

Virginia Department of Agriculture and Consumer Services  
FY 2006 AMS / USDA  
Specialty Crop Block Grant Program  
Final Report  
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**Diagnostic Honey Bee Services**  
**Project #1 Final Report**  
**Keith Tignor**

**I. An outline of the issue, problem, interest, or need for the project**

- This project was undertaken to provide equipment for diagnostic services used in the identification of Africanized honey bees and other pests and diseases in beehives.
- Honey bees are a vital part of Virginia agriculture. Many crops require insect pollination to maximize production and improve quality. The resulting enhanced harvest increases farm revenues. The honey bee is an ideal pollinator with each beehive containing thousands of individuals working together to gather nectar and pollinate plants. Hives are easily moved at appropriate times to the site of crops in bloom.
- The introduction of new exotic diseases and pest species of the honey bee has resulted in the loss of many beehives. The number of hives in Virginia available for pollination and honey production has decreased by nearly 68,000 over the past 25 years. The introduction of the Africanized honey bee is expected to further jeopardize availability of honey bees for crop pollination and honey production. To reverse this trend in hive losses, early detection is essential in containing and eradicating honey bee pests and diseases.
- This diagnostic equipment will provide apiary inspectors and beekeepers with the necessary tools for early detection and eradication of harmful pests and pathogens and to improve diagnostic services to beekeepers for detecting Africanized honey bees (AHB) and other pests and diseases that adversely affect the honey bee.

**II. How the issue or problem was approached via the project**

- As part of this project diagnostic equipment was purchased for each of the offices of the Virginia Department of Agriculture Office of Plant Industry Services (OPIS). The purchased equipment includes compound and stereo microscopes and accessories for observing honey bee diseases and pests. A cooperative effort was undertaken with OPIS staff, Virginia Cooperative Extension, and local beekeeping organizations to enhance diagnosis and treatment of honey bee disorders that would adversely affect winter survival and annual production. In addition to training in field and laboratory diagnosis of honey bee diseases and pests demonstration apiaries were established at Research farms and Agriculture Research and Extension Centers (AREC) in the state. Training for OPIS staff was obtained from staff at the Bee Research Laboratory from the USDA Henry A. Wallace Beltsville Agricultural Research Center and the Florida Department of Agriculture and Consumer Services (FDACS). Diagnostic techniques and response protocols were then provided to beekeepers at workshops organized through local beekeeping groups.

**III. How the goals of the project were achieved**

- As part of this project diagnostic equipment was purchased for each of the offices of the Virginia Department of Agriculture Office of Plant Industry Services (OPIS). The

purchased equipment includes compound and stereo microscopes and accessories for observing honey bee diseases and pests.

- To facilitate beekeeper training a demonstration apiary was established at Randolph Farm in Ettrick, VA,. The Ettrick facility offers classroom resources and a demonstration area with 10 established honey bee hives. Classroom instruction and field demonstrations were provided to beekeepers during the summer and fall of 2010. The apiary is being used to evaluate and produce queens that demonstrate resistance to honey bee pests and diseases and seasonal sustainability. Similar apiaries were established in cooperation with VCE at the Hampton Roads and Winchester ARECs. In addition, honey bee hive management techniques and equipment is being developed and evaluated at the apiary.
- Molecular diagnosis of *Nosema* spp. in honey bee adult populations is available through coordinated efforts with Virginia Polytechnic Institute and State University.
- Training in honey bee pest and disease diagnosis was obtained for agriculture inspectors at these offices through the United States Department of Agriculture Bee Research Laboratory in Beltsville, MD. Staff from the USDA Bee Lab provided training in the Fast Africanized Bee Identification System (FABIS), microscopic identification of common honey bee bacteria and fungi, as well as field evaluation of honey bee health and productivity.
- VDACS offices, located throughout the Commonwealth of Virginia, are providing beekeepers access to diagnostic equipment and personnel for rapid diagnosis of threats to honey bee health and productivity. OPIS staff developed training programs to instruct beekeepers in identifying AHB and honey bee disease and pests. Additional programs for response to AHB incidents are being incorporated in beekeeper training sessions.
- VDACS staff obtained further training in FABIS from FDACS. FDACS is equipped with equipment to conduct Full Morphometric analysis of AHB suspect samples. This analytical technique provides a more accurate determination of the origin of honey bee samples. FDACS provided information of equipment required to conduct this analysis and instruction in sample preparation and analysis.
- VDACS staff also consulted with FDACS staff in beekeeper training and preparing for insect stinging incidents associated with AHB infestation. This information was incorporated into a training program developed by VDACS for beekeeper and emergency responders involved in stinging insects. A pilot training session was conducted in at the Tidewater AREC this past summer.
- Beekeeper training and honey bee disease identification workshops were conducted various locations in cooperation with the VCE. These one day workshops included macro- and microscopic diagnosis of honey bee diseases and pests. Participants included members of the Richmond Beekeepers Association, Tidewater Beekeepers Association, Colonial Beekeepers Association, Southeast Beekeepers Guild, New River Valley Beekeepers Association, Mountain Empire Beekeepers Association, Prince William Regional Beekeepers Association, and Beekeepers of Northern Virginia. Shortened training programs were provided to other beekeeping groups such as the Shenandoah Valley Beekeepers Association, Southside Beekeepers Association, and Gateway

Beekeepers Association. There were approximately 20 to 25 attendees at each meeting in the following locations:

Abingdon, VA (2)	Fishersville, VA (2)	Stafford, VA
Amelia, VA	Halifax, VA	Stanley, VA
Ashland, VA	Harrisonburg, VA	Staunton, VA
Blacksburg, VA	King George, VA	Suffolk, VA (4)
Boyce, VA	Lynchburg, VA (2)	Yorktown, VA
Chantilly, VA	Manassas, VA	Victoria, VA
Charlottesville, VA (2)	Martinsburg, VA	Virginia Beach (3)
Chesapeake, VA	Natural Bridge, VA	Williamsburg, VA
Emporia, VA (3)	Rice, VA	Winchester, VA
Ettrick, VA	Richmond, VA (3)	Yorktown, VA
Fairfax, VA (2)	Rixeyville, VA	
Farmville, VA	Saluda, VA	

(Number of meetings)

#### IV. Results, conclusions, and lessons learned

- Improved diagnostic capabilities are available for apiary inspectors and beekeepers in the Commonwealth of Virginia.
- The project expanded beyond the initial goal of obtaining laboratory equipment of diagnostic purposes. Identification of new honey bee disorders, such as Colony Collapse Disorder, during the course of the project resulted in increase demand for assistance and training from beekeepers. Successful incorporation of the expanded goals of the project was heavily dependent on cooperation with VCE, local beekeeper associations, federal researchers, and other state's agencies. Many of the project goals, beyond the purchase of laboratory equipment, were achieved through additional funding from the Virginia General Assembly and volunteer efforts by participants from local beekeeper associations.
- All work, including staff training and resource development has been completed.
- All funds have been expended.

#### V. How progress has been made to achieve long term outcome measures

- An annual survey of honey bee hive losses is ongoing to determine improvements in winter losses. Initial responses from beekeepers indicate that training and improved diagnostic capabilities has improved response time to treatment for honey bee diseases and pest, including *Nosema ceranae*, Varroa mites, Small hive beetles, and suspected AHB infestations.
- The introduction and spread of exotic honey bee diseases and impact of Colony Collapse

Disorder further hindered efforts to improve honey bee winter survival rates. While the average hive loss has decreased to below 25%, anticipated survival rates have not been obtained. However, efforts by OPIS staff, local and state beekeeper associations, and VCE have resulted in a marked increase in the number of beekeepers in the state. Continued efforts to improve early detection of honey bee diseases and pests, honey bee management techniques and beekeeper training are anticipated to further low winter losses and increase hive production levels.”

#### **VI. Addition information**

- Digital information on diagnosis of honey bee diseases and pest, protocol for response to AHB and other stinging insects, beekeeping best management practices were developed and distributed to local beekeeping associations and through the Virginia State Beekeepers’ Association.

#### **VII. Project contact person**

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**Retail Marketing of Beautiful Gardens Plants**  
**Project #2 Final Report**  
**Rick Baker**

### **I. Outline of Project**

Beautiful Gardens® is a plant introduction project of the Virginia Nursery and Landscape Association conceived in 2003, initiated in 2006, first retail sales of Plants of Distinction in 2009 and first new plant sales scheduled for 2012. The VNLA new plant committee decided that there was real opportunity to formulate a program that would find potential new plant introductions, evaluate them, select the best, propagate and finish them through Virginia producers and sell them commercially and at retail in Virginia and all other appropriate grow zones. Our basic goal is to expand the growing and sales potential for Virginia ornamental plant growers and to bring increased positive visibility to the Virginia ornamental plant growing industry.

This specific project was designed to originate promotional materials and an initial marketing plan for the Beautiful Gardens® 'brand'. The executive committee of Beautiful Gardens®, the marketing committee and professional graphic designers all had valuable input into creating materials, making contacts and devising a work plan that has made Beautiful Gardens® a known entity in Virginia plant sales.

