



**TEXAS DEPARTMENT OF AGRICULTURE**  
**TODD STAPLES, COMMISSIONER**

**SPECIALTY CROP BLOCK GRANT PROGRAM**

**2010 FINAL REPORT**

*Grant # 12-25-B-1096*

Karen Reichel, Grants Coordinator

Date Submitted: January 13, 2014

Date resubmitted: March 11, 2014



**Texas Department of Agriculture**  
**2010 Specialty Crop Block Grant Program**  
**Final Report**  
**Grant # 12-25-B-1096**

**Annual Reports**

Executive Summary .....	1
Project 1: The Education of Texans to Recognize the Benefits of Turfgrass to the Environment and How to Maintain Healthy Lawns While Conserving Water .....	6
Project 2: Implementation of GAP’s in the Texas Pecan Industry .....	10
Project 3: From Seed to Kitchen Table: An Integrated Approach to Gardening and Food Nutrition.....	13
Project 4: Investigating Environmental Impact and Best Management Practices for Olive (Olea Europaea L.) Production in Texas.....	17
Project 5: Improving Safety of Texas Leafy Vegetables – Phase 2.....	27
Project 6: The Benefits of Herbs as a Texas Specialty Crop .....	35
Project 7: Educating the Green Industry Distribution Cycle .....	39
Project 8: Real Trees for Young Families Campaign .....	43
Project 9: Texas Rio Star Grapefruit Round-Up Days.....	47
Project 10: Advertising Campaigns for the 95 Texas Certified Farmers Markets for the Purpose of Increasing Sales of Fresh Fruits and Vegetables .....	51
Project 11: Evaluation of Cool-Season and Warm-Season Grasses for Seed Production in West Texas .....	55
Project 12: GO TEXAN Watermelon TV Campaign .....	59
Project 13: Texas Vegetable Marketing Campaign .....	65
Project 14: Alternative Commercialization Path for Specialty Crops: Promoting Stone Fruits and Pecans by Targeting High Value Markets Oriented to Human Health.....	71
Project 15: Food Safety for Produce: Traceability and State Wide Conference.....	76
Project 17: Peach Production in Hightunnel.....	82
Project 19: Creation of Informational Materials and Supporting Advertising Campaign .....	86
Project 20: Texas Department of Agriculture Educational Program .....	94
Project 21: Good Agriculture Practices (GAP) Certification Assistance Program.....	98
Project 22: Diaprepes Eradication – Dooryard .....	100
Project 23: Website-Outreach on Citrus Greening in Texas.....	103
Project 24: Food Safety Education and Buyer Tour of Texas Produce .....	107
Project 25: A Survey to Detect Citrus Greening Disease in the Citrus Greening Quarantined Area.....	113
Project 26: GO TEXAN Retail Specialty Crop Spring Promotions .....	117



## EXECUTIVE SUMMARY

---

The purpose of the federal Specialty Crop Block Grant Program (SCBGP) is solely to enhance the competitiveness of specialty crops. Specialty crops are defined, as “fruits, vegetables, tree nuts, dried fruits, horticulture and nursery crops (including floriculture).”

The Texas Department of Agriculture (TDA) applied for the 2010 SCBGP funds with projects focused on five key strategic areas: 1) food safety, 2) industry development, 3) marketing (domestically and internationally), 4) nutrition and 5) plant health. TDA’s efforts seek to ensure consumers are getting the highest quality produce and farmers/growers have the ability to protect the health of the specialty crop industry. Additionally, the agency focuses on efforts to increase consumption and consumer awareness of Texas-grown produce and plants. The completed educational, marketing and promotional activities assisted specialty crop growers in Texas by showcasing their products, increasing the value of their crops and enhancing their competitiveness in the marketplace.

### Impact Statements

Through a competitive grant process, TDA selected projects that provided a strong benefit to specialty crops in Texas. The following is a summary of the projects funded, as well as the impact the project had on Texas specialty crops. In addition, a detailed report on each project has been provided.

#### *Sub granted projects:*

- The Turfgrass Producers of Texas (TPT) developed a project television ads and YouTube videos to drive consumers to TPT’s website ([www.tx sod.com](http://www.tx sod.com)). Total visits the website during the July through September 2011 period increased by 36.7 percent compared to the same period in 2010.
- The Texas Pecan Growers Association (TPGA) conducted a project to develop written Good Agricultural Practices (GAPs) for the pecan industry. GAP booklets were mailed to approximately 1,200 TPGA members and Pecan South magazine subscribers and downloaded 62 times from TPGA’s website. Through field day presentations, an estimated 400 growers were educated on the importance of GAPs in the pecan industry.
- The High Plains Food Bank and Texas A&M AgriLife Extension Service developed a project to educate children and adults on eating habits by an integrated hands-on approach to food production from seed to harvest and into homes. Project staff successfully surpassed the goal of reaching 20,000 consumers with educational activities regarding food consumption and nutritional intake of specialty crops with a total of 126,051 consumers.
- Texas Tech University conducted a project to identify management practices for olive production in Texas. Based upon industry needs, the research addressed irrigation, plant physiology and effect of temperature on bloom and fruit set (tree phenology).

- Texas A&M AgriLife Research and Texas A&M AgriLife Extension Service investigated engineering, design and dissemination of technologies to ensure the safety and quality of fresh leafy vegetables, while enhancing communication and management throughout the food chain. Data provided critical information needed to address the problem of pathogen growth in the spinach leaves caused by temperature fluctuations during storage. Irradiation at a low dose (1 kGy) maintains the quality attributes of spinach; however, this low dose may still not be sufficient to treat contaminated spinach. It is recommended that intervention strategies should be implemented when cooling practices are slow or temperature fluctuations occur.
- The San Antonio Herb Market (SAHM) created a project that offered information on health benefits, uses, and sources of fresh herbs through public events, seminars, booklets and website presence. Attendance by visitors/customers improved from an estimated 2,000 people in 2011 to approximately 5,000 people in 2012, a 150 percent increase at the fall herb market events. Sales that were reported from the herb growers and herb product producers also increased by 26 percent from 2011 to 2012.
- The Texas Nursery & Landscape Association developed a project to increase the educational opportunities and variety for the nursery and landscape industry to improve their knowledge and training. Prior to the grant only 21 people had registered online. Staff reports that 43 online courses were completed by the conclusion of the project.
- The Texas Christmas Tree Growers Association developed a project to connect with target customers and young families by providing an up-to-date website and a multi-faceted social media advertising campaign. Website traffic increase from 83,423 visits in 2010 to 263,883 visits in 2012. Almost all growers have reported increased sales for the 2012 Christmas season, with many reports of tree sales increasing 10-20 percent.
- TexaSweat aimed to increase awareness and consumption of Texas Rio Star Grapefruit by conducting in class educational demonstrations at Texas school campuses, print and online media and a series of in-store sampling demonstrations. Project staff was able to present to 14 schools reaching a total of 3,185 students. Traffic to [www.texasweet.com](http://www.texasweet.com) increased nine percent for the period of January 1, 2011 through March 1, 2011 (the time that the program was actually being presented to the public) compared to the same dates of the previous year.
- The Texas Certified Farmers Market Corporation developed a marketing project to solely promote public awareness of fresh fruits and vegetables sold at local member markets through the use of local and area media advertising. The farmers markets using the grant funding overwhelmingly reported increased sales in their market locations. Between 2010 and 2011, TDA reports indicate that certified farmers market sales increase more than \$1.9 million, which project staff feels is a direct result of this project.

- Texas Tech University developed a project to examine the seed production capabilities of several cool-season and warm-season turfgrass species in West Texas. Extreme temperature variations, minimal to no rainfall, very low humidity, and high winds created an environment that was not conducive to grass establishment in 2011. The fact that seven of the eight turfgrass species germinated initially does provide some support to the idea that production still may be possible in West Texas.
- The Texas Watermelon Association developed a project to increase both consumer awareness and sales of Texas watermelons by creating a generic brand awareness campaign. Typically, sales of watermelon during in store demonstrations increase an average of 120 percent. With the addition of the TV marketing campaign, TWA expected to see an increase in sales of 200 percent; however retailers only reported on increase in sales of 128 percent. Including alternative sale sites, such as roadside stands and farmers markets, growers reported a 54 percent increase in statewide sales for 2010 over 2009.
- The Texas Vegetable Association developed a project that included a TV campaign, banner ads and retail demonstrations. Based on reports submitted by the participating retail grocery stores the sales of Texas vegetables increased between 65 percent and 1,263 percent for an average of 228 percent.
- Texas A&M AgriLife Research developed a project to establish an alternative commercialization path for stone fruits and pecans targeting high value markets oriented to Human Health. This multi-year project aimed to study the effects of stone fruit and pecan polyphenols against some components of the metabolic syndrome. Results indicated that stone fruit polyphenols have multiple functions and could potentially work against the metabolic syndrome in different fronts simultaneously.
- The Texas Vegetable Association developed a project to increase knowledge and encourage dialogue between producers, government agencies and other stakeholders by conducting a statewide food safety conference and a regional traceability conference. Survey results indicated there was a 38 percent increase in level of knowledge at the statewide conference, and an 18 percent increase in the level of knowledge at the traceability conference.
- The Texas Fruit Growers Association set up a high tunnel project for tree fruit in Texas. The purpose was to use hoop type structures to protect early blossom of tree fruit from spring freeze damage and hail injury and create earlier production for the season when peaches are in short supply and high priced. Results from this project indicate that this high density production method can be viable in Texas. Fruit under high tunnel production has the potential to be marketed four weeks earlier than field production and produced on one year old trees. Additional results yielded lower insect and disease threats.
- Texas Citrus Mutual developed a project that used outreach as well as a mesh ground cover to reduce the number of Diaprepes root weevil. The goal for this project was to

install ground cover in at least 15 acres of commercial and residential citrus groves in McAllen and Bayview, Texas, to reduce the diapaepes population and improve the overall health of citrus groves. In March 2012, approximately 11 acres of citrus have been installed with the ground cover fabric in the Bayview area with growers reporting reduced weevil catches and significantly improved tree health.

- Texas Citrus Mutual developed a project to increase *Huanglongbing* (HLB) awareness among growers, home owners and other industry stakeholders in Texas by disseminating detailed information via the new website and through improvements to the existing website. Monitoring of website traffic for the year to date (January through August) on both websites indicates approximately 31,000 hits.
- Texas Vegetable Association (TVA) and Texas A&M AgriLife Extension Service developed a project to create a webinar series, a food safety conference and a buyers tour to promote the science of food safety which is being developed at a rapid pace. In addition, TVA sought to evaluate the current competitive state of the fruit and vegetable industry in Texas to identify challenges and opportunities.

