine million pounds annually in turn contributing roughly $1,275,000 annually to the local economy. (Source: AMS Market News Portal Shipping Point and Movement Databases). Public awareness of the statewide economic benefits of the production and consumption of watermelons in Alabama is crucial to the success of local family farms.

Goals	Accomplishments
10 In-store retail promotions	Publix-Hoover, AL Publix-Vestavia Hills, AL Greer's Grocery Store-Robertsdale, AL Greer's Grocery Store-Fairhope, AL Greer's Grocery Store-Mobile, AL Greer's Grocery Store-Grand Bay, AL Commissary at Maxwell Air Force Base-Montgomery, AL *Results-During the in-store promotions between 250-500 samples were handed out at each store. Approximately, 2/3 of those that sampled watermelon, purchased watermelon. These consumers were given recipe cards, coloring books, and tips on selecting and handling a watermelon. Estimate of audience reached:3,000.*
5 School Appearances	Webb Elementary (1st grade)-Webb, AL Bethlehem Preschool (whole school)-Headland, AL Midland City Elementary (2nd grade)-Midland City, AL Holly Hill Elementary (2nd grade)-Enterprise, AL Presentation at Alabama Ag in the Classroom (90+ teachers) *Results-During the school appearances presentations were made to elementary students ranging from preschool to third*

	grade. Estimated to reach over 2,500 students and 100 teachers. The Ag in the Classroom presentation reached over 90 teachers with at least 20 students in their classroom totaling an audience of 1,800.
3 Welcome Center Promotions	Lanett Welcome Center-Valley, AL Houston County Welcome Center Sumter County Welcome Center Baldwin County Welcome Center Limestone County Welcome Center *Results-These promotions were not as consistent with reaching our target audience. Some promotions reached only 25 people within a two hour time period and others reached max of 125 people. Estimate of audience reached: 500.*
12 Promotions with Local Farmers (Watermelon Festivals, conventions, and farm visits).	South Carolina Watermelon Convention-2011 Florida Watermelon Convention-2011 &2012 Illiana Watermelon Convention-2011 Grand Bay Watermelon Festival-2011 Kelley Agriculture-Headland, AL Popular Head Farmers Market-Dothan, AL (2 visits) Enterprise Farmers Market-Enterprise, AL Lamond Wells & Cecil Robinson-Wells Produce-Gordon, AL Ronald Sawyers-Sawyers Produce-Slocomb, AL Dennis Mills, Mills Produce-Slocomb, AL David Bell-Bell Farms-Dothan, AL *Results-These promotions are key in generating contacts for those who grow and ship watermelon into Alabama. The farmer's markets visits were more successful in reaching the target audience, each promotion lasted 4 hours with a steady flow of consumers ready to try and buy watermelons. Estimate audience reached 2,500.*
Restructure Website	Revision and updates to website completed throughout the term of the program.

The target for this promotional campaign is to reach 25,000 consumers. This goal was reached by performing in-store promotions, school appearances, and welcome center promotions, visiting with local farmers, watermelon festivals appearances, and attending watermelon association conventions. Having a presence at the farmer's markets proved to be very successful, we were able to catch the attention of local media to do two interviews on site. These interviews captured a larger audience than ever anticipated. We estimate that this marketing campaign directly reached 8,500 consumers and indirectly reached over 20,000 consumers from word of mouth and media interviews and articles.

Expected Measurable Outcomes

- Increase of sales during the in store promotions.
  Progress: The increase of sales during a promotion depends on many different variables and actual amounts and percentages are typically proprietary information. These variables depend on time and day of promotions, preparation from the store on having

samples and ample supply of watermelon, even how well the event is advertised makes a difference.
For example: Scott Davis, Produce Specialist with Military Produce Group, states, "When we have a Queen Appearance at a commissary, I make it a big event. The sales are three fold; where sales would typically be one bin for that day I am prepared with three bins and we usually go through all three bins."