### **II. How the Project Approached the Problem**

A committee with representatives from many areas of the Virginia horticulture industry was formed to create Beautiful Gardens®. The members include the Virginia Nursery and Landscape Association, Virginia Tech, the Institute for Applied Learning and Research, the Virginia Department of Agriculture and Consumer Services, Master Gardeners, the Norfolk Botanical Gardens, the Claytor Nature Center of Lynchburg College, J. Sargeant Reynolds Community College and private plant breeders. This committee has been meeting several times a year to discuss, approve and assist in the creation of a research, business, and marketing plan that is carried out by a program coordinator and chairman of the marketing committee.

Plant evaluation sites were selected, plants were chosen for review and Master Gardeners were trained to maintain and collect data from these sites.

A brand name, logo and promotional materials were needed as we prepared for our planned entry into the retail market through selected independent retail garden centers in Virginia. Our goal was to begin promotions and advertising in 2008 with our new materials and be ready for sales in 2009.

### **III. How Goals Were Achieved**

A name and logo design was selected by the committee. Preliminary market testing of the name and design were done with very positive response. We then applied for the TM trade mark designation and subsequently the ® registered designation. This was approved and allowed us to move forward with a number of written materials that included:

Banners, Posters, Brochures, Plant Tags, Plant Pot Stickers, Exhibits and Plant Signs.

Banners are 3'x5' vinyl that are used in garden centers and exhibits.

Posters identify the plants we feature for sale each year (Plants of Distinction) and used at garden centers and exhibits

Brochures explain the Beautiful Gardens® program with pictures and summary of each plant

featured that year.

Plant Tags are used to identify selected plants ready for retail sale.

Plant Pot Stickers utilize the Beautiful Gardens® logo to identify the plant as part of the program Exhibits/Displays designed for talks, trade shows and conferences

Plant Signs are used in garden centers to identify groups of Beautiful Gardens® plants on display for sale.

The logo and brochures were used / distributed where ever there was a real benefit to the program: through the Master Gardener network, garden writers, participating garden centers, Virginia State Fair, Virginia Garden Festival, Mid Atlantic Horticulture Short Course, Mid Atlantic Nursery Trade Show, Virginia Department of Agriculture and Consumer Services, Virginia arboretums and botanical gardens, garden clubs and TV presentations.

From 2006 to 2009 we expanded our promotional efforts each year to increase awareness of the Beautiful Gardens® program and to create excitement among potential buyers.

A Beautiful Gardens® web site was created for consumers and participating garden centers were asked to include us on their websites using the logo and promotional materials developed with this grant.

#### **IV. Results and Conclusions**

In 2009 we were well prepared for our retail debut of the Beautiful Gardens® ‘plants of distinction’ (a promotion of underutilized plants that we select each that precedes our first new plant introductions in 2012). Twenty independent retail garden centers in Virginia were selected for their locations around the state, potential for sales and interest in supporting the Beautiful Gardens® program. Posters, banners, brochures and plants signs were very well received. They were used at each garden center to make attractive displays featuring the Beautiful Gardens® plants. They continue to be updated each year.

Plant tags and pot stickers created some logistical problems in application and cost and will be used only on the new plant introductions in the future.

We have emphasized the ‘locally grown’ aspect of the Beautiful Gardens® plant introduction program to date. However, we will be promoting the program regionally (appropriate grow zones) as we introduce new plants.

#### **V. Progress in Achieving long Term Goals**

Plant introduction is a challenge of patience. From the breeding or chance finding of that potential new selection to its actual sale as a hardy, resistant, beautiful plant can take years. We have begun that process here in Virginia after careful construction of a plan of work and the generous support of industry professionals. At the beginning of 2011 we have: (4) well established evaluations sites in key climatic areas of Virginia; (25) participating garden centers; new plants set for introduction in 2012 – grown by Virginia producers; liner production workshops; breeder workshops; will begin generating income from the sale of tissue culture plant material and liners in 2011; continuing search and selection of new plants for evaluation and the ongoing quality promotions of the Beautiful Gardens® program that this grant has helped us to achieve.

#### **VI. Additional Information**

You can learn more about Beautiful Gardens® by going to our website at:

[www.beautifulgardens.org](http://www.beautifulgardens.org)

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**Marketing of Specialty Crops on the Web**  
**Project # 3 Final Report**  
**Paul Estabrook**

**I. An outline of the issue, problem, interest, or need for the project**

- The web site guide should be a useful tool to specialty crop farmers that wish to have their own web site. It will help the novice to understand the various inputs needed for a web site. Even if the site is built by a professional, the specialty crop producer will be better able to provide the input needed for the production of a good web site. Fifty disks that mimic the online web site are being provided to the Virginia Department of Agriculture and Consumer Services (VDACS) for their use and distribution.
  
- The Problem: Conventional crops, because of their volume and wide usage, have many established outlets. However, marketing a specialty crop is perhaps the most difficult hurdle for a small farmer/producer. It is difficult or not possible for the specialty crop producers to use the produce auctions or the services of a broker. Farmer's markets or community supported agriculture may not provide the proper outlet for many specialty crops.
  
- The specialty crop farmer has to find solutions to many different and unfamiliar non-farm associated hurdles. Perishable Commodities rules, FDA rules, marketing, credit card sales (merchant systems), cost effective packaging, and shipping methods are just some of the items that need to be addressed for each individual crop and farmer. However, with the advent of the internet, direct sales of specialty crops have shown to be a viable route to the successful marketing of the specialty crop.

**II. How the issue or problem was approached via the project**

- Research and locate economical or free sources of software suitable for small specialty crop growers to build their own web sites.
- Write a menu driven web site guide for the small specialty crop grower for development of their own web site.
- Post the web site guide on an internet site to test compatibility with many types of operating systems and internet capable computers.
- Review the guide with VDACS and incorporate their suggestions.
- Transfer the guide from the web site to CDs for distribution.
- Maintain the web site and help email until June 1, 2009.

Note:

While the grant recipient was aware of a sizable volume of free or low cost software for this purpose, the volume of the free or nominal cost for software for web site creation was found to be extremely large. The reviewing/sorting out of easy to learn and use software became the most time consuming portion of the project.

**III. How the goals of the project were achieved**

- Each step in the development of the guide was taken as a separate project. With the objectives maintained, the online research time was shortened considerably.

#### **IV. Results, conclusions, and lessons learned**

- The expensive software advertised by the major software companies is aimed at commercial web site development operations and assumes that the web site developer knows about the limitations of graphics, photos, etc. This seems to be even truer with each new release of professional software.
- There is a huge wealth of information and free or low cost effective software available to the public. The sorting out of the usable “free or shareware software” is the major impediment for any novice web site builder to develop a web site economically.
- Specialty crop farmers should find this guide a good usable resource to build their own web site and get on line with a minimum of time and cost.
- Comment on the level of grant funds expended: The budget is under the estimated grant funds due to the online search for free or low cost software. It was not necessary to write new software for web site programs as our research located many good free sources of web site software.

#### **V. How progress has been made to achieve long term outcome measures**

- Progress made to achieve long term outcome measures: The guide CD disks have been tested by several outside sources for ease of use. Fifty of the CDs were supplied to VDACS in May of 2009. The web site has had a counter installed to measure hits on the web site for the construction guide – as of 1/1/2010 there were 209 hits. At the current time, the number of new Virginia websites is undetermined. Websites developed with or inspired by this guide CD will be tracked/monitored by VDACS Regional Market Development Managers and Direct Marketing Specialists who work directly with producers throughout the state.
- A help desk function is included on the web site with an email address for assistance.

#### **VI. Additional information**

- Web site for this project is [www.viriniagrown.net](http://www.viriniagrown.net)

#### **VII. Project contact person**

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**Pittsylvania Pumpkins: Demonstration Plot**  
**Project # 4 Final Report**  
**Pattie Owen**

**I. An outline of the issue, problem, interest, or need for the project**

- Our main goal in participating in this program was to grow test plots of various types of pumpkins and share the results with interested area farmers looking for alternative crops to grow. Pittsylvania County hosts 1,188 farms covering 125,094 acres. In 2007, there was only one known producer of large numbers of pumpkins for wholesale buyers in Pittsylvania County. This grant was used to gather information to share with other local farmers that may be interested in shipping pumpkins to local merchants or chain stores in the surrounding area. The problem facing the farmers in this area was the fact that pumpkins are 90 percent water and need lots of moisture in order to grow adequate products. The moisture would in turn encourage diseases that attack pumpkins and would require constant herbicides and fungicides to be administered in order to produce acceptable product. The problem with this is that the treatments are costly and the farmer would need guaranteed sales in order to break even or make a small marginal profit at first. There were no delays for this project. The only real problem that we faced was because the moisture and heavy rains during the day mixed with the hot humid days and night encouraged fungus growth and pest attacks. Another issued that had to be addressed was the mixture of types and sizes of pumpkins did not give us a large marketable product from any one type of pumpkin. Because we were testing different types of pumpkins, we did not have a great number of any one pumpkin.