#### *Texas Department of Agriculture projects*

- TDA's Marketing and International Trade office developed a project to increase the awareness of Texas specialty crops at the consumer level. In addition the project was intended to increase consumption of Texas produce and sales of horticulture plants through both consumer-and producer-driven projects. Retail and grower surveys indicated a 5 percent increase in sales as a result of using the Texas Superstar® plant and hang tags combined with the media promotions. The Texas Local Florist website saw a 125 percent increase in hits as a result of using the plant stakes and hang tags. Twelve farmers markets and 12 local Texas chefs from restaurants in several areas throughout Texas participated in the promotion to introduce local Texas produce into restaurants. TDA partnered with participating markets to distribute 3,400 samples of specially prepared produce and recipes to consumers. Participating farmers markets reported an average of 27 percent increase in attendance to the markets and an average of 27 percent increase of sales of Texas produce.

Producers reported an average of 59 percent increase in sales at the larger wholesale market. Smaller producers selling directly to the consumer only experienced a 27 percent increase in sales of produce.

- TDA's Marketing and International Trade office marketing project was to increase the awareness of Texas specialty crops at the consumer level through consumer, retail and chef education. The development of culinary workshops using fresh Texas produce, the development of child nutrition projects and informational materials, as well as the development of retail educational events, directly enhance the consumption of fresh fruits and vegetables.

TDA conducted 86 culinary workshops to train chefs and consumers on how to cook with Texas produce in their homes and restaurants. TDA conducted 11 regional chef and grower tours, educating more than 60 chefs on produce availability, seasons and selection. Retail produce demonstrations continue to yield excellent results with a sales increase of 59 percent. TDA also conducted the Agriculture is Your Culture – A Kids View project which benefited more than 300 children.

- TDA's Grants office developed a project for the purpose of the Good Agricultural Practices (GAP) Third Party Audit Assistance cost share program to incentivize new Texas Specialty Crop producers to participate in a 3rd party audit to become GAP certified. Staff developed a request for proposals to solicit assistance from private third party audit companies to reach approximately 100 specialty crop producers in Texas. Only four audits were completed during the grant cycle.
- TDA's Agriculture and Consumer Protection office conducted a project to survey approximately 1,400 sentinel dooryard citrus trees within the quarantined area to find out if the disease is present elsewhere in the quarantined area. Survey teams comprised of TDA and USDA personnel examined the sentinel dooryard host trees for citrus greening disease symptoms and collected foliar tissue samples from trees that demonstrated symptoms consistent with citrus greening disease. The survey results clarified that the disease currently is detectable (1) in plants in the grove where citrus greening was initially detected; (2) in the grapefruit grove directly across the road from the original site; and (3) in a residential landscape immediately adjacent to the two groves. As a result, there is no current justification for expanding the quarantined area beyond its original boundaries; this means that the number of citrus producers, citrus production nurseries, citrus retail nurseries, and homeowners that are directly impacted will be minimal.
- TDA's Marketing and International Trade office has tremendous success working with retailers through the agency's GO TEXAN program and specifically in specialty crop promotional activities. This project was intended to take the TDA/Retailer partnership to the next level, enhancing the retail participation in the GO TEXAN program's efforts to promote Texas specialty crops, thus increasing producer sales and product value. The project resulted in an 18 percent increase in sales.



## **PROJECT 1: THE EDUCATION OF TEXANS TO RECOGNIZE THE BENEFITS OF TURFGRASS TO THE ENVIRONMENT AND HOW TO MAINTAIN HEALTHY LAWNS WHILE CONSERVING WATER**

---

**Name of Organization:** Turfgrass Producers of Texas

**Project Manager:** John Cosper, Executive Director, (979) 533-9750, [tpt@txsod.com](mailto:tpt@txsod.com)

**Type of Report:** Final Performance Report

**Date Submitted:** December 2012

### **Project Summary**

Turfgrass is a valuable resource for the urban environment. Most consumers are unaware of the benefits provided by turfgrass and often do not have the appropriate information in the selection, installation and management of it. Turfgrass Producers of Texas (TPT) developed television ads and YouTube videos to drive consumers to TPT's website ([www.txsod.com](http://www.txsod.com)). The website provides information on the availability of turfgrass, as well as information on turfgrass selection, installation and maintenance.

### **Project Approach**

A total of 308 television ads, previously produced, began running in late March 2011 and continued into early May in Austin, San Antonio, and Dallas/Fort Worth, Texas. Ads encouraged the public to visit the Turfgrass Producers of Texas website, [www.txsod.com](http://www.txsod.com), to learn more about turfgrass.

The TPT steering committee saw the need to emphasize site preparation and proper irrigation installation. YouTube videos addressing these topics were developed by a marketing firm and posted to the website.

Using the internet based tool, Survey Monkey, a survey was conducted among TPT grower members asking the question "How did your 2011 sod sales compare to those in 2010?" A total of 29 responses representing a return rate of 45 percent were received. Nineteen of the 29 respondents indicated that sales had decreased in 2011 versus 2010. Ten of the 29 reported increased sales during the same period. Project staff felt that these were positive results due to the extreme drought experienced in 2011.

This project supplements work previously done by TPT. Consumers visiting the TPT website are able to utilize the educational materials developed with 2009 Specialty Crop Block Grant funds.

### **Goals and Outcomes Achieved**

The television ads started airing in March 2011 and targeted 25-54 year old homeowners. Total visits to both websites during the July through September 2011 period were up 36.7 percent compared to the same period in 2010. TPT feels that this increase is due both to the television ads and the optimization of the website.

Staff anticipated members would see improved sales up to 10 percent as a result of the marketing efforts. However, due to the drought of 2011 coupled with sluggish housing starts

resulted in only about 30 percent of TPT members who experienced an increase in sales during 2010.

### **Beneficiaries**

- **Consumers:** The television ad campaign helped direct consumers to the website where they found helpful and timely information on how to select, install and maintain turfgrass. Consumers were also able to find contact information for the members of the Turfgrass Producers of Texas selling their desired sod.
- **The General Public:** The television ads increased awareness of the benefits of turfgrass to the urban environment. Information is available to the public through the association's website and YouTube videos that were developed to provide information on installation, irrigation, maintenance and care of turfgrass.
- **TPT Members (more than 60):** The television ads drew an increased audience to the TPT website. Members reported that the television ads resulted in more contacts and visibility of their individual operations.
- **TPT:** A new alliance with Texas Turf Irrigation Association was formed and TPT worked with them to produce YouTube videos about recommended irrigation practices in Turfgrass.

### **Lessons Learned**

**Television Ads:** Television ads are expensive to produce and air. Careful consideration needs to be given to the target audience and how to best utilize the available funds to maximize the exposure to the targeted audience. Project staff could not have done this project without the assistance of a good marketing firm that was able to achieve the objectives.

**YouTube Videos:** Market researchers tell us that the younger generation of consumers is increasingly turning to social media such as YouTube for information. TPT originally hoped to produce six to eight YouTube videos about turfgrass selection, installation, and maintenance, but ended up with 28 videos. It was advised that videos should be short and present concise information. Again, using an experienced marketing firm helped us to produce these quality videos in a timely and efficient manner.

### **Additional Information**

Turfgrass Producers of Texas: Do's and Don'ts of Lawn Irrigation  
<http://www.youtube.com/watch?v=HcIzIS8nCOI>

Turfgrass Producers of Texas: How do you know which sod is right for you?  
<http://www.youtube.com/watch?v=ZrCcxV1LUv4>

Turfgrass Producers of Texas: Best Times to Water your Lawn  
<http://www.youtube.com/watch?v=Ltf93C2Oi2k>

Turfgrass Producers of Texas Sisters Television Ad  
<http://www.youtube.com/watch?v=G58oljI4mxA>

Turfgrass Producers of Texas Relationships Television Ad  
<http://www.youtube.com/watch?v=lbPrEqU3Bhg>



## **PROJECT 2: IMPLEMENTATION OF GAP'S IN THE TEXAS PECAN INDUSTRY**

---

**Name of Organization:** Texas Pecan Growers Association

**Project Manager:** Cindy Wise, (979) 846-3285; [cindywise@tpga.org](mailto:cindywise@tpga.org)

**Type of Report:** Final Performance Report

**Date Submitted:** December 2012

### **Project Summary**

Due to an increasing focus on food safety issues, recent incidents of contamination in other tree nut industries, and the lack of a written plan in Texas' pecan industry to deal with the subject, the Texas Pecan Growers Association (TPGA) determined there was a need for written Good Agricultural Practices (GAPs) for the pecan industry.

By partnering with Texas A&M AgriLife Extension Service to develop a GAP document, TPGA proposed to distribute the information to Texas pecan growers and impress upon them the need to adopt the recommended practices. Through website availability, magazine publication, county extension agents and annual conferences, these materials were disseminated to growers.

### **Project Approach**

Texas A&M AgriLife Extension pecan specialists were engaged to draft the content of the Good Agricultural Practices for Pecans. A committee of pecan growers drawn from the boards of directors for the Texas Pecan Growers Association and the Texas Pecan Board reviewed the draft and provided input. TPGA printed 4,000 copies of the final version. A copy was mailed to all members of TPGA (approx. 600) and all Texas subscribers of *Pecan South* magazine (an additional 500-600 growers). Attendees of the annual TPGA conference in July 2011 (approx. 500) received GAP booklet, as well as participants of several field days held in the fall of 2011 and spring 2012. These activities helped increase the awareness that the document exists, but more importantly, the awareness of the need to implement such practices. County agents in major pecan-producing counties were provided with multiple copies for ongoing distribution.

In order to publicize availability of the GAP document, two full-page color ads were run in *Pecan South* magazine, which has national circulation in the pecan industry. As a result, TPGA received numerous requests for copies from both Texas growers and producers across the U.S. In order to efficiently distribute the information, the GAP document has been added to the TPGA website, [www.tpga.org](http://www.tpga.org).

### **Goals and Outcomes**

TPGA worked to get Good Agricultural Practices established for Texas pecans and increase Texas pecan growers' awareness of the importance of implementing the practices in their individual operations, for the benefit of both the industry and the consumer.

The combined boards of the Texas Pecan Growers Association and the Texas Pecan Board met with Extension specialists in 2011 to discuss the initial proposed GAP document

authored by Dr. George Ray McEachern, Dr. Larry Stein, Dr. Al Wagner and Monte Nesbitt (all Extension specialists). The group discussed the feasibility of implementing the proposed document and made significant changes so the GAP document could be effective and feasible for implementation. With this significant input from major growers and industry leaders, the revised document was considered complete and ready for presentation at the Texas Pecan Growers Annual Conference in July 2011.

GAP booklets were mailed to approximately 1,200 TPGA members or Pecan South magazine subscribers and downloaded 62 from TPGA's website. Through field day presentations, an estimated 400 growers were educated on the importance of GAPs in the pecan industry.

Project staff did not prepare the written survey prior to the annual conference. So, a verbal Q&A at conference. Project staff asked how many of the audience (approx. 500) were currently aware that the GAP document was available and how many had obtained and reviewed a copy. An estimated eighty percent were aware of the guidelines and had received a copy of the document. Several non-members were in attendance and copies of the document were provided to them at this time). When asked how many had implemented changes as a result of guidelines suggested in the document, the number was small - maybe 5-10 percent. When asked how many were already complying with guidelines suggested in the document, over 50 percent indicated they were already in compliance.

