

### **Performance of a Novel Solar Greenhouse Prototype**

In spring of 2009, after many years of planning and fund-raising, a forward-thinking, civic-minded, community-based group of volunteers in Blacksburg, Virginia (ordinary citizens working together with scientists and engineers from private and public entities) constructed a novel prototype solar greenhouse for demonstration purposes. This group invested much money, time, and effort based on their assessment of existing reasonable and convincing anecdotal evidence that their novel solar greenhouse design can be successfully adapted for home-grown and commercial production of high-quality specialty crops (specifically winter vegetables, culinary and medicinal herbs) at much lower cost in Virginia. The problem is that there has been no systematic applied engineering research on the insulation, solar heat storage/dissipation and other performance measures (production and cost efficiencies) of their prototype structure needed to develop science-based, universally-applicable guidelines for design and operation of such solar greenhouses. This information gap is the major impediment for this group to publicize and generate interest in their prototype for homeowners or entrepreneurs interested in investing time and money in their solar greenhouse design. We are seeking VDACS funds to (a) purchase the hardware and software (meaning indoor and outdoor meteorological test equipment and sensors) needed to evaluate the performance of this prototype solar greenhouse, and (b) assist in publicizing the findings and results to extension agents, the public, and industry in Virginia and beyond.

### **Marketing Expansion Initiative Promoting Virginia Grown Christmas Trees**

The Virginia Christmas Tree Growers Association (VCTGA) is seeking to take a more proactive approach to better connect tree growers and potential buyers by focusing primarily, but not exclusively, on civic, community, and non-profit organizations and groups. Project "Marketing Expansion Initiative Promoting Virginia Grown Christmas Trees" will help in the sale of Virginia Christmas trees by establishing greater visibility and marketing opportunities for its growers within the Commonwealth by sponsoring marketing expos in each region or by combining regions of Virginia as a vehicle to connect growers and buyers.

The industry faces many challenges that must be promptly addressed. This proposal will enhance marketing practices and bring growers and buyers together in a professional setting. All involved will benefit from marketing expos and will boost the overall economic wealth of Virginia.

A strategic marketing plan is proposed to help increase the effectiveness of the VCTGA and better reach 325+ growers across the state. This project has a strong outreach component aimed to help small and large tree growers, limited resource growers, women in agriculture and minorities. This project will impact hundreds of growers and thousands of buyers in Virginia as well as millions of customers.

### **Increasing the Competitiveness of VA Specialty Crop and Disadvantaged Farmers through a Statewide Situational Assessment of the VA Farm-to-School Program**

In 2007, the Virginia General Assembly passed Senate Joint Resolution 347, establishing a Farm-to-School Task Force. During 2008 and 2009, diverse groups collaborated to strengthen the Virginia Farm-to-School Program. In 2010, the General Assembly passed House Joint Resolution 95, establishing a Virginia Farm-to-School Week. Although the Virginia Farm-to-School Program has been significantly enhanced through these efforts, a comprehensive, scientific analysis of the potential impact to Virginia's specialty crop sector has not been completed. The purpose of this project is to conduct a statewide situational assessment of the Virginia Farm-to-School Program to improve the competitiveness of Virginia's specialty crop and disadvantaged farmers. This project will focus on fruits and vegetables for Virginia Farm-to-School.

This project will employ an interdisciplinary, collaborative approach. The objectives are to increase the purchasing of Virginia fruits and vegetables for: 1) all Virginia school divisions for all school lunches, 2) enrolled USDA Fresh Fruit & Vegetable Program schools and 3) the 2011 and 2012 Virginia Farm-to-School Weeks. The project activities include pre-survey forums, a statewide survey of school nutrition and food service directors, focus group sessions, key informant interviews, educational workshops to report results, a mentorship network, and a final project report.

### **Specialty Crops Cooling and Packing**

Plastic bins and a box and crate packing inventory for the Southwest Virginia Farmers Market cooling program will save farmers the full amount of this award annually. By reducing the cost of these supplies, the savings are passed back directly to the farmer. The inventory can be replaced as it is used, so although it is consumable, this award will maintain a very handsome return on your investment to farmer net profits for many years.

### **Educational Opportunities for Farm Direct Marketers & Farmers Markets**

Direct marketing of agricultural products has grown to meet the needs of small- to medium-size family farms looking to sustain the farm and preserve farmland. Selling directly to the end user provides the farmer with more money for his products. Direct marketing also meets the needs of the local community, providing consumers, restaurant chefs and retail stores with a source of fresh product. The desire for fresh, safe and flavorful farm products has heightened, due in part to food borne illness outbreaks nationwide. Advocates of buying locally feel having a relationship with the farmer means fresher, safer food. This project is a three-pronged approach to bolster direct marketing in Virginia:

1. Develop an updated, revitalized Farmers Direct Marketing Association (FDMA) Web site. The site will focus on keeping direct marketers up to date on issues, provide tools and resources for growing their businesses, provide membership information, and alert them to meetings, workshops and conferences related to direct marketing and the production of specialty crops.