**II. How the issue or problem was approached via the project**

- Owen Farm approached the problems by gathering information from Allen Straw, Area Specialist in Horticulture, Small Fruit, and Specialty Crops; Dr. Andy Overby, District Program Leader Southwest District VCE (Virginia Cooperative Extension); and James Light and Bobby White, both farmers that have produced marketable pumpkins for 10 years or more in Southwest Virginia. All information was gathered and help was enlisted from the local extension agent, Jami Stowe, and a local fertilizer distribution company, Royster-Clark. Everyone worked together to find the best method of planting, watering and controlling healthy growth in the different variety of pumpkins. In order for the pumpkins to become ripe at the appropriate time, the seeds were planted from the end of June through the first of July. This is primarily a dry time for this area but we were unexpectedly blessed with sufficient amounts of rainfall. In our favor, we only had to water the pumpkin fields once during August. The problems with fungus, mold and pests were approached by administering Bravo-Nova, Liquid Seven Dust, Command, Platinum and Kocide-Copper by-weekly to prevent and discourage growth and to control pests. These products were purchased with money from the grant. We did have one unusual development—several of the pumpkins cross pollinated to produce multi-colored pumpkins. This gave us great results that seemed to be very marketable.

**III. How the goals of each project were achieved**

- Proper land preparation, correct volume and region friendly seeds, and proper spacing plus proper treatments with proven methods of herbicides, fungicides and insecticides insured successful results. Communication with experienced personnel helped to provide us with all the information needed to insure the results we were able to achieve.

#### **IV. Results, conclusions, and lessons learned**

- A meeting was held on October, 14, 2008. Thirty-five local farmers attended and were given the results of the pumpkin plots. Allen Straw spoke on the viability of raising marketable pumpkins in Pittsylvania County. Jami Stowe, Freddy Wagner and Steven Barts, all part of our local extension agency, were in attendance. Owen Farm hosted the meeting, Jami Stowe organized the meeting, Freddy Wagner comprised the marketing survey and Steven Barts aided in the set-up of the meeting. Brochures were distributed to local businesses and also to the visitor centers. Information was posted on the website and in surrounding newspapers. More than 100 farmers received personal invitations. The following information and results, which were distributed to each farmer that attended, is currently available if needed:

1. The pre-treated seeds did much better than untreated seeds.
2. High yields from pies came from Neon's, Lil' Ironsides, and Hybrid Pams. Jack-o-lanterns that produced best were Aladdin's and Howdens.
3. Larger pumpkins with a continuing high yield were Atlantic Giants producing sizes exceeding an average of 75 pounds or more and Big Max. The Jarradale, a green pumpkin, still had ripe product in December.

- Cover crops did not produce better or more pumpkins. The "pick-your-own" pumpkin patch needs to be planted later in order to have fresh product throughout the pumpkin season. Drought hardy plants need to be chosen due to the hot dry weather in our area.

- Pumpkins plants should be treated with insecticides before blooming to prevent worm larva from entering the pumpkin and eating the pumpkin from the inside out. Treat early and often for blight and mold, preferably during the cooler evening time so that the treatment is less likely to evaporate as quickly. Be sure to use bee friendly products so that the bee population is not affected. Proper pollination is needed for uniformed fruit. Plant sunflowers or another early blooming crop next to the pumpkins or rent a hive of bees from a bee keeper.

- The production cost per acre based on results of this grant is as follows:

Seeds: \$60

Fertilizer and lime: \$75

Labor-100 hours at \$7 per hour: \$700

Land: \$75

Equipment: \$300

Initial start-up cost will run higher due to the need for new equipment or different land preparation.

- Grant funds expended:

This grant came in under budget. Monies were disbursed under the following categories:

Advertising: \$1821.97

Supplies: \$2029.53

Meetings \$486.99

Other: \$3456.91

Total: \$7795.42

## **V. How progress has been made to achieve long term outcome**

- We feel that this grant enabled us to compile valuable information together to insure a successful and measurable long term product at Owen Farm and in Pittsylvania County. Owen Farm gained five local businesses that will be able to purchase product grown on the farm and not have to rely on other pumpkin farms to provide the product. There is at least one farm and one known nursery already advertising that they will be open for a pick-your-own pumpkin patch using the information provided by this grant with others showing great interest. Owen Farm is presently in the Virginia Grown catalog and has placed permanent signage promoting the “Buy Local” program and the “pick-your-own” produce program. We are also promoting a “from the farm to the table” project to insure that all visitors understand the planting and harvesting process.

- The farm opened on September 26, for the 2008 pumpkin season and remained open until November 3 for the harvesting of pumpkins. The estimated pumpkin count for Owen Farm for the 2008 season was in excess of 10,000, more than tripling the product from the 2007 season. Owen Farm is now a member of the Virginia Grown program/Virginia’s Finest Fresh Vegetables, Farmers Direct Marketing Association, Local Extension Agency, Virginia.org, Travel Danville.com, the Visitors Center and the Chamber of Commerce, along with the Virginia Pumpkin Growers Association. With each partner in place, Owen Farm is able to promote the “buy local” program and the “pick-your-own” project. Sales were much higher for the 2008 season from the local and surrounding areas. The viability of using pumpkins as an alternative crop has been established and adopted. This grant has been a success.

## **VI. Additional information**

- [www.owenfarmtours.com/about.html](http://www.owenfarmtours.com/about.html)

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**Promoting Farmers' Markets As An Outlet For Specialty Agriculture Products In Virginia**  
**Project # 5 Final Report**  
**Denise Mainville**

**I. An outline of the issue, problem, interest, or need for the project**

- Specialty crops offer great opportunities to improve the sustainability and livelihoods of rural communities and agriculture in Virginia. As suburban and urban areas grow, putting pressure on land prices and traditional commodity agriculture, it becomes harder for commodity producers to “stay afloat.” At the same time, however, these same trends are driving the rapid growth of high-value markets for specialty agriculture products, particularly those that are direct marketed from the farmer to the consumer. These opportunities are driven by consumers’ increasing interest in supporting local, “non-industrialized” food systems, due to both altruistic and individualistic motives.
  
- There are diverse types of direct markets that offer a range of specialty agri-food products and services to consumers. These include pick-your-owns, farm and roadside stands, community-supported agriculture, and producers selling direct to restaurants and food service or even branded products to retailers. One of the most important direct market outlets for specialty agriculture products, however, is farmers’ markets. A 2006 survey revealed that 47 percent of specialty crop growers surveyed sold through direct markets, and 85 percent of them sold in farmers’ markets specifically. Currently there are more than seventy-five farmers’ markets throughout Virginia, and new ones are being established regularly.
  
- Farmers’ markets are a unique and exciting facet of specialty crop markets because of both the potential and challenges they present. On the one hand, consumers enjoy, and spend money at farmers’ markets because they offer a variety of high quality, fresh products, as well as an intangible connection to rural communities and tradition that satisfy a nostalgic yearning. Producers likewise benefit from farmers’ markets because they provide an established infrastructure and customer base for selling their products, enabling the establishment of a sustainable market base and higher revenues. On the other hand, farmers’ markets are very heterogeneous in terms of their structure and organization, and their development in Virginia (and elsewhere) is curtailed by 1) a lack of information about how they operate and what constraints exist to their performance and growth, and 2) a lack of information about the structure, organization and economic impact of farmers’ markets. Exacerbating this issue is the fact that there is no “school of farmers’ markets” and hence no foundation of knowledge to draw from and the managers of farmers’ markets tend to come from very diverse backgrounds such as public administration, farming, extension services, etc. These factors mean that there is a lack of information available to policy makers, investors, farmers’ market managers and vendors as to what steps can be taken to improve their functioning, performance, growth, and economic contribution.
  
- There is a need to better understand the nature and performance of farmers’ markets in Virginia in order to better understand how they are performing, opportunities for and constraints to their continued growth, and ways that farmers’ markets can make their best contribution to the welfare and livelihoods of both consumers and Virginia’s agricultural producers. There is also a need for baseline data on the characteristics of farmers’ markets and their economic impact.

## **II. How the issue or problem was approached via the project**

- The problem was addressed in two parts: 1) characterizing farmers' markets in Virginia and identifying key issues affecting the performance of farmers' markets from the perspective of farmers' market managers while analyzing the structure, scope and organization of farmers' markets, and 2) estimating the economic impact of farmers' markets in the state.
- The characterization of farmers' markets in Virginia was done through an on-line survey of farmers' market managers. Thirty-five managers representing 58 markets in Virginia completed the survey accounting for approximately 44 percent of the farmers' markets in the state.
- Information on key issues affecting farmers' markets in the state was collected in the course of educational programming relating to farmers' markets, meetings with farmers' market managers, and through a listserv for farmers' markets in Virginia which currently has 140 subscribers including farmers' market managers as well as other supporters of farmers' markets such as Virginia Cooperative Extension specialists and agents, Virginia Department of Agriculture and Consumer Services (VDACS) personnel and others. A Virginia Cooperative Extension publication titled "Foundations for a Successful Farmers' Market" is currently under review for publication and presents the lessons learned from this research with a focus on the initial factors that should be taken care of to ensure a sustainable and successful farmers' market.
- Data for the economic impact of farmers' markets was collected through a survey of farmers' market vendors. Farmers' market managers distributed approximately 1500 surveys to their vendors with the vendors returning the surveys anonymously to the project investigators in postage-paid envelopes. Approximately 300 completed surveys were returned. Additional information on each farmers' market was collected from market managers through phone interviews. Data from the surveys has been entered and is currently being analyzed. The impact analysis is projected to be completed by the end of June.