### **Beneficiaries**

Pecan growers, and thus the pecan industry in general, as well as the consumer, are beneficiaries of this project. Other tree nut industries, and the peanut industry, have incurred tremendous losses as a result of contaminated products and resulting illnesses, primarily from Salmonella. The pecan industry has fortunately not faced such a crisis. Pecans are a considerably smaller industry than almonds or walnuts and such an incident would have a more significant negative impact. Just as importantly, these recommended agricultural practices have the ability to contribute to a safer food supply for consumers. The TPGA membership fluctuates between 550 and 600 members; however the Ag Census data shows considerably more pecan growers than that in the state. Many of the growers who are not members of TPGA do subscribe to our monthly magazine, Pecan South. In 2009, Texas produced 60 million pounds of pecans valued at \$89 million; in 2010, Texas produced 70 million pounds valued at \$159 million; in 2011, Texas produced 40 million pounds valued at \$94.5 million.

### **Lessons Learned**

While this project successfully produced guidelines and distributed the information to pecan growers, the adaptation of the guidelines is the ultimate goal and the ultimate benefit. The pecan industry must continue to publicize and educate growers on the necessity of GAP implementation.

Staff continues to distribute the GAP booklet at their annual conference. Staff has indicated that they will continue to follow up on GAP practices and continue to increase the knowledge of Texas pecan growers.

One of the lessons learned is that some producers are not interested in adjusting their management programs unless it is required rather than suggested. Staff is pleased to learn that most producers already employ good practices, are concerned about food safety issues, and are very diligent in implementing responsible management practices.

**Additional Comments**

Good Agricultural Practices for Pecans in Texas: [http://www.tpga.org/good\\_practices.php](http://www.tpga.org/good_practices.php)



## **PROJECT 3: FROM SEED TO KITCHEN TABLE: AN INTEGRATED APPROACH TO GARDENING AND FOOD NUTRITION**

---

**Partner Organization:** High Plains Food Bank and Texas A&M AgriLife Extension Service

**Project Contact:** Ronald French, Ph.D., (806) 677-5600

**Email:** [rdfrench@ag.tamu.edu](mailto:rdfrench@ag.tamu.edu)

**Date Submitted:** December 2011

**Type of Report:** Final

### **Project Summary**

The purpose of this project was to educate children and adults on eating habits by an integrated hands-on approach to food production from seed to harvest and into homes. In the process, participants learned about factors in food production that affect crop production, such as plant diseases. Nutritional education is needed in order to correct and improve the eating habits of both children and adults who are accustomed to highly processed foods, especially those at higher risk of hunger. The Texas Panhandle is a region with an extremely high rate of obesity and diabetes. Through this project, the High Plains Food Bank (HPFB) in Amarillo educated residents about food consumption and nutritional intake. At the Food Bank Garden (Garden), locally grown specialty crops were utilized as part of this educational program and information gathered on yield and nutritional content were used to recommend certain varieties for home garden production. Home gardens improve nutrition to those who supplement their vegetable consumption intake by growing their own produce.

Three goals were set: 1) improve nutrition for the population of the Texas Panhandle by educating consumers served by the HPFB regarding food consumption and nutritional intake; 2) determine the best specialty crops to grow in the region based upon factors such as yield, taste, and pest and disease vulnerability; and 3) teach the basic process of local food production through educational gardening classes.

### **Project Approach**

Within the first quarter of the project, October – December 2010, project staff began reaching out to the community. In an initial outreach campaign, the HPFB Nutrition Training Coordinator worked in schools across the Texas Panhandle to begin teaching the basics of nutrition using USDA approved lessons. 1,295 individuals of all ages participated in the first group of classes. Each class was 30-45 minutes long and involved direct participation by the students. The initial campaign reached 106,129 consumers by e-newsletter, two TV segments on local news stations and one health fair. Although project staff exceeded their goal of reaching 20,000 consumers early in the grant cycle, they continued to focus attention on direct education.

Continued efforts in the second quarter provided direct education to 1,200 students/consumers. Additionally, 3,500 received nutritional information from social media, T.V. and the High Plains Food Bank website (input website).

A survey was created in January 2011 and was distributed within the network of agencies to determine what vegetables are desired and culturally appropriate throughout the Texas Panhandle. According to these agencies, the top three vegetables most desired during the growing season are: tomatoes, green beans and onions. The results of this survey and staff research helped determine the best specialty crops to grow in this region.

In the third quarter of the project, 1,542 consumers were reached through direct education classes while 5,770 received information from social media, T.V. and the High Plains Food Bank website.

During the peak-growing season, the two garden interns documented the process of starting a garden while learning the hands-on techniques themselves. The information they compiled was assembled into a user-friendly “how-to” document available for distribution. This project was a valuable education experience for the two interns and the resulting document is a useful marketing tool for educating the public on the basics of gardening in the Texas Panhandle. The booklet was mailed to rural Food Bank agencies, distributed at local fairs and used as a guide for both large and small scale food gardens. By the end of the fourth quarter, approximately 200 “how to” documents had been distributed to the public.

In addition to the “how-to” document distribution in the fourth quarter, 62 consumers participated in nutrition education classes and 5,538 consumers received education from social media, TV and the High Plains Food Bank website.

In an effort to promote healthy eating and obtain data on the public’s taste preference on ten varieties of specialty crops grown in the Garden, project staff conducted a taste test at the High Plains Food Bank on September 27, 2011. The individuals that participated ranged in age, gardening ability and interest. The data from this taste test was used to incorporate these delicious and successful specialty crop varieties into the nutrition education outreach and curriculum.

The information gathered was important in assessing the nutritional, production, and educational needs of the Texas Panhandle through the work carried out by the High Plains Food Bank (and Garden) and the collaboration of Texas A&M AgriLife Extension Plant Pathology. Although the project may be over, HPFB staff will continue to produce and experiment with new specialty crops. Texas A&M AgriLife Extension is committed to the HPFB Garden and the Texas Panhandle residents and will continue giving talks, diagnose new and old issues with crop production in the Garden, train new staff in diagnosis and the use of microscopes for disease detection if need be. New factsheets or presentations will continue to be developed and updated.

The foods produced at the HPFB Garden will be distributed system-wide. Texas A&M AgriLife Extension will continue to provide information to County Agents, Master Gardeners, and others interested in diseases, pests, food issues, and soil health. Since information generated from this project is available online, other areas in Texas will also benefit from it.

## **Goals and Outcomes Achieved**

Project staff successfully surpassed the Goal 1 target of reaching 20,000 consumers with educational activities regarding food consumption and nutritional intake with a total of 126,051 consumers participating in one of the many forms of nutrition education outreach.

It is an ongoing process to determine what specialty crops are the most successful in the Panhandle region. The target of producing 25,000 lbs. of tomatoes, eggplants, melons, and peppers was not met as the extreme drought and heat conditions affected production of many vegetable crops. Some varieties were able to better withstand the heat and drought and may prove valuable for future plantings. Data generated will be summarized independently and be made available as factsheets and/or presentations prior to the next vegetable-planting season. Information will also be prepared in Spanish to assist the Spanish speaking populations in Texas and beyond.

HPFB met with a total of 1,008 consumers from October 1, 2010 through September 30, 2011 through educational gardening classes meeting the goal of reaching 1,000 consumers.

The integrated approach of developing a sustainable and organic agricultural food garden, providing food nutrition education, promoting healthy eating, and providing education to manage diseases may prove even more successful if others adapt this system.

## **Beneficiaries**

There are many groups that benefitted or may continue to benefit from this project. Several agencies are affiliated with the High Plains Food Bank and are recipients of nutritional information generated from this project. In the city of Amarillo, such agencies include: Cal Farley's Boys Ranch, Prairie View Baptist Church, Cornerstone Outreach Center and Freedom Fellowship. Rural agencies consisted of Vega Food Pantry, Living Water Benevolence in Borger, Hope4U Pantry in Childress, Calvary Baptist Church in Friona, and First Assembly of God in Fritch.

As for the actual food (produce) grown at the HPFB Garden, specialty crops were distributed through the already well-established Food Bank distribution system in the Texas Panhandle.

A total of 1,008 consumers from October 1, 2010- September 30, 2011 benefitted from educational gardening classes on local food production. The Food Bank Garden Newsletter also reached consumers providing information on gardening, food nutrition, "pick of the month" specialty crop, cooking recipes, and information on workshops offered at the HPFB Garden related to canning, composting, and seed starting.

Educational material that was generated on plant diseases, pests, agronomic issues, weeds, soil nutrition, composting, food safety, drought stress and growth issues, are readily available for Master Gardeners, homeowners, county agricultural extension agents, Junior Master Gardeners, and garden enthusiasts through project websites. Live or web-based presentations are conducted by Texas A&M AgriLife Extension Service every year to Master Gardener

interns, Master Gardeners, and Summer Garden series type of vegetable and crop production talks in the Texas Panhandle.

Other groups that benefitting from the information include: Amarillo Botanical Gardens (who have adult and youth educational programs on topics such as composting and seed starting), plant nurseries and garden shops, organic food store consumers, elementary schools with education greenhouse production, horticulture clubs, herb clubs and Amarillo farmer's market shoppers or sellers. Additionally, some specialty crop growers have asked for information from Texas A&M AgriLife Extension Service specialist in the Texas Panhandle. With material in hand, a specific curriculum can be devised to target a specific group.

Materials in Spanish are always in demand in certain parts of Texas, and educational material in Spanish will be offered to programs such as "Joven Jardinero Maestro (JJM)" (Junior Master Gardeners) so that some of the material could be incorporated. This JJM program is offered through Texas A&M AgriLife Extension Service in other parts of the state of Texas such as the Rio Grande Valley and in countries like Guatemala.

### **Lessons Learned**

Taking a specialty crop from seed to kitchen table is a multi-step process that involves land preparation, seed starting, transplanting, fertilizing, managing pests, diseases and weeds, harvesting, packaging, and distribution to target consumers. For 2011, unexpected weather that was hotter than normal (10 degrees F on average) and drier (less than 3 inches of rain) affected production and harvest goals and increased pressure from weeds. However, allowing crop production to continue until the first freeze (frost) allowed for harvests to continue through October. The volunteer force was crucial and having access to more volunteers in the future will help in managing weeds, growing seedlings, and conducting other crop production management practices.

Project staff learned that on an unusual dry and hot year, cherry tomatoes yielded much better than the large ones such as beefsteak tomatoes. The same for other crops like cucumber, eggplant, squash, cantaloupe, and watermelon. Not all of the crops suffered the same effect from the 2010 and 2011 droughts, which allowed project staff to generate data that will help consumers to choose varieties might be more successful in another dry and hot.

In summary, the research has shown that the public is interested in nutrition education if it is easily accessible. For example, an increase in posting nutrition or gardening articles through social media outlets resulted in an increase in the Garden workshop participation and an increased readership to article and blog postings on the website. The production of the "how-to" document will ideally spread to rural areas that are difficult to reach with direct education classes, expanding the outreach throughout the Texas Panhandle.