From our experience at farmers' markets the Alabama Watermelon Queen promotion, which includes providing samples, boosted sales. The University of Kentucky performed a survey on sales increase from samples and found, "55 percent of respondents to the survey bought what they sampled even though they hadn't originally planned to do so". (Source: http://www.thegrower.com/e-newsletters/fresh-from-the-field/Study-Sampling-at-farmers-markets-boosts-sales-185893932.html)

- Increase of new stores promoting Alabama-grown watermelon during the growing season and surveying retail outlets to determine how much if any increase in sales occurred during the season.
  Progress: These two outcomes are best measured by tracking market advertising which gives us data of ads from retail outlets. Ads at Bruno's were up 16% in 2012 compared to the average of the preceding two years. Winn Dixie was even higher with 28% more ads. Pricing at each store is split as Bruno's priced their whole watermelon at 10% less than the average and per pound pricing was also 8% below the average. Winn-Dixie, meanwhile, was priced around 14% higher on "by the each" and 8% higher on the per pound priced watermelon.
  Analysis: We see a smaller than usual crop with higher than normal pricing, but it looks like retail didn't take the higher Freight on Board pricing as a sign to cut back on ads as each chain had more ads than normal. Retail pricing was split based on the chain with Brunos "on ad" pricing being lower across the board while Winn-Dixie showed the opposite.
  Source for data: Market Track, LLC

- We will also be able to verify the increase for demand by comparing watermelon shipments from previous seasons to the upcoming season.
  Progress: See table below.

	2009	**2010**	**2011**	**2012**	**2009 - 11 Avg.**
Movement	10,850,000	9,040,000	7,270,000	5,240,000	9,053,333
Revenue	$ 1,665,428	$ 968,894	$ 1,190,791	$ 837,619	$ 1,275,038
Freight on Board	$ 0.153	$ 0.107	$ 0.164	$ 0.160	$ 0.141

Freight On Board is the price that the shipper receives.

Analysis: Movement was down 42% from 2012 compared to the average of 2009 - 11. Unsurprisingly, this pushed Freight on Board pricing up to around 14% above the norm which helped leave our revenue estimate at only 34% below the prior three-year average. Source: http://marketnews.usda.gov/portal

- We will be able to monitor website activity through the number of hits that it receives.
  Progress: This has been somewhat of a challenge as consumers are turning to social media outlets for their information. We have created a FaceBook Page to update people who "like" the page on activities of the Alabama Watermelon Queen, recipes, and the health benefits of watermelon. The host for our webpage, Wix.com is a free webpage host and does not offer a counter of webpage hits.

Beneficiaries
According to the 2002 USDA statistics, Alabama farmers harvested 3,051 acres of watermelon from 732 farms. However, by 2010 only about 2,800 acres were harvested. This marketing campaign benefited watermelon farmers and supporting industries by increasing demand for watermelon in turn generating increased sales for the farming industry of Alabama.
(Source: http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1399)

Lessons Learned
The presence of the Alabama Watermelon Queen gains the attention of consumers of all ages. This lesson proved that having the Alabama Watermelon Queen represent the industry is a key component in the success of this marketing campaign.

We were able to exceed the goal of visiting three Alabama Welcome Centers. Promotions were held at five of the eight Alabama welcome centers. During the promotions we discovered that the flow of travelers was inconsistent and unpredictable. We learned that our time and this portion of the budget could be more beneficial in other areas of the project.

The result and feedback from teachers was very positive. The children were receptive of learning about nutrition. The local farmers were excited to see they had an ambassador for their product.

The impact of this marketing campaign could have been better documented. We learned that we could use pre and post surveys with teachers and those who help set up the grocery store promotions. These surveys could help us better measure our effectiveness and learn how we can improve upon our communication techniques. We could have set more definite goals for measuring the effectiveness of the promotional campaign. We learned that creating a promotion report would have been very beneficial if completed after each promotion. This would provide us written documentation on the promotion and would allow us to report verbal feedback while it was current in our memory. Overall, we have learned it is important to document everything, have customers write down their feedback, collect as much data as possible, and keep accurate and detailed records.

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Additional Information

The Alabama Watermelon Queen tour can be seen in the Vineline Magazine. This will include grant funded and association sponsored appearances and activities. Please take a look at previous issues online at http://www.nationalwatermelonassociation.com/vineline.php.

The Alabama Watermelon Queen, Amber Nolin, demonstrated how to use watermelon in the classroom to over 90 teachers during the 2012 Ag in the Classroom conference. This appearance gained attention in the ALFA publication Neighbors. This publication reaches more than 400,000 people who are members of ALFA and can be seen at http://www.alfafarmers.org/neighbors/index.phtml?id=142.