2. Develop a business-to-business Facebook page, where direct marketers can network with their peers, allowing them to share information and resources to benefit their operations.

Develop a series of workshops to benefit farm direct marketers and farmers markets. These workshops would provide direct marketers with information and resources for developing direct marketing operations, diversifying existing operations, locating markets, and effectively marketing their operations. Once developed, these workshops could be conducted across the state, based on the needs of the area.

### **Strawberries**

According to the 2007 Agriculture Census, 330 acres of strawberries grew in Virginia on 178 farms. Over 150 acres were grown in the Southern half of the state. Plasticulture strawberries are very expensive to grow but can be a profitable specialty crop with good management practices and productive sales. Each year it becomes harder to get consumers to the farm to pick or purchase berries.

Consumers need to know when the berries are in season, the location of the farms, how to pick, care for and use the berries, and to learn the nutritional benefits. Such gained knowledge would lead to new customers visiting the farm to buy berries, customers purchasing more berries, repeat purchases, and a satisfied customer in knowing how to care for and use the berries.

This proposal is to design, develop and supply promotional tools to the farm to increase nutritional knowledge of strawberries and to develop community awareness of locally grown strawberries thus increasing on farm sales and consumption of berries. Marketing tools will include nutritional facts and recipe brochures to be used at the farm, strawberry booklets and stickers for children, and media advertising to alert consumers to the local strawberry season.

### **Beautiful Gardens Plant Breeder Workshop**

The Virginia Nursery and Landscape Association (VNLA) manages a plant introduction program recognized by the branded name of Beautiful Gardens®. This program, initiated in 2004, is composed of several partners (commercial, governmental, and academic). The program's specific purpose is to locate, evaluate, select, propagate, distribute, and promote for sale new-to-the-trade landscape plants with an emphasis on native plants. The overall purpose of Beautiful Gardens is to expand the plant production and sales opportunities for Virginia nursery growers and retail garden centers. A key factor in the continuing success and growth of the Beautiful Gardens® program is the "discovery" of new plant material. We have acquired new plants from private individuals/collections, arboreta, and plant collection trips. The goal of this proposed project is to add an additional source of new plants for Beautiful Gardens® by designing and implementing a series of plant breeding workshops throughout Virginia. This educational activity would be offered to commercial and private individuals (i.e., hobbyist gardeners), a large and

viable pool of plant breeders, for the purpose of developing new and improved plant varieties. Beautiful Gardens® would then serve as a resource for the evaluation, propagation and sale of this new plant material.

### **Increasing GAP Certification Readiness among Organic and Conventional Growers and Nutrition Knowledge and Consumption of Specialty Crops among Children and Adults in Southwest Virginia**

ASD proposes a 12-month project that aims to impact two key issues facing its stakeholders in Southwest Virginia: 1) knowledge gaps on good agricultural, food handling, storage and transportation practices that organic and conventional specialty crop farmers face to be in compliance with anticipated new regulations that will come with new national food safety legislation; and 2) nutrition knowledge gaps and access to good, healthy food, including specialty crops, especially among low-income people, which in part contributes to a high obesity rate – and associated illnesses - in the region.

ASD will increase from 40 to 75 the number of local organic and conventional specialty crop growers in its target beneficiary group who are GAP certification ready, by providing them with comprehensive GAP training developed and delivered by ASD and its Appalachian Harvest staff. Through its Healthy Families – Family Farms Program (HFFF), ASD and local partners will use education and media events to increase consumer awareness of the nutritional value of specialty crops, especially among low-income, underserved populations. HFFF will incorporate this education and media work into its overall program, which raises local funds to purchase organic specialty crop seconds from ASD's Appalachian Harvest growers and donates them to local food pantries. The education and media campaigns will also help direct targeted beneficiaries to the food banks to help them source healthy specialty crop produce.