**Additional Information:** The educational material developed can be found at the following websites: <http://sickgardens.tamu.edu> or <http://healthygardens.tamu.edu>

## PROJECT 4: INVESTIGATING ENVIRONMENTAL IMPACT AND BEST MANAGEMENT PRACTICES FOR OLIVE (*OLEA EUROPAEA* L.) PRODUCTION IN TEXAS

---

**Partner Organization:** Texas Tech University  
**Project Contact:** Dr. Thayne Montague, (806) 742-2838  
**Email:** [thayne.montague@ttu.edu](mailto:thayne.montague@ttu.edu)  
**Date Submitted:** December 2011  
**Type of Report:** Final

### Project Summary

As a new specialty crop (first commercial production of olives (*Olea europaea* L.) in Texas was in 2007), there is much to learn about how particular dimensions of the Texas climate, soils, pathogens and pests, and irrigation rates affect olive tree growth and olive oil production. Since 2007 the Texas Olive Oil Council has had numerous requests for information, instruction, education, and tutoring on products, programs, processes, and procedures required to grow, harvest, and market olives and olive oil in Texas. Fresh extra virgin olive oil is known to have excellent organoleptic qualities as well as biochemical properties that are being researched in connection to possible treatments for high blood pressure, hypertension, cholesterol management, immune deficiencies, and cancer. The United States currently consumes more than 20 percent of the world's production of extra virgin olive oil, yet less than 1 percent of olive oil consumed in the United States is produced in the United States. Developing domestic olive oil production in Texas will provide new opportunities for Texas farmers, and address domestic production of a product increasing consumer demand. This project was implemented to fund Texas Tech researchers working in conjunction with the Texas Olive Oil Council to identify management practices for olive production in Texas. Based upon industry needs, this proposed research addressed the following topics: Irrigation / plant physiology and effect of temperature on bloom and fruit set (tree phenology).

### Project Approach

Activities for this project began fall 2010 and carried through until December 2011. Graduate students performed much of the “hands on” work (data collection, experiment upkeep, etc). In addition, several olive producers contributed time and in-kind donations (orchard trees, labor, etc.) which helped with completion of this project. For the 2010 Specialty Crop Block Grant, research focused in the following areas:

- **Regional climatic factors influence on bloom and fruit set:** Due to the importance of location on olive fruit production within the State of Texas, it is critical to gather data indicating phenological differences (seasonal growth stages as related to climatic factors) between differing orchard locations. Data collected (average date of flowering) allows initial comparisons on flowering of ‘Arbequina’ olive trees in four Texas counties (La Salle, Dimmit, Frio, and Bexar) and five olive orchards. Data collection was initiated early spring and was completed late spring 2011. ‘Arbequina’ flowering data suggest location influenced average date of first flower (Figure 1). Trends suggest southern orchards (La Salle, Dimmitt counties) flowered earlier when compared to

olive trees in Frio and Bexar counties (northern counties where data was collected). Due to extreme cold during the winter months, fruit production was minimal at each orchard and could not be investigated. Loss of growth due to frost damage was recorded at each orchard (Figure 2).

- **Plant physiology of olive trees as influenced by irrigation:** With costs of energy increasing and water availability decreasing, accurate irrigation volume application is of key concern for olive producers. Research was conducted on field grown olive trees in three orchards (Conly (Asherton, TX, Figure 3), Texas Olive Ranch (Carrizo Springs, TX, Figure 4), and Central Texas Olive Ranch (Walburg, TX, Figure 5) using one olive variety ('Arbequina'). Research investigated variable irrigation regimes (low, medium, and high treatments based upon "normal" orchard production practices) and the influence on tree physiology (stomatal conductance), fruit production, and growth. Kaylee Whitehurst Decker and Amber Bates visited each orchard four times (Figure 6) during the Summer of 2011 (mid-May, June, July, and August) to collect stomatal conductance (rate of water loss from leaf surface), soil moisture, and leaf temperature data. Stomatal conductance data from each orchard (Figures 7, 8, 9) indicate trends for each orchard. For example, throughout the growing season stomatal conductance of Texas Olive Ranch trees under high irrigation were greater when compared to medium and low irrigation trees. However, stomatal conductance of trees located at Central Texas Olive Ranch and Conly Orchard varied throughout the year. At these orchards greatest stomatal conductance was not always associated with greatest irrigation. Stomatal conductance means for the entire growing season (Figure 10) also indicates trees receiving less water at Conly Orchard and Central Texas Olive Ranch had similar conductance when compared to trees receiving the greatest amount of irrigation. Decreased stomatal conductance is an indication of greater water stress, reduced photosynthetic rate, and therefore perhaps reduced growth and fruit production. Physiological data indicate low irrigation levels reduced stomatal conductance on just a few occasions indicating potential irrigation savings.

In addition to field data, a greenhouse study investigated physiological response of potted olive trees (grown in five gallon containers) to variable irrigation volumes (Figure 11). Four varieties of olive trees ('Arbequina', 'Arbosana', 'Mission', and 'Koroneiki') were shipped to Lubbock, TX in early March. Trees were planted into five gallon containers and maintained at the Texas Tech University greenhouse facility. From early July to late August trees went through two sequences of irrigation treatments. Low irrigation trees were irrigated every fourth day, medium irrigation trees were irrigated every second day, and high irrigation trees were irrigated every day. Every fourth day prior to irrigation mid-day stomatal conductance / photosynthetic rate data was measured on trees (Figure 12). Each irrigation sequence lasted approximately 16 days. Stomatal conductance data for 25 and 29 July and 2 and 6 August (representative days) indicated differences between irrigation treatments and olive variety (Figures 13, 14). Of varieties examined, there appeared to be variability in response to irrigation regimes. Under high irrigation 'Mission', 'Arbequina', and 'Arbosana' had greater conductance and photosynthetic rate when compared to

‘Koroneiki’. However, of varieties investigated, gas exchange rates of ‘Koroneiki’ appeared to be the greatest over medium and low irrigation levels.

- **Nutrient management as impacted by mycorrhizae:** Improved nutrient uptake has been shown to increase olive tree productivity. However, research on the influence of mycorrhizae and nutrient uptake of Texas olive trees had not been conducted prior to this project. The purpose of this project was to increase the knowledge base for olive producers on the interaction of mycorrhizae, nutrient uptake, and production of olive trees grown in Texas. Three species of mycorrhizal fungi were selected to inoculate plants of four cultivars of *Olea*. *Glomus intraradices*, *Glomus clarum*, and *Glomus mosseae* inocula were acquired and stored until use. Rooted cuttings of *Olea* cultivars ‘Arbequina’, ‘Arbosana’, ‘Koroneiki’, and ‘Mission’ (Figure 15) were obtained and sustained until all materials were ready for use. Mycorrhizal inoculum was added to the medium in the root zone immediately prior to planting the rooted cutting. Project staff also obtained a control inoculum which was composed of all the substrate and plant roots except for fungal inoculation. Other control treatments included plants in the peat/sand medium without any additional substrate scheduled to receive the three nutrient treatments, and a control treatment whereby plants in sand/peat medium received no chemical nor mycorrhizal input. All experimental units were randomized within each mycorrhizal treatment. Two weeks after transplanting, the mean height of plants was 21 cm and mean width was 6 cm. Three weeks after the transplant date, the first nutrient application was conducted. Six replicates of each cultivar/mycorrhizal species combination received either 0, 1/4x, or 1x Hewitt’s Nutrient Solution. Growth data measured thus far included plant height, plant width, number of branches including the main stem, and whether flowers were present on the plants. For each of the 375 healthy experimental units, growth data including plant height, width, number of branches including the main stem, and stomatal conductance were measured bi-weekly between 20 July 2011 and 5 October 2011. At the end of this period, each plant was carefully removed from its container and roots were washed with tap water to remove the growing medium. Fresh weight of roots and shoots from each experimental unit was recorded separately (Figure 16). Up to 1 g of root tissue was separated from the roots representing each treatment combination and samples were stored at 4°C for further use in estimating mycorrhizal infection. The remaining roots and all shoots were then dried in a forced air oven (Figure 17) at 55°C for 72 hours before dry weights were recorded. Dried tissues were sent for analyses of tissue nutrient concentrations, including N, S, P, K, Mg, Ca, Na, B, Zn, Mn, Fe, Cu, and Al. Root samples stored at 4°C were cleaned and stained for estimation of mycorrhizal infection (Figure 18). All data will be statistically analyzed when infection estimation is complete and all measures can be analyzed together.
- **Weed control in olive orchards:** Weed control is critical during initial establishment and long-term productivity of olive trees. Therefore, the purpose of the project was to investigate grower weed management options. In spring and summer of 2011 field experiments were conducted at the Central Texas Olive Ranch in Walburg, TX to evaluate the efficacy of mulch and/or pre-emergence herbicides (Figures 19, 20) for weed control in high density olive production. Studies were conducted on three year old

olive trees. Plots measured 1.8 x 4.8 m and were arranged in a randomized complete block design with four replications of treatments. Each plot contained four olive trees spaced 1.2 m apart. Herbicide treatments were applied using a CO<sub>2</sub> backpack sprayer. Treatments consisted of isoxaben (2.2 kg ai ha<sup>-1</sup>), oryzalin (4.5 kg ai ha<sup>-1</sup>), oxadiazon (3.36 kg ai ha<sup>-1</sup>), and mesotrione (0.14 kg ai ha<sup>-1</sup>). Plots were irrigated following herbicide application with approximately 0.6 cm of water to ensure activation of herbicides in the soil profile. Hardwood mulch (to a depth of 6 cm) was applied to half of each plot, immediately following irrigation. A non-treated check was included for comparison purposes. Tree phytotoxicity ratings and percent weed control were recorded at 1, 2, 4, 8 and 12 weeks after treatment. No tree phytotoxicity was observed throughout the length of the trial. All pre-emergence herbicides exhibited greater-than or equal-to 90 percent weed control at four weeks after treatment. At the same data, mulch alone provided 72 percent weed control. However, pre-emergence herbicide efficacy was not enhanced by the addition of mulch. A similar trend was observed two months later. All pre-emergence herbicides exhibited 87 to 97 percent weed control 12 weeks after treatment. Weed control with mulch alone decreased to 50 percent at 12 weeks after treatment, while pre-emergence herbicide efficacy was not enhanced by the addition of mulch.