## **III. How the goals of the project were achieved**

- Through the information and data collected from surveys, publications and extension programming will help farmers' markets to have a source of information about their operations, structure, organization and economic impact.

## **IV. Results, conclusions, and lessons learned**

- Overall, the project was successful in achieving its objectives though final publications are still forthcoming. Three extension publications—one on starting a farmers' market and two characterizing farmers' markets in Virginia are forthcoming as a result of the project activities. Extension programming has also been enabled by the grant—for example, the listserv and several workshops and planning sessions, while themselves not funded by the grant, were enabled and greatly strengthened as the results from the grant-funded research were used for the programming.
- Important lessons for future work in this area were learned, particularly in the area of budgeting as well as feasible timing of project activities. During the first year, there were delays to the implementation of project activities due to the schedule of the farmers' market season.

- Comment on the level of grant funds expended (under/over budget): all grant funds were expended. The grant funds, combined with matching funds, were largely adequate to complete the project objectives although budget redistribution was necessary.

**V. How progress has been made to achieve long term outcome measures**

- Extension programming has already benefited from the project activities, and the extension publications that are being produced will also help ensure that the contributions of this project are sustained and continue to expand.

**VI. Additional information**

- Several publications are currently in process and will be published on the Virginia Cooperative Extension website. Denise Mainville (contact information below) can also be contacted for these publications.

**VII. Project contact person**

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**Providing Pollination Support to Local and Regional Growers**  
**Project # 6 Final Report**  
**Michael Sandridge**

**I. An outline of the issue, problem, interest, or need for the project**

- The primary purpose of this project was to demonstrate that sideline pollination operations are possible and profitable in the Mid-Atlantic region and locally in Virginia. A second, but equally critical, purpose was to fill the demand for pollination services among local and regional growers at a reasonable cost. The project will help fruit and vegetable growers to deliver profitable yields.
  
- Background: Beekeeping and local honey production continues to decline nationally and regionally. The beekeeping industry commonly accepts the following three factors as the cause of decline.
  1. Like most agricultural professions, beekeepers are generally over the age of 60 and therefore, the number of beekeepers declines each year. Few interested persons are willing to do more than just experiment with beekeeping.
  2. Mites and other diseases have decimated many colonies causing losses to sometimes approach 50 percent. Such losses have discouraged fulltime, sideline operators, and hobbyist alike. Only the most determined continue to pursue this vocation. In the past few years, there have been massive losses of honey bee colonies used for pollination. This is called Colony Collapse Disorder (CCD) and the cause, as of this date, has not been positively identified.
  3. Like family farms, sideline beekeeping operations (family run) have declined dramatically. There has been a polarization toward either hobby beekeepers or large-scale, full-time operations with thousands of colonies. The cost of starting or expanding, like other agricultural pursuits, is high. As a result, there is a shortage of local pollination services.
  
- This project seeks to validate the viability of sideline pollination operations and provide the service to regional fruit and vegetable producers. This will reduce reliance on large pollination operations from other regions and provide pollination of crops to help food production for human consumption on a local and regional basis.

**II. How the issue or problem was approached via the project**

- The project plan was to expand a small honey operation to provide a viable pollination alternative in the region. The main objective was to demonstrate the economic viability of a pollination sideline operation on a regional level. Additionally, the project would provide local and regional growers with a local pollination alternative.
  
- The project was expected to result in 50 new hives and pollination services for at least one regional orchard and up to 10 vegetable or other fruit growers over the course of a growing season. The project was projected to have a positive return on investment in two years.

- The project was divided into the following phases:  
Phase I. Acquire equipment  
Phase II. Communicate value and capability to producers  
Phase III. Establish colonies  
Phase IV. Deliver Services  
Phase V. Communicate success

### **III. How the goals of the project were achieved**

- Phase I. Equipment acquisition and preparation

Plan: The process began with the acquisition and construction of equipment for the new pollination hives. Some of the materials were on-hand, in rough form, and were cut and assembled. During the reporting period, the plan was to acquire a trailer for moving large numbers of bee hives and maintain equipment built for the project.

Objectives Achieved:

1. Equipment was used on new colonies.
2. Equipment not needed by the bees to over-winter was stored.
3. Trailer for beehive transport was purchased, repaired to meet road inspection standards, and licensed/registered. Trailer body was configured to support secure loading and shipment of beehives.
4. Equipment was utilized in the 2009 season and established a base to further expand in the 2010 season.
5. The trailer transport proved successful with 35 colonies being moved with a half-ton truck and trailer to and from the cantaloupe fields in Middlesex County, Virginia.

- Phase II. Communicate value and capability to producers

Plan:

1. The operator (project manager) used the Internet, extension agents, farm co-ops, farmers markets, Farm Bureau, and other farming publications to tell the story and continue to raise grower awareness.
2. Direct communications with letters, flyers, and on-site meetings with growers of fruits and vegetables were undertaken. The targeted audiences were farms and orchards of at least 5 to 50 acres in fruit or vegetable production.
3. The communication plan was fully developed and the process began in the fall of 2007.

Objectives Achieved:

1. During the reporting period, a direct mailing campaign was executed.
2. A letter, brochure and price listing was developed and mailed to prospective clients.
3. The letters were sent in August 2008 to 22 farms and orchards within 120 miles of the operator's base of operations.
4. A follow-up mailing was executed in January 2009, and an email campaign with extension agents was executed. All extension agents in the Middle Peninsula, East Central Virginia, and Northern Neck were contacted.
5. One major contract resulted and several small contracts.

- Phases III and IV. Establish colonies and deliver services

Plan:

1. In the spring (March), the hive bodies were rotated and the hives fed to start the queen bee's egg laying for spring honey production.
2. The producer ordered queen's mite resistant stock and bees from a regional apiary. The plan was to buy packaged bees, or Nucs, from Mr. T. Holt in Mt. Pilot, NC.
3. April 1 and April 15, 2008, the producer divided and established new colonies. The beekeeper provided the divided hives a new queen.
4. The new hives were fed sugar or corn syrup to help them establish, and honey supers were provided for winter storage.
5. At least 35 hives were expected to be strong enough to rent for pumpkin or other vegetable pollination, but the primary objective was to develop strong hives that could over-winter by September.

Objectives Achieved:

1. Completed start up of 50 colonies by May 15, 2008.
2. The new hives were fed sugar or corn syrup to help them establish themselves, and honey supers were provided for winter storage.
3. Hives were available for rent; however, no customers requested services.
4. Twenty-five of the colonies survived the drought that gripped the region from June–September.
5. Hives were treated for mites and fed sugar syrup and sugar patties due to lack of natural food.
6. March 22, 2009, the grower attained 45 three-pound packages from Georgia and installed them on drawn comb from last season. The colonies prospered with better weather.
7. Thirty-five hives were rented for eight weeks to pollinate cantaloupe fields in Middlesex County. Hives were also rented and placed for pollination in James City County and Hanover County.

- Part V. Communicate Success

Records of expenses, activities, and customer surveys were used to measure the results of the project. Lessons learned are to be communicated through group presentations and published articles. A narrative of the experience will be drafted after the project is completed and offered for publication.

#### **IV. Results, conclusions, and lessons learned**

- Establishing Colonies: Environmental conditions can severally impact expansion plans. Because pollination providers have no control over extreme weather conditions, they must develop plans to mitigate the risk. Unlike some animal husbandry operations where corrective actions are more readily available and can occur at almost any time, the beekeeper is restricted in what can be done. Flying insects are inherently more difficult to manage, as they can simply

leave the nesting sites (hives) if things get really bad, or rob each other and thus destroy weaker colonies that might have survived with care. Feeding is exceptionally difficult if there are too many collocated colonies.

- Unexpected delays and impediments

Effects of Extreme Weather: The most significant unfavorable issue impacting the project was an extreme drought that negatively impacted colony survival and resulted in colony collapse of 50 percent of the project hives. Hanover and adjacent counties were declared drought disaster areas by the Governor and the USDA. Drought impacts the bees by cutting off the flow of nectar that sustains the colony. In Virginia, excess nectar is collected in the spring and the minimal nectar flow in summer months sustains the colony until a fall flow of nectar provides additional winter foods and, more importantly, supports brood rearing of bees that over-winter. The drought caused the queen bees to stop laying earlier than normal, and the bees ate up most of the excess honey for the winter by early August. The colonies began robbing from weaker colonies with abandon. Populations declined as a result of the lack of brood rearing and combat between honey bees. In the end, the colony population dwindled to critical levels and collapsed even though sufficient food stocks were provided. Over-wintering of colonies was expected to be poor. However, additional sugar patties were added to the colonies on warm days in December, and it appeared that most of the remaining hives had a fair chance of survival. A major cold snap and winter snow storm in March 2009 resulted in further losses. Only nine of the over-wintered colonies survived.