### **Handling and Use of Poultry Litter Incineration Ash Byproducts as Organic Fertilizer in Fresh Market Tomato Production**

Virginia tomato growers fertilize with inorganic phosphorus fertilizers based on soil test recommendations. Meanwhile, grain farmers land apply fresh poultry litter that contains significant phosphorus concentrations as a substitute to inorganic fertilizer sources, but this option is not available to vegetable growers due to food safety concerns. This research aims to develop a management program for production, handling and use of poultry litter ash (PLash), a high phosphorus byproduct of poultry litter incineration in biomass to energy systems, as an alternative fertilizer source for organic and conventional fresh market tomato production. We will compare different PLash sources to inorganic triple superphosphate (TSP) fertilizer. Different PLash sources will be derived from one experimental and two pre-commercial incineration systems and evaluated at 40, 80, and 120 pounds P<sub>2</sub>O<sub>5</sub> per acre and compared to a no-fertilizer control. Findings will be disseminated to industry and producers via conferences, field days, brochures, and fact sheets. If PLash provides an alternative to inorganic phosphorus fertilizer in fresh market tomato production, the opportunity exists to incorporate surplus fertilizer sources into local vegetable production after undergoing change through

bioenergy systems. Improving use of poultry litter in sensitive watersheds, such as the Eastern Shore, will facilitate sustainable production systems.

### **Developing, Teaching and Promoting Sustainable and Organic Growing Practices at Maple Hill Educational Farm**

Local Food Hub is a Virginia-based nonprofit organization working to provide small and beginning farmers with concrete services and hands-on educational opportunities to advance their economic vitality, increase their production of specialty crops, and promote stewardship of the land.

Local Food Hub has been granted use of a 75-acre, certified organic educational farm. We will work with other successful farming organizations to develop a sustainable, stand-alone, small farm that will serve as a blueprint for the establishment of more organic, Specialty Crop farms in our area.

In addition, Local Food Hub will create and host hands-on workshops and classes at this educational farm, with topics ranging from sustainable crop planning, organic pest management, season extension, and other sustainable and organic farming methods. This curriculum will help Specialty Crop Producers learn and implement organic and sustainable farming practices and increase production of specialty crops, thereby becoming more profitable and competitive.

Local Food Hub will also develop the next generation of Specialty Crop Producers through apprentice and internship opportunities, classes and seminars that will provide them with the skills and knowledge necessary to operate their own sustainable and/or organic farms.

### **High Resolution Vineyard Site Suitability Mapping**

There are many decisions that a potential grape grower must make as he or she contemplates putting in a vineyard. Site selection is arguably the most important first decision to be made. Success or failure of a commercial vineyard hinges directly on this issue. Up until now there have been few resources available to the new grower regarding the process of picking a suitable site.

The development of a contemporary GIS vineyard site suitability program will significantly improve the site selection tools available to all Virginians. The proposed reassessment will also encourage 'smart growth' of Virginia vineyards which will help maintain a competitive edge for Virginia's grape and wine industries.

### **Organic Management of Pest Predation in Commercial Production of Summer Squash**

Virginia farmers who sell organically-grown vegetables have reported consumer's rising expectations for the richness and variety of locally grown summer squash. Examples

include a green zucchini, Costata Romanesco, two specialty types, Magda and Floridor and a white patty pan, White Bush Scallop. The summer production of these crops are challenging due to insect pest pressure from the squash bug, the squash vine borer and the cucumber beetle. Currently, farmers spend time and field space planting succession crops of summer squash in order to circumvent their devastating effects. Although there are insecticides that are OMRI approved, they only work at specific growth stages or are ineffective to prevent plant mortality. We propose to test two different management practices centered on trap crops and beneficial companion plants to help extend the life and productivity of summer squash plants throughout the state of Virginia. Replicated field trials concerning insect pest pressure on summer squash will be conducted in 2010 and 2011 at six organic farms. The two management protocols will be tested on four different varieties of summer squash at paired locations.

### **Working Capital Grant to Develop a Broad Based Website for the Promotion of Virginia Apples**

The Virginia Apple Industry desires to facilitate communication, increase awareness, promotion and consumption of and further education about Virginia apples by development of a website through which information can be exchanged between producers, consumers, commercial apple processors and retailers, educators and industry boards. This website will be a collaborative effort between the Virginia Apple Board, the Virginia Apple Growers Association and the Virginia State Horticulture Society, with technical support on international trade being given by The GIC Group.

The home page will flow to sections with links to commercial components of the industry, industry resources and educational information for consumers, educators and professionals. The site is envisioned as a link to other links. The site will be interactive and developed in such a manner as to enable future use of additional applications, such as webinars, GPS, Facebook, Twitter, blogs, a members-only area and capabilities for non-English speaking users. It will also be developed using software which will allow ongoing maintenance and updates to be done mainly by an administrative assistant.