In addition to the above experiment, at the same location in the summer of 2011 an experiment was begun to evaluate the efficacy of post-emergence herbicides for weed control in high density olive production. Treatments were initiated 29 April 2011 and consisted of single or sequential applications of quinclorac (0.42 kg ai ha<sup>-1</sup>), metsulfuron (0.042 kg ai ha<sup>-1</sup>), thiencazabone + iodosulfuron + dicamba (0.18 kg ai ha<sup>-1</sup>), aminocyclopyrachlor (0.052 kg ai ha<sup>-1</sup>), glyphosate (1.16 kg ai ha<sup>-1</sup>), and mesotrione (0.21 kg ai ha<sup>-1</sup>). Sequential treatments were applied four weeks after initial treatment. A non-treated check was included for comparison purposes. Tree phytotoxicity ratings and percent weed control were recorded 1, 2, 4, 5, and 8 weeks after initial treatment. Tree phytotoxicity was not observed throughout the length of the trial. At 4 weeks after initial treatment single applications of metsulfuron and glyphosate exhibited 35 and 37 percent weed control respectively. All other single application treatments exhibited greater-than or equal-to 20 percent control 4 weeks after initial treatment. Single applications of metsulfuron and aminocyclopyrachlor exhibited 55 and 31 percent weed control respectively, eight weeks after initial treatment. All other single application treatments exhibited greater-than or equal-to 4 percent control four weeks after initial treatment. Sequential applications of metsulfuron, mesotrione, and aminocyclopyrachlor exhibited 60, 47, and 46 percent weed control, respectively, eight weeks after initial treatment. All other sequential treatments exhibited greater-than or equal-to 30 percent control eight weeks after initial treatment.

### **Goals and Outcomes Achieved**

One of the chief goals of this project was to investigate response of olive tree flowering to weather/climate. Although progress has been made in this area (see Tree Phenology section in Project Approach section above), to date project staff has not accomplished all that was planned. Vikram Baliga, a graduate student, was gathering historical weather/climate data from areas of olive production orchards to establish data to assist with prediction of tree

phenology. Although historical data will assist in this area, project staff needs to continue to work with producers to learn timing of phonological events in each orchard. Additional data will be collected this upcoming spring. To assist with correlation of phonological events and climate, weather stations were set up in three orchards (Conly, Texas Olive Ranch, and Central Texas Olive Ranch). The hope is that using on site weather data can better correlate phonological events with local weather / climates.

A second goal of the research project was to investigate the physiological response of established and containerized olive trees to various irrigation regimes. Research goals were achieved in this area (see Irrigation/Plant Physiology section in Project Approach section above). Field grown trees in three orchards were subjected to three irrigation regimes. The data indicated trees exposed to low irrigation rates compared favorably with trees exposed to medium and high irrigation rates. Field tree physiology was affected by irrigation regime. However, differences were based upon orchard location. Future research will give attention to fruit quality as affected by irrigation rate. Greenhouse work found variability between olive varieties exposed to three irrigation regimes. Of varieties investigated ('Mission', 'Arbequina', 'Arbosana' and 'Koroneiki') Koroneiki appears most adapted to low irrigation regimes.

Mycorrhizal/nutrient uptake data appears promising. Data is currently being analyzed, and will give insight into the influence mycorrhizae have on olive tree nutrient uptake. Weed control data also indicated encouraging results. Several pre and post emergent herbicides and mulch management options reduced weed competition. The data continues to give insight into physiology/irrigation/nutrient uptake/weed control options for olive tree production. Project staff found irrigation may likely be reduced and tree response (physiology and crop production) would not be adversely affected. To gain greater insight in this critical area of research, physiological data will be collected for another growing season in each of the three orchards and oil production and quality will be analyzed. In addition, mycorrhizae/nutrient uptake and weed control experiments will continue.

### **Beneficiaries**

Those who will benefit from this research are current and future olive oil producers within Texas. Texas Olive Oil Council members and conference attendees have reported a total of approximately 1,000 acres currently in olive cultivation for purposes of processing high quality extra virgin olive oil, statewide. Current producers are in need of greater management information. As previously mentioned, irrigation management in olive orchards is critical for healthy trees and quality of fruit and oil. Data from the research gives current producers information which will allow them to make decisions to maintain or increase productivity, while reducing costs (energy), and saving a precious natural resource (water). Future growers will benefit by having greater knowledge of olive varieties which may be best suited for Texas climates and weather. In addition, future growers will have greater knowledge of irrigation requirements, soil management techniques to improve production, and weed control options of orchard trees. This will assist in planning and installing irrigation systems in new orchards.

### Lessons Learned

Project staff continues to experience the difficulty of managing projects from a distance of several hundred miles (Lubbock to Asherton, Carrizo Springs, or Walburg, Texas). Cultural management practices (irrigation, pruning, etc.) will need to be better coordinated between producers and the Texas Tech University team. Data collection at a distance is difficult and time consuming. It would have been better to collect data more frequently (weekly or bi-weekly) during the experiment. However, because of distance and finances this was not possible. Therefore, project staff took the best approach and collected data on a monthly basis. They continue to see that olive growers are very interested in the work and very eager to assist. There was little difficulty with schedules, travel, site selection, etc. with growers. In addition, whenever a need has come up, growers have been anxious to assist in finding solutions. During the upcoming year, project staff plans to address growers and present the data, discuss their concerns, and solicit help for additional data collection at various orchards throughout the State.

### Additional Information

Graduate students Kaylee Decker and Vikram Baliga presented data at the Southern Region American Society for Horticultural Science annual meeting in Corpus Christi, TX (5 – 7 February, 2011). They presented papers in graduate student competitions. They will also present posters at the Southern Region American Society for Horticultural Science meeting (4 – 6 February, 2012) in Birmingham, AL. Dr. Henry presented two posters on his weed control work at the Crop Science Society of America meeting (October, 2011 in San Antonio, TX).

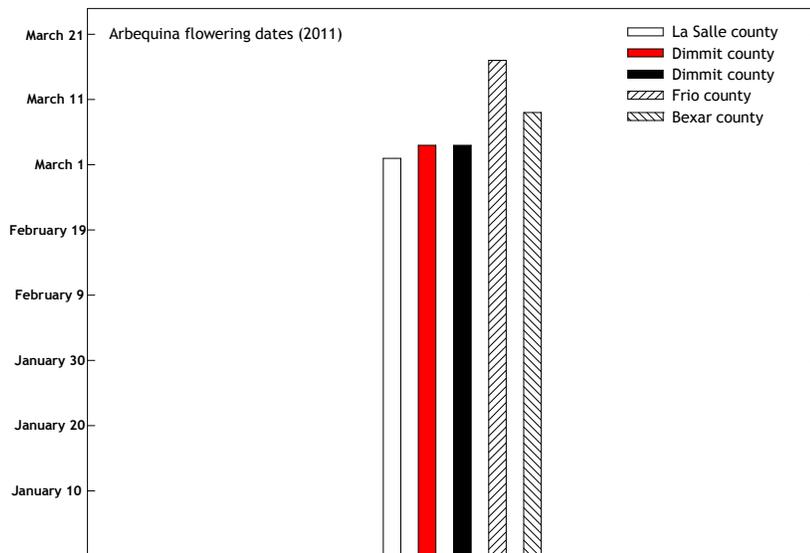


Figure 1.



Figure 2.



Figure 3.



Figure 4.



Figure 5.



Figure 6.

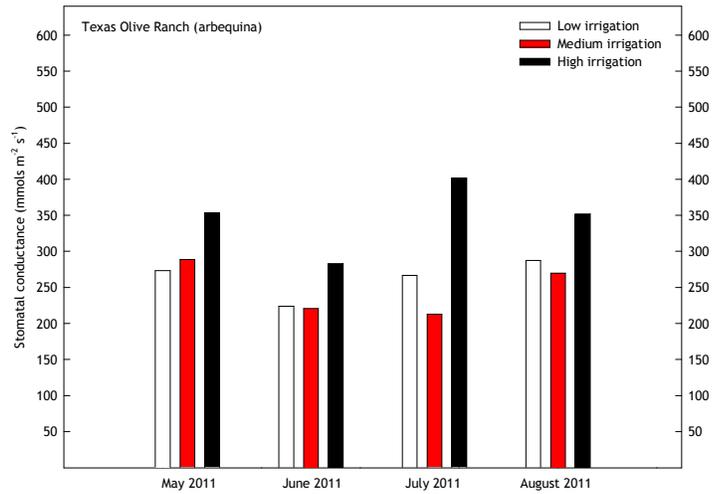


Figure 7.

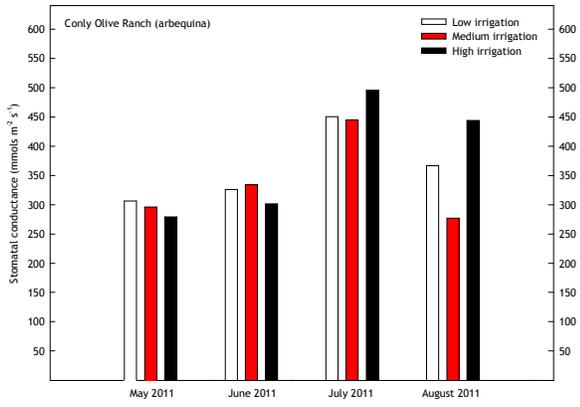


Figure 8.

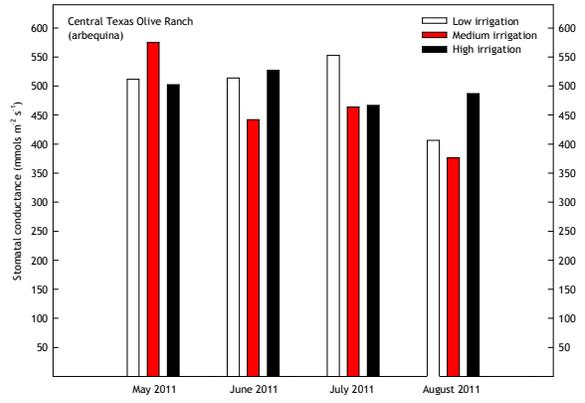


Figure 9.

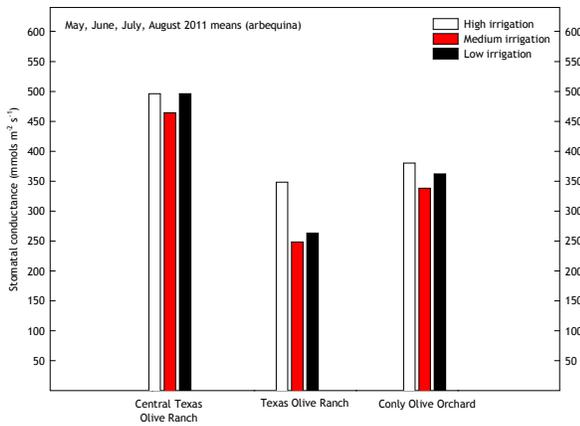


Figure 10.



Figure 11.



Figure 12.

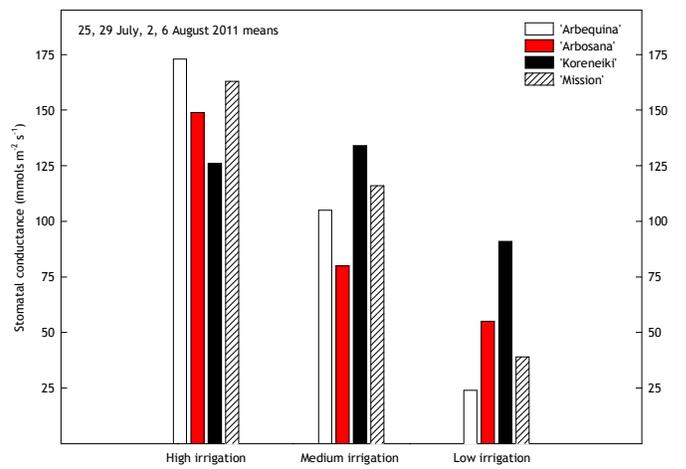


Figure 13.