- Recommendations: Have alternate sites available to spread out colonies (miles apart). Have access to a ready supply of a large quantity of feed. Feed early. Combine hives early so you have more strong colonies to resist robbing when you feed. Have a plan to restock bees on your equipment, order early, and order enough to replace 80 percent the first year. If you have excess packages, sell them to other beekeepers. After the second year, the beekeeper should plan to set up a sustainable internal replacement system with Nucs and local queens. Colony replacement is the norm and not the exception.

- Communication/Marketing Plan: Effective communication of the value added through rental of honey bee hives for pollination is difficult. Small local growers have limited resources to expend and although they understand the proven value of pollination, they cannot justify the added expense. The loss of pollinators and other factors that contributed to lower crop yields occurring over the same time frame, as well as a long history of free pollination (feral colonies and honey producers), has contributed to a lackluster response from small and medium size growers. Large growers and orchardists who understand and value commercial pollination require significant numbers of bees, and they have come to rely on very large commercial pollination organizations that operate in many states. Small growers have an incorrect perception that their crops provide sufficient nectar to provide honey that the beekeeper can sell.

- Recommendation: Effective communication and marketing require time and persistence. Plan to use multiple communication channels to growers. Extension agents, mailing, internet, grower markets and co-ops are all channels that can and should be used. For the sideline pollinator (with 100 or less hives), the primary customer will be growers of cantaloupe, watermelon, cucumbers, and pumpkins. Most commercial orchard requirements will exceed the resources available through a single sideline pollinator. Partnering with several other pollinators has potential. Extension agents were the best resource to match growers and pollinators. Mass mailings had limited impact where personal communications had the greatest impact.

- Delivering Services: Deployment of the hives for the sideline pollinator is a major logistical and physical effort. The work is far from over when you have pollination contracts and hives ready to provide the pollination services requested. Loading 35 hives in the dark, without the use of fork lifts and with little light, is time consuming hard work. It took six hours to load the trailer for deployment. A minimum of one additional person is required for loading and unloading.
- Recommendations: Have at least one assistant to load and deploy. If time is an issue, double your temporary help to three. The cost will be a third higher but the time required will be reduced by half. Plan your travel routes carefully. Good routes are those that are obstacle free, easily followed, and low in traffic with the least possible miles. The internet resources today allow you to plan your routes in detail, including stops for fuel or rest. Prepare early. If you have hives dispersed, it may be necessary to collocate them a week or more in advance. Prepare trailer and hives for loading early in the morning or evening. Day time moves need to be done at first light before heating becomes an issue. Since you are loading by hand, it will take time. Once you begin loading, the operation can move quickly. It is best to have one crew shutting entrances while another loads. Using this method it will take about three hours to load and secure 35–40 hives. Unloading will take about two hours.
- Summer moves are best on the bees when done at night. It is cooler but the work is more difficult. Summer temperatures take their toll on your crew as well as on the bees. Hydration is critical for you and your staff. You may need changes of clothing as well as towels to dry off under high humidity conditions. White light attracts the bees, but the lack of light makes closing as well as strapping down, and loading difficult. Red lights including flood lighting and hat lights make the task easier and safer.
- Keep the grower informed. Let them know when you are loading and retrieving hives. Also make sure you have walked the locations with them to ensure the bees are properly placed for both pollination and the growers' activities. Make sure you discuss moves and the impact of spraying in the contracting phase.
- Honey Production as Revenue: Pollination hives don't produce excess honey. The operator anticipated some honey production as an additional source of revenue. Although this was understood to be minimal, some additional revenue was forecasted. The reality was very much the opposite. All hives engaged in pollination services required extensive heavy feeding. Any surplus generated from unrented hives had to be used to supplement rented hives.
- Recommendations: Do not include honey as a forecasted revenue stream from hives designated for pollination. The crops pollinated have little value as nectar producers. Though attractive to the bees, the amount of consumption and the collection of nectar are equal which nets nearly no reserves for the colony. Plan on feeding rented hives on a massive scale. At least five to ten gallons of sugar syrup per colony will likely be required.
- Return on Investment. The return on investment (ROI) takes longer with a start up operation. ROI is driven by cost, availability of rental units, and customer demand. The project clearly points out that there is no quick return on investment. Building up clients is a difficult and time consuming process. It will likely take two to three years to get a large enough base of customers to maximize the rental capacity of the colonies. Based on estimates from the project it could take three to five years to reach breakeven. But once the producer reaches breakeven, the annual ROI will be significant.
- Recommendations: Beekeepers should plan for it to take at least three years before making a profit. The operator's focus should be on building the number of clients and rental capacity.

- Conclusions: Establishing local and regional pollination services is possible but a strong business plan and experience is prerequisite. Even with a good plan and experience, success is not guaranteed. Beekeeping operations (like other agricultural pursuits) have the unique issues related to working with living organisms. Disease and environmental issues can disrupt the plan causing increased cost and time delays. Building a client base is difficult and will require a sustained effort.
- The basic plan for this project can serve as a framework; however, based on this experience, a sideline beekeeper should plan for a two year build up of pollination resources. The rate of successfully establishing new colonies from any method is less than 50 percent. This rate drops significantly if there are unusual environmental stresses or heavy pest and disease infestations. Anyone embarking on a venture like this should plan on doubling the time they think is needed to establish a certain level of colony resources. Plan to retain a financial reserve to replace at least 80 percent of the bees in the first year. As soon as practical, the beekeeper needs to move to a self-sustaining mode of replacing colonies lost with survivor colony nuclei.
- Establishing a client base will take a great deal of effort. The beekeeper must contact as many resources as possible that can refer growers. Extension agents were found to be a great resource in communicating availability to growers who express a need for pollination. Additionally, beekeepers need to recognize that relationships between pollination providers and growers are often well established. Confidence and trust are central to this relationship. The beekeeper needs to be prepared to respond when any opportunity presents itself. The beekeeper needs to also realize that there is a quantity and availability issue involved in the grower's pollination service decisions. For instance, commercial orchards are rarely less than 200 acres in size and need at least 200 hives for pollination in the early spring when local hive populations may still be low. This project proposed establishing 50 hives that would support orchards and vegetable growers. Fifty hives is sufficient to support melon and other growers but would not be a likely choice for the average commercial orchard. Regionally, this reduces the number of clients for the service and the corresponding revenue. As a result, this extends the time that it will take to recuperate cost and begin to make a profit.
- Pricing and the number of contracts for each colony are related to each other and to the expected return on the investment. Base start up cost for a colony of bees was found to be \$250. The start up cost excludes transportation assets and the value of personal labor. The number of engagements (contacts) per colony (in this region) is limited to one or two per season because of the smaller number of colonies and seasonal availability levels. In a pollination service only scenario, using \$250 as a base cost and targeting break even at three years, each colony would have to earn \$83.00 per year. Two rentals per year for three years would be required to break even on the initial investment. In a combined pollination service and honey production scenario, the hives are rented for pollination one year and then put into honey production for the second year. In this alternative, break even is reached in two years or less, because in the honey production year the hive should yield \$200 in revenue and the pollination revenue would only have to be \$50. This analysis tells us that a sideline pollination operation would not be profitable on its own; however, a combined pollination and honey production sideline operation could be profitable.

## **V. How progress has been made to achieve long term outcome**

- Current efforts are focused on getting the maximum number of colonies through the winter. Begin heavy feeding in late February and through mid March. Split as many colonies as

possible. Order and install at least 30 packages of bees. Target is to increase and stabilize colonies on hand to 70. Provide pollination services to more growers in May–June. Rent at least 80 percent of the colonies. Continue to document experience and write articles for publication by professional magazines. Provide information to State Apiarist and share experience with other beekeepers in local and regional associations. The first presentation to a local association has been scheduled for February 2010.

#### **VI. Additional information**

Article(s) have not been published. They are still in development and are not ready for primetime yet. I want to send drafts to each of the mentioned publications this spring with the hope that one of them will publish my submission. I delayed writing as I wanted to see the results of the pollination rental on the hives that were rented out last summer. They were very short of nectar (honey) at the end of the summer.

As to the presentation, the focus group is on beekeepers, the first group is 30 beekeepers in the Central Virginia East beekeeping Association. This presentation is scheduled for February. After that presentation, I plan to offer it to other state associations through the state apiarist and state association. I am hoping other opportunities present themselves to share what I have learned.

#### **VII. Project contact person**

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**Organic Brambles for Fresh Local Markets**  
**Project # 7 Final Report**  
**Amy Hicks & George Ferguson**

**I. An outline of the issue, problem, interest, or need for the project**

- This project was conceived to demonstrate the feasibility of establishing and growing organic blueberries, raspberries and blackberries for local markets. Through the experience, we hoped to raise interest among growers to add these fruit crops in an effort to further diversify their small market farms and bring more organically raised local fruit into regional markets. The local markets are deficient in local, organic berries and customers (farmers' market customers, retail stores, restaurants etc.) increasingly request these products.