The following link is to a national publication which explains the importance of a watermelon queen. http://www.theproducenews.com/index.php/what-s-new/7966-watermelon-queen-program-creating-industry-ambassadors.

Photos

Project 10

Project: The Chilton Food Innovation Center

PROJECT SUMMARY

The Mission of the Chilton Food Innovation Center (CFIC) is to provide a federally and locally approved facility and certified personnel for the development and production of value-added products.

During idea conception, a survey was taken among specialty crop producers in Central Alabama. About 30% responded positively to the use of a facility that would enable them to utilize the portions of their crops that were not suitable for fresh market or during high yield seasons when the market was saturated. It was estimated during an average season that about a third of their peach crop, for example, was lost each year to edible, but over-ripe, under-sized or otherwise imperfect fruit.

This project is well situated in time and location. Chilton County is in the center of the state, between Birmingham and Montgomery with the Interstate running through it making it an ideal location for distribution. Alabama Cooperative Extension reports that Chilton County is ranked first in the state in fruit farming making it an ideal location to provide a processing facility to specialty crop producers.

With the economic downturn, people are looking for jobs and entrepreneurship is on the rise. At the same time, a new word has been coined, "locavorism," meaning eating locally.

> "Eating locally grown foods has long been a lifestyle for many Alabamians, dating back to the state's agrarian roots. But for others, it's become the chic thing to do in recent years, a trend spurred on by a desire to eat healthy and know exactly where their food comes from."
> http://www.al.com/living/index.ssf/2012/10/post_42.html

These two events happening simultaneously created demand for Chilton Food Innovation Center and its products.

This project is a continuation of work previously done with the assistance of the Specialty Crop Block Grant Program. During the prior grant periods, CFIC went from concept to realization. The Start-up funds were used to provide the necessary research as mentioned earlier as to the interest in such a facility. A Board of Directors was gathered and established. A building was acquired and equipment was donated. The project is a continuation of the start-up process. During this grant period, CFIC was able to begin processing.

PROJECT APPROACH

This grant allowed for the purchase of shelving and a refrigerator/freezer. Labels to be added to our client's products that include the CFIC logo were purchased from a local printer. Some of the donated equipment was repaired and refurbished for use in CFIC.

Much plumbing was done, including the installation of an 85 gallon commercial hot water heater and the restoration and installing of a steamer, and oven, two three-compartment sinks and three steam jacketed kettles. Drains and water lines were inspected and repaired as required. An eye wash station, a hot water booster and a steam generator were also added. Other supplies include used mixers and work tables. Jim Pitts with the Chilton County Agricultural Research Station provided time refurbishing, cleaning and transporting equipment.

First Aid and cleaning supplies were purchased. Alabama Cooperative Extension System (ACES) recruited volunteers from the Master Gardeners program to help with cleaning, installation of a splashguard near hand wash sinks, shelving, a commercial can opener, the first aid kit and a mop hanger. The Chilton County Board of Education continues to provide the building. The Center Director, and Extension County Coordinator attended the "Growing the Appalachian Food Economy" in Asheville, NC. There they were able to learn from a community that is very strong in supporting local food systems as well as tour a shared food processing facility and incubator. The funds awarded for Promotional Activity were spent in attending the Alabama Fruit and Vegetable Growers Association Conference where Mrs. Mendoza was able to make several contacts with potential clients or suppliers.

Shelving and tables were purchased from government surplus, thus saving supplies funding. Some lab equipment that we had anticipated buying with this grant was purchased with other ACES funds. An extension was given to allow CFIC to use the remaining funds allotted for the purchase of supplies. CFIC and our clients are grateful for that extension because it gave us the time to see what other type of supplies would be needed. A commercial food chopper was purchased which will reduce produce preparation time drastically for certain product types.

CFIC alliances include the ongoing collaboration with Alabama Cooperative Extension System with Administrative support, an office and office supplies for the Director. Most of her salary is also paid by state and county ACES funds. ACES also supported us by means of providing us, free of charge, a Marketing Packet: full color brochures, an article to share with media and a large display to use at presentations. Mrs. Mendoza also continues to work with ACES in the teaching of the Better Process Control School, which is a required course of every manufacturer of food products such as produced at CFIC. Through this effort, she is able to assist ACES in their work of educating Alabama in Food Safety as well as make contacts for the Center. Plans are underway to also assist Auburn University's new Food Systems Initiative, which will provide the much needed aspects of a food business incubator, complimenting the efforts of CFIC.