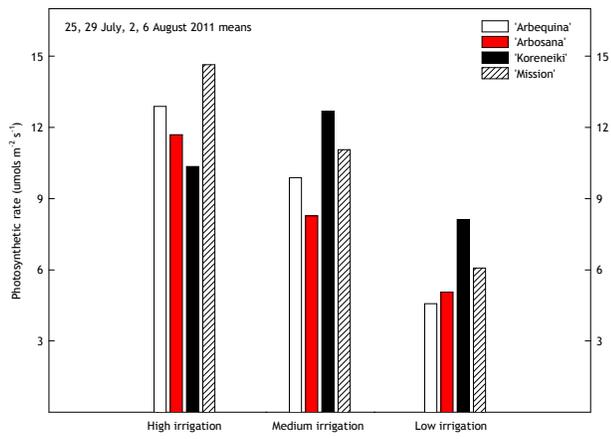


Figure 14.



Figure 15.



Figure 16.



Figure 17.



Figure 18.



Figure 19.



Figure 20.



## PROJECT 5: IMPROVING SAFETY OF TEXAS LEAFY VEGETABLES – PHASE 2

---

**Name of Organization:** Texas A&M University (Texas A&M AgriLife Research and Texas A&M AgriLife Extension Service)

**Name of Project Manager:** Dr. Rosana G. Moreira, (979) 847-8794, [rmoreira@tamu.edu](mailto:rmoreira@tamu.edu)

**Type of report:** Final Performance Report

**Date Report is submitted:** December 2012

### **Project Summary:**

This project continued the efforts from Phase 1 funded during the 2009 Specialty Crop Block Grant Program (SCBGP) on engineering, design, and dissemination of technologies to ensure the safety and quality of fresh leafy vegetables, while enhancing communication and management throughout the food chain. The approach consisted of combining the benefits of irradiation technology and other intervention strategies (such as washing) with quantitative risk assessment methods.

During Phase 1, (2009 SCFBP funds) which was comprised of research to quantify the problem of pathogen contamination of leafy vegetables in Texas and develop a preliminary risk assessment framework which would provide a series of recommendations for avoiding outbreaks, the team conducted a preliminary evaluation of the effectiveness of irradiation technology, in combination with dose-reducing technologies to (a) minimize produce quality degradation, (b) improve dose accuracy, and (c) reduce operating costs. In addition, the team began the development of a risk-analytic framework food safety.

On Phase 2 (this project), the team continued the work on project goals by expanding the experimental data collection (quality and microbiological), refining the risk-assessment tool, testing it, and developing some preliminary recommendations for handling and cooling practices.

When completed (Phase 3, funded under the 2011 SCBGP), the multi-year effort will provide both an operational tool for ensuring safety, cost, and quality targets, as well as a strategic tool for guiding new investments and developing risk-based standards for global food safety. This knowledge is critical because Texas producers have little or no information on benefits and cost analysis of intervention technologies. A major effort from extension, academia, and food industry is the only way to start gaining public acceptance of use of irradiation and other technologies to fresh fruits and vegetables.

Leafy vegetables such as spinach are responsible for 34 percent of produce related bacterial outbreaks in the United States. The foodborne illnesses in most of these outbreaks (86 percent) were caused by *Escherichia Coli* O157:H7. In 2006, a multi-state outbreak of *E. Coli* O157:H7 infections from Dole® pre-packaged spinach caused 276 consumer illnesses and 3 deaths.

*Salmonella* sickens about 40,000 people and kills approximately 600 in the U.S. each year. Although most cases of *Salmonella* poisoning are caused by undercooked eggs and chicken, several U.S. spinach producers had bagged baby spinach recalled for potential *Salmonella*

contamination over the past several years. Although still relatively uncommon, the frequency of these outbreaks is increasing, and tracing back to the source of contamination is practically impossible.

Current packinghouse practices (water washing and liquid sanitization treatments using chlorine) are not sufficient to ensure the safety of the produce when initial pathogen contamination loads are high, or when a substantial amount of pathogenic bacteria gets into the processed produce by cross-contamination.

Most fresh produce in the US does not receive a lethality step to inactivate pathogens during processing and/or handling. Recent studies indicate the internalization of pathogenic organisms into the core of leafy vegetables rather than contamination in the exposed surface only. This bacterial mobility makes surface treatments to reduce *E. Coli* O157:H7 very ineffective.

Despite its obvious advantages, before irradiation can be implemented in the process of fresh and fresh-cut leafy vegetables, the technology needs to be evaluated, in combination with dose-reducing technologies to (a) minimize produce quality degradation, (b) improve dose accuracy, and (c) reduce operating costs.

A risk-analytic framework is needed to provide both an operational tool for ensuring safety, cost, and quality targets, as well as a strategic tool for guiding new investments and developing risk-based standards for global food safety.

Therefore, the main goals of this project were to (1) continue experiments to obtain reliable data to help establish the most cost effective intervention technology using quantitative risk analysis; and (2) develop recommendations to educate producers, processors, and consumers about the advantages of the technology(s).

### **Project Approach**

The list below summarizes the key activities and tasks performed, and major developments.

- 1) A risk assessment tool to assess the potential risk of contamination of leafy vegetables (spinach) during handling and the effectiveness of intervention steps was validated with experimental data. Once refined, this tool will enable the user to predict the likelihood that retail product can cause illness on a scale from mild sickness to widespread outbreak.
- 2) Growth models for *Salmonella* and *E. Coli* strains in ready-to-eat baby spinach when exposed to different cooling and storage conditions were developed. These models predict the growth of the two commonly found pathogens as a function of temperature and it will be a useful tool to evaluate the impact of cooling practices at the processing facility on the growth of pathogens in fresh produce.
- 3) Preparations for experimental data collection of growth data for a third pathogen, *Listeria*, were completed in December 2011. Experiments started on January 2012 (Phase 3 of the project).
- 4) The team works well together and all partners provided equal and important contributions to the progress of the project.

## Goals and Outcomes Achieved

**Goal 1:** Continue experimental data collection of growth curves of *Salmonella*, *E. Coli* and *Listeria* at different storage temperatures.

- ✓ *Activity 1:* Texas A&M AgriLife team obtained all three *E. Coli* strains and non-virulent *Salmonella* Typhimurium LT2 resistant to 80 g/ml of Rifampicin for continuation of microbiological growth experiments. Work on *Listeria* was postponed for the Phase 3 of the project (in progress) due to the tremendous amount of experiments required.
- ✓ *Activity 2:* Texas A&M AgriLife team worked on development of a fresh produce packing house flow chart for use in the quantitative risk assessment model. This helped to develop a preliminary model using Matlab software to simulate the microbial distribution after every processing step (washing, packaging, etc.) assuming case normal distribution.

Result: The sensitivity analysis provided useful information to predict potential risk of cross-contamination at different steps of the flow chart (i.e., plant layout). For example, the team was able to determine the critical temperature range (5-30°C) at which leafy greens could be exposed during storage and handling, and the composition of washing water treatments (% chlorine) commonly applied by the leafy green processor. Development of the flow chart and sensitivity analysis also allowed for evaluation of incorporation of intervention strategies (ie, irradiation) after the washing treatments. The quantitative analysis was carried out later (see Activity 4).

- ✓ *Activity 3:* Texas A&M AgriLife team completed experimental data collection of growth curves of *Salmonella* and *E. Coli* at different storage temperatures.

Result: These data provided critical information needed to address the problem of pathogen growth in the spinach leaves caused by temperature fluctuations during storage. The main findings from the study were published in one peer-reviewed article entitled Modeling the growth rates of Escherichia coli spp. and Salmonella Typhimurium LT2 in baby spinach leaves under slow cooling (A.F. Puerta-Gomez, R.G. Moreira, J. Kim, and E. Castell-Perez.) 2013. Food Control 29, 11-17. doi: <http://dx.doi.org/10.1016/j.foodcont.2012.05.070>.

- ✓ *Activity 4:* Since bacterial outbreaks are likely triggered by relatively infrequent instances of very high pathogenic load, Texas A&M AgriLife team was able to mimic common cooling and handling practices by evaluating the growth of the pathogen (*E. Coli* or *Salmonella*) under four different temperature scenarios. The following are the summary results and recommendations:
  - Right after harvesting and transportation to the processing facility, baby spinaches are cooled down from 30°C (field temperature) to the target storage temperature of 10°C.
  - Faster cooling of baby spinach leaves, with the use of ice or other methods, is crucial to ensure spinach safety.

- Once baby spinaches are exposed to the high temperatures, the bacterial population will not decrease even when stored at low temperature and intervention methods such as washing with chlorinated water, irradiation treatments, or use of antimicrobials, should be implemented to ensure produce safety.
- If baby spinach was exposed to a higher temperature of 30°C due to equipment malfunction, the bacteria would grow to levels high enough to make people ill. The recommendation is that temperature should be reduced to suppress the growth of the pathogen with application of intervention practices.

**Goal 2:** Continue experimental data collection of spinach quality attributes (color, texture, vitamin C, chlorophyll) prior to and after application of preventive measures (MAP, films, and irradiation).

- ✓ **Activity 5:** Texas A&M AgriLife team evaluated the impact of irradiation on quality of baby spinach. Different quality aspects (crispiness, color, moisture, vitamin C, total chlorophyll, and carotenoid contents) were incorporated in the analysis as these factors help determine shelf life and salability from the retailers point of view.

Result: Irradiation at a low dose (1 kGy) maintains the quality attributes of spinach. However, this low dose may still not be sufficient to treat contaminated spinach.

**Goal 3:** Fine-tune the risk assessment tool as a quantitative measure of effect of handling practices on potential outbreaks in leafy vegetables, using actual experimental data (Goals 1 and 2).

- ✓ **Activity 6:** A comprehensive assessment of effect of process parameters (washing step, irradiation dose, sterilizing agents, storage temperature, etc.) on minimizing potential of *E. Coli* and *Salmonella* contamination and consequent outbreaks was initiated.

Results have yielded interesting information that helped understand the impact of produce handling on potential for pathogen contamination. The main findings from the study (only for *Salmonella*) were published in one peer-reviewed article entitled Quantitative assessment of the effectiveness of intervention steps to reduce the risk of contamination of ready-to-eat baby spinach with *Salmonella* (Puerta-Gomez, A., Kim, J., Moreira, R.G., Klutke, G.-A, and Castell-Perez, M.E.) 2013. Food Control. In press. Accepted October 2012. doi: 10.1016/j.foodcont.2012.10.022.

- ✓ **Activity 7:** The team members assessed the impact of different combinations of mitigation strategies (washing with chlorinated water and irradiation) on the number of pathogens present in ready-to-eat baby spinach.