The Virginia Apple industry believes that a web presence in today's marketplace is absolutely necessary. Creation of such a website will be a powerful communication and marketing tool that will serve to greatly enhance the exposure, efficiency and therefore profitability of the Virginia Apple Industry.

### **Connecting Southwest Virginia Farmers to Institutional Buyers through Local Food Processing and Preservation**

The purpose of this project is to study the feasibility of a food processing center in Floyd County, Virginia. The center will aggregate, process, store and package locally grown fruits and vegetables then market and distribute the products to regional buyers including institutions, college cafeterias, Farm-to-School programs, grocery stores and restaurants. The facility will connect southwest Virginia farmers to these large customer groups actively seeking locally-grown, sustainably-farmed food that meets their unique requirements. By serving to decentralize Virginia's food supply, it will also serve to

enhance our food security and provide long-term markets for sustainable specialty-crop producers.

The facility would not compete with the region's vibrant small-scale farms now serving CSA's, farmers markets and gourmet restaurants. Instead, it would allow existing and new Virginia farmers to serve larger buyers who require a larger scale, greater standardization, ease of preparation and availability outside the growing season. In short, the study paves the way to sustaining and creating viable specialty-crop producers to serve this large, untapped market in Southwest Virginia.

### **Expanding Markets for Virginia's Specialty Crops**

Although Canada is a significant market for Virginia Grown ag products, there is plenty of room for growth. Potatoes, green beans, tomatoes stone fruit and watermelons are among the the products that are shipped to Canada each year, and Virginia producers have expressed an interest in increasing their market share in Canada.

The project will consist of three parts each of two years:

1. Evaluating the market in the Toronto area
2. Visits to existing and potential customers by VDACS personnel

Evaluation of project

### **Improved Management of Harlequin Bug in Cole Crops**

Harlequin bug is an important pest of cole crops in Virginia, and if not controlled, total crop losses can occur in some years. Historically, conventional vegetable growers have used broadspectrum insecticides (carbamates and pyrethroids) to control harlequin bug. In the interest of human and environmental safety and IPM, there has been a shift away from the aforementioned chemicals for more narrow-spectrum and less toxic approaches. Effective IPM-friendly alternatives have been adopted for control of caterpillar pests in cole crops, but these narrow-spectrum insecticides do not control harlequin bug.

The use of soil-applied neonicotinoids and trap cropping with more attractive plants that draw bugs away from the cash crop have potential as effective alternatives to broadspectrum insecticides. The objectives of this project are: (1) to evaluate the residual efficacy of various soil-applied neonicotinoid insecticides for harlequin bug control; 2) identify proper trap crop plant species through lab research/bioassays; and (3) develop proper implementation of the trap crop in field trials/research trials at Virginia Tech research facilities as well as on commercial vegetable farms in Virginia. Conducting research on commercial farms is of particular importance to this project. Input from farmers will improve the likelihood of implementation in the future.

### **Stink Bug Populations, Injury and Control on Primocane-bearing Caneberries**

The proposed research deals with stink bugs on primocane-bearing caneberries. These late season pests cause losses from feeding injury to berries as well as contamination with their waste. Stink bug populations are in a state of change, and the

exact species composition on berry crops is unclear. Stink bugs feed before and during berry harvest; consequently pesticide selection is difficult because of preharvest intervals. This project has three objectives:

1. Determine which stink bug species occur in Virginia caneberries and whether stink bugs use caneberries as feeding and/or reproductive hosts.
2. Determine efficacy of selected conventional insecticides, low-risk pesticides, and organic alternatives against stink bugs in caneberries.
3. Determine the mechanisms of stinkbug feeding injury in caneberries

### **Production and Marketing of High Tunnel Grown Ginger Roots In Virginia**

Nationally, consumer demand for locally grown fresh fruits and vegetables is on the rise. In addition to this, consumers in the US are also considering food products with recognized health benefits. Ginger root is an Asian plant spice with numerous health benefits that has crossed over to the main stream American food market, and it is commonly used in different cuisines and beverages. In 2008, the United States imported a total of 41,468.3 metric tons of ginger with a value of 37.2 million dollars. Hawaii is the only state in the U.S. with commercial production of ginger root. Ginger cannot be grown under field conditions in Virginia as it requires 9-10 months of growing season. It is possible, however, to extend the 7 month Virginia growing season to 10 months using high tunnel structures. Investigation at Virginia State University has shown that high quality ginger can be grown under high tunnel conditions in Virginia. Test marketing results from the local markets showed considerable consumer demand for Virginia grown fresh ginger root. As Virginia growers continue to look for new and profitable specialty crops, high tunnel production of ginger root can be considered an alternative.