CFIC has implemented a protocol to ensure these funds will be used to solely enhance the competitiveness of specialty crops. The Board of Directors must review and approve all

applicants before they are permitted to use the facility. A general listing of ingredients and equipment is required on the application. All clients will meet specialty crop requirements or will not be allowed to produce their product using the equipment supported by these funds. We currently have four clients and their products meet the specialty crop criteria.

Clients who do not meet these requirements will not be allowed to use all of the equipment. Equipment only available to specialty crop clients will be labeled as such if/when clients who do not meet the requirements are approved to use the facility.

GOALS AND OUTCOMES

The first goal achieved was our inspection when we received the "OK to Operate" Permit from the Health Department. We were inspected, approved and ran two test batches: peach jam and salsa. Shortly after, we had our first client. Their products are blueberry dessert topping and blueberry chipotle sauce with plans to expand to include other blueberry products such as Bar-B-Que sauce and jelly. The processing operations were as effective and efficient as we expected. CFIC had two clients within ten weeks of opening.

Christy Mendoza, CFIC Director, worked with both clients to help them get all tasks accomplished before processing. They also expressed the need for marketing assistance. Mrs. Mendoza arranged a marketing seminar through the Alabama Small Business Development Center Network. The program was free to CFIC and the 8 attendees. ACES supplied the meeting room. Mrs. Mendoza continues to evaluate the needs of CFIC and its clients and is working toward meeting them.

At the time of this report, CFIC has four manufacturing clients. This is half of our target of eight within the first two years of operation. We have learned that the clientele we attract will not need to utilize the facility as often as originally anticipated. We will need more clients to be self-sufficient. Our goal was to be self-sufficient within three years. This will not be attainable in that time frame. The Performance Measure used for this project is the number of repeat clients. Only two of our four manufacturing clients return on a regular basis. Another revenue generator is the offering of food science consulting. Mrs. Mendoza invoiced six clients for consulting service and provided general guidance in getting started in a food business to approximately 50 others.

The second milestone of this grant period was our Open House. There were about 95 people in attendance. We were featured in several publications and websites including: Alabama Cooperative Extension System website, Auburn University's website, Auburn University's AG Illustrated, The Clanton Advertiser, and Peach Living Magazine. The Alabama Cooperative Extension System provided the postage needed for this and other marketing efforts as well as for correspondence to clients and potential clients.

BENEFICIARIES

The beneficiaries include the four CFIC clients, their employees, their suppliers and Chilton County. The new businesses are still in start-up phase so have little or no profit to report as of yet. The following information is from two of CFIC clients that provided feedback for 2013:

Part-time jobs created: 11
Cases of product sold: 66
Income estimation: $3830
Expenses estimation: $11,240

LESSONS LEARNED

As mentioned earlier, we learned that our original goal of self-sufficiency was a lofty notion for a three year term. We learned that the percentage of actual clients from the pool of interested parties in very low, about 8%. There is a steep learning curve for people who want to start a food business and a gap in the education of how to achieve a successful start-up. We will need to provide more training, allow more time for one-on-one coaching with interested customers. There is an opportunity for a partnership with a business incubator or start-up mentoring and for a co-packer. Above all, there is a need to automation, which was determined early in this project. CFIC has already been awarded another grant from the Specialty Crop Block Grant Program for the first phase of automation. This has sparked more interest from serious potential processors.

Future Project Plans

As mentioned above, the clients and potential clients are very interested in automation. The Specialty Crops Grant of 2011 has been awarded to us for the beginning phase of automation in order to increase the speed of processing the products made with specialty crops. A more formal Marketing Plan is also needed. That will be our main concentration early in 2014; to design and implement a marketing plan that will increase the visibility of CFIC and what we offer. It is expected to increase the client growth and in turn, enhancing the competitiveness of specialty crops.

Additional funding was sought and awarded that would provide similar equipment for the use of clients that do not meet the requirement of this grant. Equipment locks have been purchased to prevent the use of the SCBP funded equipment for these clients. There are still no clients that do not meet the requirements set forth in this program.

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