Result: It is recommended that intervention strategies should be implemented when cooling practices are slow or temperature fluctuations occur.

**Activity 8:** Texas A&M AgriLife team visited local producers to collect data on handling practices and microbiological analyses performed on site.

Result 1: This information was used to develop a tool to mimic all operations from field harvesting to shipment from the packinghouse, to assess the impact of each step (e.g., temperature fluctuations during produce handling, washing methods, packing, and storage) on the potential risk of cross-contamination and, consequently, a foodborne outbreak.

Result 2: This visit proved to be educative to the host producers. They became aware of the study and were interested in serving as a site for local testing of the risk assessment tool.

Work on *Listeria* was postponed until Phase 3 (in progress) due to the tremendous amount of experiments required.

- ✓ **Activity 9:** The team tested the output from the risk assessment framework against available literature data (California 2007 *E. Coli* outbreak, for instance) and the experimental data collected during this project (**Activity 3**). This comparison was carried out to validate the risk assessment modeling tool.

### **Beneficiaries**

This project will benefit over 50 Texas leafy vegetables producers (spinach, cabbage, cilantro, parsley) and consequently the U.S. consumer. The extension activities are designed to reach as many producers and consumers as possible. For instance, staff worker directly with at least one large retailer (HEB) who deals with around 100 producers covering an area more than 100,000 acres and expects to the work to other producers as the project progresses through year 3.

### **Lessons Learned**

The original outcome of “a set of industry guidelines to inactivate pathogens in fresh and fresh-cut spinach using e-beam” had to be extended for one more year due to the complexity of the processing/distribution process. Therefore, the team will develop a set of preliminary guidelines during Phase 3 of the project. The team learned that plans for experimental data collection for three pathogens were too much; hence, the experiments on *Listeria* were postponed until Phase 3 (currently in progress). The team also learned that by carefully planning and scheduling of tasks assigned to each member of a team result in completion of the tasks as planned. No significant problems were encountered by the team.

### **Additional Information**

Presentations:

A poster was presented at the Institute of Food Technologists (IFT) Annual International Meeting in New Orleans, June 2011. The average attendance of the poster sessions at the IFT meeting ranges between 10,000 to 15,000, including growers and processors of specialty crops (though the exact number of specialty crop stakeholders is unknown). The poster highlighted the results prediction of the growth of *Salmonella* in baby spinach leaves.

Two abstracts were submitted for presentations at the Institute of Food Technologists (IFT) International Annual meeting, Las Vegas, June 2012. They highlight the work done on growth models of *Escherichia Coli* as affected by different cooling practices and preliminary fine-tuning of the risk assessment tool for prediction of outbreaks due to *Salmonella* contamination.

1. *Comparison of growth rates of Escherichia Coli spp. and Salmonella Typhimurium LT2 in baby spinach leaves (Spinacea olerac) under slow cooling* by Puerta-Gomez, A.F., R.G. Moreira, J. Kim, and E. Castell-Perez, Dept. of Biological and Agricultural Engineering, Texas A&M University, College Station, TX 77843-2117
2. *Development of a quantitative risk assessment model for Salmonella Typhimurium in fresh baby spinach* by J. Kim, A.F. Puerta-Gomez, R.G. Moreira, E. Castell-Perez, and G. Klutke. Department of Biological & Agricultural Engineering, Texas A&M University, College Station, TX 77843-2117, Department of Industrial and Systems Engineering, Texas A&M University, College Station, TX 77843-3131.

## Publications

1. The team submitted a manuscript for publication entitled “Comparison of growth rates of *Escherichia Coli* spp. and *Salmonella* Typhimurium LT2 in baby spinach leaves under slow cooling” by A.F. Puerta-Gomez, R.G. Moreira, J. Kim and E. Castell-Perez. Submitted to *Food Control* on January, 2012.
2. Although not a direct result of the research funded by TDA, as a result of the extensive literature search conducted throughout this project and design of the irradiation tests, the team became aware of inconsistencies regarding available data on the dose required to decontaminate a particular pathogen (*E. Coli*, *Salmonella* or *Listeria*) when present in fresh leafy greens. One tangible result was the acceptance of a publication entitled Factors Affecting Radiation *D*-Values ( $D_{10}$ ) of an *Escherichia Coli* Cocktail and *Salmonella* Typhimurium LT2 Inoculated in Fresh Produce, by Rosana G. Moreira, Alex F. Puerta-Gomez, Jongsoo Kim, and M. Elena Castell-Perez, recently accepted by the *Journal of Food Science* (January, 2012).

Abstract: This study evaluated the effect of produce type, re-suspension medium, dose uniformity ratio (DUR), and sample preparation conditions (tissue exposure, MAP, anoxia) on the  $D_{10}$ -value of an *Escherichia Coli* cocktail (BAA-1427, BAA-1428, and BAA-1430) and *Salmonella* Typhimurium LT2 inoculated on the surfaces of tomato, cantaloupe, romaine lettuce, and baby spinach. Produce at room temperature were irradiated using a 1.35MeV Van de Graaf electron beam accelerator at 0.2 to 0.9 kGy. The  $D_{10}$ -values for *E. Coli* and *Salmonella* were  $0.20\pm 0.01$  kGy and  $0.14\pm 0.01$  kGy, respectively. Bacterial inactivation was not affected by produce type as long as the samples were irradiated in unsealed bags, the bacteria were suspended in broth, and the sample tissue was exposed. Sample location in front of the e-beam source during exposure is crucial. A 20% increase in DUR yielded a 53% change in the  $D_{10}$ -values. Variations in sample preparation, microbiological methods and

irradiation set-up, result in variable  $D_{10}$ -values for different microorganisms on fresh produce.

## Dynamic growth model of *Salmonella Typhimurium* in baby spinach

Jongsom Kim, Alex F. Puerta-Gomez, Rosana G. Moreira, M. Elena Castell-Perez, and Georgia A. Klutke\*  
Biological & Agricultural Engineering, Industrial & System Engineering - Texas A&M University

This research was funded by the TDA Project SCF8-101 (1)

---

### Abstract

Salmonella is clearly a public health concern, since the microorganism has been associated with food-borne outbreaks from consumption of leafy vegetables. Proactive microbiology can be used to determine the growth of pathogens in foods during processing and storage. However, unlike other food products, a growth model for *Salmonella* strains in leafy vegetables is not available. The Baranyi model was fitted with growth data for 10, 20, 30 and 37°C, and corresponding maximum growth rates were estimated. Using a secondary model, the maximum growth rates were modeled as a function of temperature using a square-root type equation. A dynamic model was developed by integrating the primary and secondary models. Root mean squared error (RMSE) values were 0.32 log10CFU/g and pseudo-R<sup>2</sup> values were greater than 0.99 for the Baranyi model fitting. The R<sup>2</sup> value was 0.91 for the maximum growth rate fitting into the secondary model. The integrated dynamic model was used to predict values in 4 temperature profiles: For exponential cooling, when temperature decreased from 35°C to 10°C in 5 hours, the *Salmonella* population increased by only 0.29 log10CFU/g. However, for linear cooling, where it takes 12 hours to cool down to 10°C, *Salmonella* more than tripled (0.84 log10CFU/g). For a sinusoidal profile, being analogous with temperature abuse scenarios, *Salmonella* population gradually increased with time until it reached the stationary phase. For exponential heating, which could be the worst scenario during baby spinach handling, *Salmonella* grew exponentially (1.8 log10CFU/g in 9 hours).

### Results

Figure 1: Fitting of growth data at different temperatures to the dynamic model.

Figure 2: Maximum specific growth rate of *Salmonella Typhimurium* as a function of temperature.

Figure 3: Maximum growth rate of *Salmonella Typhimurium* as a function of temperature.

### Methods

Baranyi and Roberts (1994) proposed a dynamic model in a set of different equations to predict time-varying temperature conditions. The Baranyi model was fitted with baby spinach growth data for 10, 20, 30 and 37°C, and corresponding maximum growth rates were estimated. Using a secondary model, the maximum growth rates were modeled as a function of temperature using a square-root type equation. A dynamic model was developed by integrating the primary and secondary models. RMSE and pseudo-R<sup>2</sup> were used to evaluate the model performance.

### Results

Baranyi and Roberts (1994) proposed a dynamic model in a set of different equations to predict time-varying temperature conditions. The Baranyi model was fitted with baby spinach growth data for 10, 20, 30 and 37°C, and corresponding maximum growth rates were estimated. Using a secondary model, the maximum growth rates were modeled as a function of temperature using a square-root type equation. A dynamic model was developed by integrating the primary and secondary models. RMSE and pseudo-R<sup>2</sup> were used to evaluate the model performance.

The integrated dynamic model was used to predict values for different scenarios (Fig. 2). For exponential cooling, when temperature decreased from 35°C to 10°C in 5 hours, the *Salmonella* population increased by only 0.29 log CFU/g. However, for linear cooling, where it takes 12 hours to cool down the produce to 10°C, *Salmonella* more than tripled (0.84 log CFU/g). For a sinusoidal profile, being analogous to temperature abuse scenarios, *Salmonella* population gradually increased with time until it reached the stationary phase. For exponential heating, which could be the worst case scenario for baby spinach handling, *Salmonella* grew exponentially (1.8 log CFU/g in 9 hours).

### Objectives

- To predict the growth of *Salmonella* in baby spinach under fluctuating temperatures for use in a quantitative risk assessment model.

\*Author for correspondence: gklutke@tamu.edu



## PROJECT 6: THE BENEFITS OF HERBS AS A TEXAS SPECIALTY CROP

---

**Name of Organization:** San Antonio Herb Market

**Name of Project Manager:** John Marrs, (210) 649-1853, [marrsgardens@aol.com](mailto:marrsgardens@aol.com)

**Type of Report:** Final

**Date:** December 2012

### **Project Summary**

The San Antonio Herb Market (SAHM) is an organization dedicated to the idea that herbs play a significant role in enhancing the flavor of food, as well as having nutritious and healthful benefits. One purpose of this project was to offer multiple avenues of education through public events, seminars, booklets, and website presence where the public can learn the health benefits, uses, and sources of fresh herbs. Specialty Crop Block Grant funds enabled the SAHM to promote and conduct two new annual public (four events during the grant period). This project provided funds for an expanded media and advertising budget which increased attendance and consumer awareness of the SAHM and thereby increased the public's knowledge of the many healthful benefits of fresh herbs. This project promoted the use of herbs which, in turn increased the sales of herbs and herbal products grown by Texas herb producers.

### **Project Approach**

*Develop and Implement a Publicity Plan:* SAHM used grant funds to increase the number of street banners and other signage promoting the public herbal events. In 2011, project staff advertised on five radio stations in the San Antonio area, but in 2012 advertising was limited to two stations. Seven newspapers were used in 2011 and only one local paper in 2012 was utilized to promote the public event. Other publications like Edible Austin and local online blogs were also used. Facebook and SAHM's website were updated and enhanced to reach more people in 2012. The Pearl Farmers Market assisted SAHM by promoting the herb events on their website.