**II. How the issue or problem was approached via the project**

- Organic blueberry, raspberry and blackberry plants were established and grown for local markets. By learning the most efficient and economical methods by trial and error to obtain the best organic plants to be sold at the local markets, we can raise interest among growers.

**III. How the goals of the project were achieved**

- The purpose of this grant and our goal for the project was to see if the addition of small fruits would be beneficial to a small diversified organic farm. The challenges, costs, maintenance and productivity of small fruits including blackberry, raspberry and blueberries were assessed during the two year period. The project proved that small organic fruit is much in demand in local markets and the addition of these crops is expensive and labor intensive; however, with proper management they can add a valuable new crop to small organic farms who market their products direct to the public. Our goals were lofty and some results were unanticipated but overall the experience was positive and we will continue to add additional production of small fruits to our farm. Raspberry production has been the least successful due to late season rust and small harvests in season two. We are consulting with Virginia State University to improve our raspberry production-nutrient management may be part of the problem-because the demand for raspberries in the local market is very strong. Blackberry production was excellent in year two of the project; however, the demand for blackberries appears to be less than for raspberries. Any unsold blackberries were successfully used for value added production (jam and blackberry hot pepper jelly). Harvesting of the blackberries was more time consuming than we would have thought, but the harvest was concentrated over just a few short weeks and came primarily in June when we do have the time to devote to it. We anticipate our first blueberry harvest in 2010 and are looking forward to marketing the berries in our local market.

**IV. Results, conclusions, and lessons learned**

- Late spring and summer of 2008 were dry, and we experienced some loss in the blueberry planting. Lesson learned: irrigation frequency was increased in the latter half of the 2008 growing season and plant losses ceased. Most of the seven varieties of blueberries flourished with the variety "Legacy" being the standout with demonstrating good growth and nearly 100 percent survival. "Tifblue" proved to be the weakest variety with considerable losses in the field; perhaps due in part to insufficient watering. Bed plastic (white in color) was removed and hardwood mulch was applied to the blueberry beds in summer. Hardwood mulch and composted fines were obtained locally and delivered to the farm. A less expensive supplier of hardwood

mulch will be needed as this will be a considerable expense when mulching all plants each year. Weeding around the plants was necessary at least once a month and cutting/weeding between the rows of blueberries required a fair amount of labor throughout the summer. For the first season, rows of tomatoes were grown and produced between the beds of blueberries to make efficient use of the space since the blueberry plants were still small. A cover crop of rye was planted in the fall where the tomatoes had been-effectively creating a winter windbreak and reducing weed growth in the aisles over the winter. In future years, the aisles will simply be mowed and we will try to find an appropriate permanent cover for this area. Regular feeding of organic fertilizer was accomplished through foliar and drip applications of fish and seaweed during the 2008 season. The plants were side dressed with fish meal and Planters II micronutrient formula in the spring of 2009. In late May 2009, the variety "O'Neal" had begun to ripen with nice large berries.

- Raspberry plants began to bear in early August and we were delighted to find a favorable response from customers when we added this fruit to our markets. Raspberries were sold throughout the months of August and September for \$5 per half pint. On September 8, 2008, we picked 75 half pints, which was the most so far for the season. In September, we began to see rust on the raspberry plants, and the fruit was no longer suitable for sale by the end of the month due to the rust on the fruit itself.

- We continued to pick and process the berries for our own use since the fruit was fine for making preserves etc. The yellow variety "Anne" did show resistance to rust, and we were happy to note this fact. We'll consider adding more "Anne's" to the patch. The variety "Heritage" also appeared to be more rust tolerant than "Carolyn" or "Jaclyn." In early October, the majority of the raspberry plants were cut to the ground and the foliage/canes removed in an attempt to decrease the negative effects of the rust on the plants. A colleague from Westmoreland Berry Farm did note that the fall of 2008 was the worst year for rust on raspberries she had seen in 20 years; this statement did make us feel better. However, the raspberry plants which were cut back did not come back out as well as expected in spring 2009; leading to the conclusion that the plants should not have been cut back as severely. We will replace missing plants by dividing existing raspberry plants and they hopefully will send up many offshoots in the spring. One could easily expand their raspberry plantings by simply dividing the plants in spring without buying more plants!

- The black raspberries "Bristol Black" grew vigorously and produced very long canes during the 2008 season. In May 2009, the plants were loaded with small berries just beginning to change color. Trellising of the raspberry and black raspberries took place in July 2008, with the black raspberries being much larger and requiring additional support and training of the canes.

- The blackberry plantings grew well and required more support maintenance throughout the 2008 season compared to the raspberries and blueberries. The "thorn less" variety, "Ouachita," did prove to be less thorny than "Kiowa;" however, both were difficult and painful to trellis and train due to the thorns. This should be taken into consideration before planting. The aisles between the blackberry rows were both mechanically cultivated and hand weeded (with hoes) during the 2008 growing season and a winter cover of rye was planted in October between the rows. The rye helped suppress weeds and create a windbreak during the winter and early spring.

We are now in the process of removing all plastic mulch on the raspberry and blackberry beds and applying straw or hardwood mulch for the 2009 season. The blackberries have fruit on them at this time (May 2009), and we look forward to harvesting them in June.

- Labor appears to be the largest consideration when deciding to add organic production of blackberries, raspberries or blueberries to a farm. The labor for weeding, maintaining and harvesting these crops is considerable and thus labor should be available, dependable and affordable to make these crops feasible. We have been very happy with the project results and are encouraged to continue to expand fruit production by the response we have received at market for these products. Revenues are expected to be good because organic fruit does command a premium price. In addition, we see the possibility of value added products made from the berries in years to come; thus, increasing the scope of our product offerings and adding value to what is already a high value crop. We would like to thank the Virginia Department of Agriculture for their support of this project.

- The grant allowed us to attend the Virginia Berry Production and Marketing Conference at Virginia State University in March of 2008, just as we were beginning our grant funded study of organic small fruit growing. During the 2009 season, we were asked to speak at 2 conferences presented by Virginia State University. The conference held Feb. 26, 2009 was a webinar featuring several agricultural topics; Amy's Garden presented an overview of their organic farm, marketing practices and crops. The addition of small fruits via the USDA specialty crop block grant to our farm was presented and discussed. At the time of presentation, in excess of 50 participants were signed on to view the webinar live. The webinar was later posted online to be viewed at will allowing for further dissemination of the information. The benefit of raspberry production was explored in depth due to the fact that they were marketable at a very good price within the first year of planting. At the Small Family Farm conference held November 8th in Richmond, VA. Amy's Garden presented a lecture on successful small-scale farming; with diversity being the key to our success, this concept was presented and again the addition of small fruits to the organic farm was discussed. The lecture was presented to approximately 100 growers and many in the audience acknowledged a lack of organic small fruits in their local markets. The idea that there is an opportunity to fill this niche was well received by the attendees. The Small Family Farm conference attracted growers from all over the state of Virginia, with an attendance of over 350 people.

## **V. How progress has been made to achieve long term outcome measures**

- Progress was made by learning what works best with the different types of organic fruit. We learned such things as which plant varieties flourished and which showed signs of weakness for this area, how often to irrigate, which fertilizers work best, cost of mulch, weeding, benefits of cover crops, maintenance for each crop, winter cover crops, planting crops between rows of fruit, rust on raspberries, cutting plants back in the fall, trellising blackberry plants, and the high cost of labor.

## **VI. Additional information**

- Amy's Garden hosted an tour for regional agricultural agents on June 16, 2008. The event, organized by our county extension agents Paul Davis and Leanne Dubois, brought 40 agricultural extension agents from across Virginia to tour our farm. The small fruit crops,

recently planted through the USDA grant, were discussed and observed. The pros and cons concerning the addition of these crops (blackberries, raspberries, blueberries) to our diversified organic farm were explored, benefits and challenges were discussed. The agricultural extension agents had many questions about organic plant maintenance, organic weed control, organic fertilizers, disease and pest control; we explained our practices in depth, shared our marketing techniques and asked questions of them as well. Their advice was welcome and helpful and the exchange of information was productive. The recent loss of both of our county agricultural agents has made it difficult to initiate outreach opportunities during the last year. However, Dr. Reza Rafie of Virginia State University, an expert in raspberry and blackberry culture, visited our farm in August 2009 to discuss plans for an on farm field day during the 2010 season. We are currently seeking his advice on some issues we are struggling with concerning raspberries and will continue our communication with Dr. Rafie for his counsel on growing small fruits and outreach opportunities.

#### **VII. Project contact person**

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**Educating to Ensure a Future for Christmas Trees**  
**Project # 8 Final Report**  
**Sue Bostic**

**I. An outline of the issue, problem, interest, or need for the project**

National Christmas Tree 2006 tracking poll reveals 45% of households display a fake tree, 26% of households display no tree and 25% of households display a real tree. If Virginia tree growers and Joe's Trees can capture part of the no tree displayed families we can increase sales. The seven million Christmas trees growing in Virginia need to have a home to be displayed in. Through this project and the information gained through this project, more than 200 growers in all regions will be offered farm tour guides and over 11,000 educators and their students will have the opportunity to learn about real Christmas trees. Farm tours are a unique and fun way to make an impact on young children. In order to ensure that real Virginia trees are a part of each individual's Christmas, Joe's Trees makes an attempt to start by educating school age children through school tours and teaching the benefits of real trees over fake trees at Christmas.

**II. How the issue or problem was approached via the project(s).**

Joe's Trees mailed 185 farm tour invitations with a brief overview of what will be offered during the tour to surrounding schools. Educated through school tours and using the Ag in the Classroom (AITC) & the Virginia Standards of Learning (SOL) correlated lesson plans in one way we made out tours attractive to teachers. AITC provides resources to use agriculture as a vehicle to teach across existing curriculum. AITC partnered with Joe's Trees in this project to ensure that the SOL criteria are met in the correlated lessons. In the next three years, the AITC Christmas tree lesson plans and related lesson plans have the potential to impact more than 725,000 students in Virginia says AITC Director of Development, Kelly Pious. Along with the AITC lesson plans Joe's Trees demonstrated to kids how Christmas trees grow starting from a pinecone, planted as a seedling, cared for until harvest, and what tools were used and needed during the 8-10 year cycle of a tree's life. After an in depth visual lesson was done with kids they enjoyed a hayride to view the nine different tree types growing on the farm. Joe's Trees cut wooden disk from the trunks of leftover 2006 and 2007 trees and gave out to each teacher in an educational review packet. Enough disks were given for each student to review the growth rings and then be use in art class to make a Christmas ornament. The packet included a review of the farm tour and other information such as the Ag in the Classroom (AITC)'s two SOL-correlated lesson plans and worksheets to complete in the classroom and the Virginia Christmas Growers 8 minute video that was produced in 2006 by VCTGA and the Virginia Department of Agriculture and Consumer Services (VDACS) all to be used as additional tools for teaching. An evergreen seedling was given to each child attending the farm tour. The main objective was to encourage kids to buy a real tree and understand the environmental benefits of tree farms.

**III. How the goals of each project were achieved**

We sent invitations to schools, compiled educational materials and lesson plans needed, created a timely field tour that would involve a hands-on lesson that encouraged learning for all children. We also collaborated with Ag in the Classroom to ensure that the AITC

newsletter provided accurate information for schools on the tour as well as for those who could not leave the classroom. Once the project was complete, Joe's Trees created a how to guide for Christmas tree farm tours that was shared with the Virginia Department of Agriculture & Consumer Services, the Virginia Christmas Tree Growers Association & the National Christmas Tree Association to be used to help other growers throughout Virginia and other parts of the nation.

#### **IV. Results, conclusions, and lessons learned for each project.**

Survey results showed that we were on target for meeting the SOL requirements by Virginia. We also kept the tour fun as well as educational. Teachers that have attended once have continued to return year after year. At this point we have a 100% return rate. Our overall goals of project **Educating to Ensure a Future for Christmas Trees** was to bring awareness to the younger generation. While having school tours that were fun and exciting, Joe's Trees wanted to offer SOL-correlated lesson plans to encourage educators to bring their students to the farm. By kids coming to the farm, Joe's Trees had hoped that kids would return with their families to buy a real tree after attending our tour. We feel that these goals were met. An obstacle that we did not plan for was the price of fuel increasing and the economy taking a turn for the worse. Many schools wanted to attend but did not have funds in the budget to justify any field trips. We feel that if this tour was offered in a booming economy that we would have had many more tours in turn that would have helped us meet the highest goal possible.

#### **V. How progress has been made to achieve long term outcome measures for each project**

The data that we collected this project through post surveys made us realize that this could impact the future of growing Christmas trees more than we realized. Survey results indicated that this was a much needed tour in our area. One comment made such as the one listed below and others attached to this report have convinced us that this is something we will do from now on. Comment: "This is a field trip that we will be attending yearly & we will recommend to fellow teachers and friends." Narrows Elementary/Middle School. This project will not only help many children and educators understand and learn about Christmas trees and how they are grown but it will make planning easier for the next farm tour of a fellow grower through the Christmas Tree Farm Tours 101 guide that Joe's Trees has compiled. 25 % sales were not accomplished as intended. Increased sales were concluded at 3.5%. This net % increase was very low due to the blizzard of 09 and bad weather on prime weekends in 2010. Weather and high fuel prices killed farm tours and tree sales overall.

#### **VI. Additional information available (e.g. publications, Web sites).**

[www.joestrees.com](http://www.joestrees.com)

[www.agintheclass.org/Documents/Newsletters/Fall2007.pdf](http://www.agintheclass.org/Documents/Newsletters/Fall2007.pdf)

#### **VII. Contact person for each project with telephone number and e-mail address**

Sue Bostic ; 540-544-7303; [joestrees@pemt.net](mailto:joestrees@pemt.net)

**Cooled Produce Demonstration Program**  
**Project # 9 Final Report**  
**Kevin Semones**

**I. An outline of the issue, problem, interest, or need for the project**

- Abstract: The southwest Virginia Farmers' Market will provide a facility and qualified personnel to implement a demonstration program that will test the feasibility and economic vitality of a cooler. The rapid cooling of fruit and vegetables removes field heat, significantly enhances freshness, and results in a longer shelf life. The net effect is increased returns for the grower, the ability to ship the cooled produce, and the diversification of crops. A strong market potential currently exists in the region for these items. This machine will cool specialty crops, enabling farmers to diversify their crops and meet new market opportunities. There is a great demand by grocers, chain food stores, the military and others for specialty crops of fruits and vegetables. Without a means to remove heat, the farmers in southwest Virginia cannot meet these demands.
  
- Due to the lack of cooling/packing infrastructure in Southwest Virginia, it has always proven impractical for our producers to produce large quantities of many crops. Crops such as broccoli, cauliflower, corn, and peaches require specialized cooling equipment in order to adequately remove field heat in a rapid manner.
  
- All of these crops and potentially several others can be grown well in the region. However, without adequate cooling they are not marketable in large quantities. In order to create an adequate shelf-life and retain adequate sugar content, we must be able to cool these products at a rapid rate. Conventional cooling will not cool the product at an acceptable rate. One of the best ways to remove field heat from some products is hydro-cooling. Not all products can be hydro-cooled, but products like broccoli, corn, and peaches can be cooled very well using this method.
  
- In order to purchase a pre-built hydro-cooler, it will take a very large sum of money. Current bids would put this into the \$450,000 to \$600,000 range. This cost is too large for any small grower or even a group of producers in general to absorb.
  
- Products such as sweet corn and broccoli have a great market demand. Some of these crops, especially broccoli, appear to have an excellent net income potential for the producer. Access to adequate cooling would allow this region to be a successful producer/shipper of some of these commodities.

**II. How the issue or problem was approached via the project**

- In order to adequately determine if hydro-cooling will work economically for our producers, we chose to rent a portable hydro-cooler with the assistance of the grant. This would allow us to determine for sure if hydro-cooling was a method that we needed to continue pursuing. It would give us a chance to ensure our theory that the lack of adequate cooling was the major stumbling block hindering our region to move significant quantities of certain crops. It would also give us a better opportunity to discover the actual costs of operating such a cooling method. By renting a machine, we had a chance to discover both the good and bad points of the machine. Therefore, we could design a better machine if we decided that purchasing/building a

hydro-cooler was the best direction to take. It would also give us an overall chance to lay the ground work in developing a marketing strategy for larger numbers of product in future years.

### **III. How the goals of the project were achieved**

- With the rented machine, we were able to cool 420 bushels of corn in a 45 minute period. To better put this number in perspective, we were able to properly cool a tractor trailer load of corn in a two hour period. Most of the data that we have studied indicates that this is the best method for corn due to the rapidness of cooling and the fact that the moisture is being added and not taken away. The 2007 season was one of extreme drought. Thus our corn crop was about half of its normal yield. We were still able to cool 14,612 crates of corn at a market value of \$131,508. During the height of season, we shipped 6,913 boxes of broccoli at a value of \$69,130. During the entire season, we shipped 20,931 boxes of broccoli at a market value of \$230,241. A total of 19 growers were involved in this project in the first year. The total value of the two crops was \$361,749. All nineteen of the producers involved produce other commodities as well. While there was basically no conversion of vegetable acreage from this project in the first year, there was another significant step gained in our process of assisting producers and diversifying. We will see a significant conversion of cabbage acres in 2008 due to the results of the 2007 project. The project involved about 147 acres of crops in 2007. We believe this number will likely double in 2008.

- In the first year (2007), we had a total of 19 growers. Since we did not have a cooling program of this nature at the market in 2006 or previous years, all these growers produced the products the first time for this program in 2007. Some might say that this is a 100 percent increase while others would say it's a 1900 percent increase. On the other hand, some would argue that you can not technically start at zero and calculate a percentage increase. This is our dilemma because we feel the increases were definitely greater than 40 percent in the first year while the second year (2008) saw another 36.85 percent increase in the number of producers using the cooling program. Based on current discussions, 2009 will also show substantial percentage increases in the number of producers using the program.

### **IV. Results, conclusions, and lessons learned**

- The project proved several factors that were expected to be correct. Broccoli will grow though the summer months at higher elevations. We have better ideas of the necessary production practices for both broccoli and sweet corn. Last year's results proved that we have the potential to sell large quantities of both of these products, but only if they are properly cooled. Our growers gained significant confidence in the ability to both adequately grow and market these two products. Our corn went to markets across Virginia as well as markets in North Carolina, South Carolina, Georgia, Florida, and Alabama. Several of the chain stores that we worked with in 2007 are even more interested in working with us in 2008 as long as we still have the ability to hydro-cool their product.

- We learned very early on in the process that it was hard to use the same cooling chamber for two very different products. When a hydro-cooler is built, it should be made of non-porous, easily cleanable materials, and the unit should be as nearly self contained as possible to prevent contamination. The producers involved in this project now understand the importance of properly hydro-cooling their products. Significant knowledge was gained about the importance

of high water flow and tonnage cooling capabilities needed to keep the water cool.

- We feel very comfortable in stating that we now need to purchase a hydro-cooler for the producers of the region. Other crops such as peaches, cauliflower, and greens will also benefit from this type of cooling. Some of the regions' orchard growers are already in discussion with us about hydro-cooling some of their peach crop. We will also cool at least 25 acres of cauliflower into 2008. No other conventional cooling method can remove so much heat in so little time and not dehydrate the product at the same time.
- The water dispensing tank needs to be close to some products such as broccoli and cauliflower. We also understand the need to move the produce through the chamber efficiently.

#### **V. How progress has been made to achieve long term outcome measures**

- The timeframe for this project was October 2007 through September of 2008. Further details on the installation of a permanent hydro-cooler and the implementation of a more comprehensive marketing plan will be available with the completion of a second project funded with Specialty Crop Grant funds. The dates of that agreement are May 2008 through April 2010. While we have not been able to purchase a factory built system, we expect to be able to construct a well built system from the experience in which we learned from the 2007 project. While we may need to add and/or take away some crops utilizing this system in future years, we believe that this project has put a lot of questions about the necessity of proper cooling to rest. When buyers were told that product had been hydro-cooled, it made the product so much easier to sell. Our return rate was basically zero thanks in large part to the adequate cooling. Both new and last year's project growers are both calling to make sure of the availability of a hydro-cooler for 2008.

#### **VI. Additional information**

- Please note that the time frame for this project was October 2007 through September 2008.
- Anyone who would like to discuss this project further should feel free to contact the Southwest Virginia Farmers Market at 276-728-5540. We will be more than happy to discuss what we have learned from this project.

#### **VII. Project contact person**

- Kevin Semones, 276-730-3128, [ksemones@carrollcountyva.org](mailto:ksemones@carrollcountyva.org)

**Updating and Improving the Potato Disease Advisory  
Project #10 Final Report  
Steve Rideout**

**I. An outline of the issue, problem, interest, or need for the project**

- The Virginia Potato Disease Advisory (VPDA) is a weather generated fungicide application advisory that is issued weekly to Virginia potato growers on the Eastern Shore. The VPDA starts issuing reports generally in March and runs through July advising growers whether conditions have been favorable for disease development and thus a fungicide application is warranted. The weather conditions that are essential to the VPDA are generated at six locations across the Eastern Shore of Virginia (ESV). These environmental sensors are in disrepair and the company that manufactured these sensors is out of business making repairs impossible. This proposal requested monies to replace the outdated sensors and replace them with new sensors.

**II. How the issue or problem was approached via the project**

- We used the monies from the VDACS (Virginia Department of Agriculture and Consumer Services) specialty crop grants to purchase new sensors and supporting technologies for the six locations over the course of 2008 and 2009.

**III. How the goals of the project were achieved**

- The new sensors have performed well over the forecasting seasons of 2008 and 2009 enabling a more efficient download of weather data from the six locations for the VPDA. Fewer problems with the equipment have resulted in more continuous weather data used to determine fungicide recommendations.

**IV. Results, conclusions, and lessons learned**

- Results from the improved VPDA: Thirteen weekly advisories (April through July) were disseminated in 2008 to 100 percent of the Eastern Shore commercial potato producers. In 2008, environmental conditions rarely favored severe disease development. On the average, six fungicide applications were spared through the implementation of the Virginia Potato Disease Advisory. Reduced fungicide applications constituted a savings of \$360,000 in unnecessary inputs for Eastern Shore potato producers. No severe outbreaks of potato diseases were reported.

- Fourteen weekly advisories (April through July) were disseminated in 2009 to 100 percent of the Eastern Shore commercial potato producers. In 2009, environmental conditions favored disease development frequently. On average, three fungicide applications were spared through the implementation of the Virginia Potato Disease Advisory. Reduced fungicide applications constituted a savings of \$180,000 in unnecessary inputs for Eastern Shore potato producers. No severe outbreaks of potato diseases were reported despite favorable conditions for disease.

**V. How progress has been made to achieve long term outcome**

- The VPDA is well equipped to serve Irish Potato growers on the Eastern Shore of Virginia in the new decade due to VDACS support on this project. All sensors are functional and ready to begin the approaching 2010 growing season.

**VI. Additional information**

- Additional information for this project is available by contacting Steve Rideout.

**VII. Project contact person**

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**Increasing Farm Income Through Organic Crops**  
**Project #11 Final Report**  
**Appalachian Sustainable Development**

**I. An outline of the issue, problem, interest, or need for the project**

- Explore ways to increase sales of organic produce and the number of farmers raising organic crops.
- This report focuses on activities and accomplishments over the final 6 months of this project, though it also includes overall progress in some key areas for the full 18 month grant period.

**II. How the issue or problem was approached via the project**

- Raise farm income through organic crops by increasing
  1. sales of Appalachian Harvest organic produce,
  2. the number of participating farmers,
  3. the production and sales of Appalachian Harvest produce, and
  4. markets for produce “seconds.”

**III. How the goals of the project were achieved**

- Goal 1: Increase overall sales of Appalachian Harvest organic produce by 75–100 percent in 2007, and increase the number of participating farmers to 50.
  1. The number of participating *Appalachian Harvest* farmers increased to 64 by the end of the project period. We have found that retaining current growers is a challenge along with recruiting and training new growers. We have strengthened and expanded our educational and technical support to help more farmers be successful.
  2. Ten growers who raised for *Appalachian Harvest* but no longer do so, now produce organic and specialty crops for sale at farmers markets, restaurants and CSA’s (community supported agriculture).
  3. Sales of Appalachian Harvest reached \$513,000 in 2008. We project sales of \$650,000 to \$700,000 in 2009.
  4. The number of egg producers increased to 12 by the end of the project period.
- Goal 2: Increase the production and sales of Appalachian Harvest produce in the spring and fall through the construction and utilization of 20–25 low-cost hoop houses.
  1. Twelve farmers constructed a total of 18 hoop houses (mostly 100 feet long) as a result of this project. Crops grown included zucchini, golden zucchini, yellow straight neck squash, Carmen peppers and tomatoes.
  2. Several other farmers attended ASD (Appalachian Sustainable Development) hoop house workshops and requested information on design and materials; at least two of these farmers built hoop houses on their own.
  3. The ASD director’s high tunnels and hoop houses were featured in the spring issue of Virginia Farm Bureau magazine.
- Goal 3: Increase markets for produce “seconds” by expanding our partnership with East Coast Fresh Cuts (began in 2006) to produce and market fresh organic salsas and other specialty products.

1. Sales of produce seconds increased dramatically over the life of the project, all but eliminating waste for these foods and providing additional income to approximately 50 growers.
2. Seconds sales includes:  
The Healthy Families–Family Farms \$7,735 in 2007 and \$31,000 in 2008.  
East Coast Fresh Cuts/Coastal Sunbelt \$2,291 in 2007 and \$4,126 in 2008.  
College dining services were added in 2008 with sales totaling \$194.

#### **IV. Results, conclusions, and lessons learned**

- At the beginning of this project period, only a handful of growers in southwest Virginia used hoop houses or other season extension techniques. As a result of the workshops and demonstrations funded by this project, at least 15 growers now use hoop houses for either spring or fall production, and several others have shown interest. It seems feasible to think that hoop houses will become increasingly widespread over the next several years, both for Appalachian Harvest and farmers market type growers.
- The other positive development resulting from this project was the expansion of markets for organic produce seconds. In addition to Healthy Families, Family Farms, and East Coast Fresh Cuts, the emergence of college and university dining services as a buyer of seconds opens a potentially enormous market for these good quality but aesthetically imperfect foods. Because they can be sold at a discount and still provide a good return to farmers, it may be feasible to move substantial volumes of local, organic produce into university food service.
- The overall increase in local farmers raising organic produce during this project was about 30, including both *Appalachian Harvest* and direct market farmers.

#### **V. How progress has been made to achieve long term outcome**

- As a result of this project, efforts will be made to continue increasing the use of hoop houses and to expand the markets for organic produce seconds.

#### **VI. Additional information**

- Additional information about this project can be obtained by contacting Katherine Terry.  
[www.asdevelop.org](http://www.asdevelop.org)

#### **VII. Project contact person**

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