*Develop and Publish Nutritional Information of Herbs:* In the first year of this project, SAHM successfully created an herb booklet which contained information about the nutrients found in herbs, how to grow the herbs mentioned, as well as recipes for using the herbs in cooking. The majority of publications have very little data on the nutrients found in herbs. A total of 3,800 booklets were distributed to visitors, at no cost, at both fall events in 2011 and 2012.

*Secure Speaking Services of Experts on Herbs and Nutrition:* Grant funds allowed SAHM to secure two quality speakers and herb food demonstration chefs for the four events. These speakers and cooking demonstrations were very popular attractions as evidenced by the visitor attendance and response. Over 1,400 consumers participated in the herb food demonstrations and about 520 total consumers attended the speaker events.

*Establish Data Collection Processes and Evaluate Results:* Two different surveys were used in both years of the project. One was created to judge the reaction of visitors to the public

events. The other survey collected information from the vendors to measure how the promotions affected their sales from one year to the next.

*Project Partners:* The principal project partner, Pearl Brewery LLC, provided the venue for the events and contributed other means of advertising. Working closely with the Pearl Farmers Market was a substantial benefit to the San Antonio Herb Market.

In May of 2012 SAHM moved the website to the new provider and have had better capabilities; with more pages and better graphics, more pictures, etc. Traffic increased during the second half of 2012. Website hits: 2011: 3075; 2012 13,779

### **Goals and Outcomes Achieved**

One of SAHM's goals was to try and show the public that adding fresh herbs to their diet would add important vitamins, minerals and other nutrients. SAHM believe this was accomplished by printing and distributing the booklet listing the nutrients contained in various herbs.

Project staff estimates that visitors/customers numbers improved greatly from an estimated 2,000 people in 2011 to approximately 5,000 people in 2012, a 150 percent increase to the visitors at the fall Herb Market events. Sales that were reported from the herb growers and herb product producers also increased by 26 percent from 2011 to 2012. Through the activities funded with this grant, SAHM achieved the goal of increasing the number of visitors to the herb market event and helped the growers/producers increase their sells over the previous year.

### **Beneficiaries**

This project benefited 15 growers/producers that participated in the San Antonio Herb Markets' four events. Two groups that improved their economic status the most were the growers and producers of the Herb Market, as well as the growers and producers of the Pearl Farmers Market located in close proximity to the Herb Market. In addition, thousands of visitors and/or customers benefited from this project by attending educational seminars/lectures and food demonstrations.

### **Lessons Learned**

One thing that SAHM found to be a challenge was to accomplish the production of a nutritional booklet about fresh herbs. Obtaining nutritional information just for herbs required a lot of research. There was a scarcity of books detailing nutritional information. The internet was a valuable tool in completing this task.

SAHM wanted to evaluate the success of the herb market events by having a visitors' and growers' survey. Many visitors and some vendors were reluctant to complete surveys even though responses were anonymous. Regardless, the surveys that were completed provided information and allowed SAHM to evaluate the events. The surveys also provided evidence that social media is becoming a major factor in promotions.

SAHM learned that associating themselves with farmers market benefitted all parties involved. More people attended the Basil Fest and farmers market combined than attended just the farmers market alone. The farmers had an increase in sales as a result of us promoting and conducting the summer herb event.

**Additional Information**

<http://www.sanantonioherbmarket.org/>



## **PROJECT 7: EDUCATING THE GREEN INDUSTRY DISTRIBUTION CYCLE**

---

**Name of Organization:** Texas Nursery & Landscape Association

**Project Manager:** Amy Graham, (512) 280-5182

**Type of Report:** Final

**Date Report Submitted:** December 2012

### **Project Summary**

The specialty crop industry and Texas agriculture face many issues that are out of an individual's control, from weather to the economy—there is little that can be done to change the situation. Unlike the weather, a grower should be able to rely on a retailer's knowledge, expertise and care to keep their plants alive from arrival at the nursery to purchase by a consumer. A consumer, likewise, should rightfully expect to purchase a quality product that has been well grown, cared for and sold.

As labor, a slow economy, and limited budgets continue to be an issue for specialty crop businesses, the Texas Nursery & Landscape Association (TNLA) found that the education of the distribution cycle has suffered and thus the end consumer has suffered. The purpose of this project was to increase the educational opportunities and variety for the nursery and landscape industry to improve their knowledge and training.

### **Project Approach**

In order to provide a variety of education opportunities, TNLA used Specialty Crop Grant funds to bring business speakers to the Nursery/Landscape EXPO Education Conference (EXPO) and the TNLA Management Workshop, offer Business Segment Trainings at the EXPO, develop the final stages of online trainings and market the availability of these learning opportunities. By increasing the quality and quantity of educational opportunities new individuals have benefited from these tools by improving their employees, customers, and/or their own knowledge. Whether an individual is a visual, auditory, read-write, or kinesthetic learner, the wide range of trainings offered provided a style and learning opportunity for everyone.

The online trainings, <http://www.tnlaeducationportal.org/>, were developed to assist primarily landscape contractors, retail garden centers and secondly, growers and suppliers about the essentials of the business. Modules were developed in order to assure best management practices are being used in the maintenance and selling of the plant material. Since many employees are seasonal, the modules help train on the care and maintenance of plants by the industry and finally the consumer. Both trainings have learning quizzes throughout to assure actual knowledge has been retained.

### **The Landscape Pro training modules:**

Safety and First Aid

Landscape Design and Plan Reading

Landscape Installation

Landscape Maintenance & Color

Landscape Maintenance Equipment

## Landscape Pruning

### **Nursery Professional Training modules:**

The Retail Nursery Business

Basic Botany

Plant Care and Maintenance

Soils

Plant Nutrition

Plant Pests & Controls

Disease ID

Weed ID

Pruning

Plant Propagation

Plant Materials

The Home Landscape

TNLA believes that growing a product is only half the challenge. Growers, as well as landscape contractors and garden centers all need to talk/sell to the consumer. The right plant, the right place is only as good as the information that has been provided. Sound business principles will enhance the competitiveness of a specialty crop purchases over other purchases consumers may make. Thus our keynotes are focused on these business practices.

*Courses that were offered under this grant were:*

**Breakout Tracks:** (EXPO 2011)

Sales & Marketing, Landscape, Retail, Trees & Other Living Things, Pest Management, Irrigation

### **Keynotes:**

**Charles Marshall - *Shattering the Glass Slipper*<sup>TM</sup>**

**Destroying fairy-tale thinking before it destroys you** (EXPO 2011)

Charles shows how implementation of *The Seven Powers*<sup>TM</sup> can create success in the life of any individual or organization. Charles relates inspirational stories of everyday underdogs who have used *The Seven Powers*<sup>TM</sup> to overcome obstacles and achieve success.

**Jennifer James, PhD - *Thinking in the Future Tense*** (EXPO 2011)

Every major system in America is in the process of a major shift. Major industries, in particular telecommunications, were hit first and healthcare soon followed. The political, legal and academic systems are facing the same “rightsizing.” Leadership in this new era requires the ability to think in new ways. Management requires the skill of thinking about thinking, knowing how you think and operate. This seminar will provide experience in eight thinking skills: • Perspective (seeing with new eyes) • Awareness of Patterns (recognizing the future) • Critical Thinking (understanding the social context) • Response Time (the ability to change and help others change) • Context (understanding the past to know the future) • Effectiveness (doing more with less) • New Forms of Intelligence (using the rest of your brain) • Diversity I.Q. (profiting from diversity)

**Marty Grunder, Jr. - *How to Lead in Lean Times*** (EXPO 2011)  
 Learn from the expert the 5 Steps to becoming a better leader now!

**Ken Schmidt - *Make Some Noise: Open the Throttle and Dominate Your Marketplace*** (EXPO 2011)

The former director of communications for Harley-Davidson Motor Company, Ken Schmidt played an active role in one of the most celebrated turnarounds in corporate history. His presentation, “Make Some Noise,” is a fascinating story of building an entirely new corporate culture, of rekindling relationships with customers, and reaching out to new ones in completely untraditional ways. After all he has accomplished, his philosophy of life and business has remained the same: “Never do what’s expected, make yourself as noticeably different as possible, and have a lot more fun than you’re supposed to.”

**The Efficiency Perspective: Now in 3-E!** (Business Management Workshop 2011)

The workshop taught how to maximize the efficiency of people, systems and marketing. Communicate more efficiently and develop the necessary tools to build sustainable efficiency. From motivation and performance management to active listening; you will be more efficient, more productive and engaged.

**Karl Ahlrichs** - a national expert in the people side of business, has a broad range of experience in a wide range of business roles, and has live experience in all areas of Human Capital.

**Jay Baer** - a hype-free social media strategy consultant that works with major corporations and PR firms to harness the awesome power of the social Web.

**Goals and Outcomes Achieved**

In November 2011, staff had already surpassed their goal of a 10 percent increase in online course registrations. At that time the number of individuals trained by these courses had increased by 42 percent over the previous year. Registrations continue to increase, 43 online courses were completed with 5 months remaining of TNLA’s fiscal year. TNLA is confident that the goal of 50 trainings per year will be met.

Number of people trained in all facets of project:

	<b>Before Grant</b>	<b>November 2012</b>
<b>Online Education</b>	21	43
<b>Expo Education Conference</b>	553	988
<b>Management Workshop</b>	78	87
<b>TOTALS</b>	<b>652</b>	<b>1118</b>

Number of people who trained online and then passed the certification test:  
 (Online training for 5.5 months)

**Number trained: 31**

**Passed test: 28**

**Beneficiaries**

Beneficiaries of these projects include members and non-members of TNLA, growers, suppliers, retailers, landscapers and the consumers that use their services and products. By having a healthier and smarter distribution cycle, the products that are sold or delivered will improve. The green industry is a \$16.9 billion segment of the Texas economy. TNLA serves 1,400 members including nursery businesses, landscapers and others.

**Lessons Learned**

Though there is a significant up front cost for design and production of online trainings, funds are also needed to host the trainings, conduct monthly maintenance, and implement periodic updates and changes. This can be a very costly method of education, but with proper industry support, these trainings are worth the time, effort and money and will only get better with time. TNLA has been very happy to see the industry embrace these trainings. In this industry, it took a great deal of effort to entice individuals to give online learning a chance. The grant dollars used for marketing these trainings were vital to increasing awareness and ultimate utilization of these online courses.

## **PROJECT 8: REAL TREES FOR YOUNG FAMILIES CAMPAIGN**

---

**Partner Organization:** Texas Christmas Tree Growers Association

**Project Manager:** Leigh Ann Smith

**Contact Information:** [info@TheHolidayAcres.com](mailto:info@TheHolidayAcres.com) (281) 756-9120

**Type of Report:** Final

**Date Submitted:** July 2013

### **Project Summary:**

The Texas Christmas Tree Growers Association (TCTGA) is an organization whose members operate family-owned Christmas tree farms, primarily choose and cut farms. There were approximately 120 member farms at the beginning of this project. Due to the climate, Texans are often unaware that there are Christmas tree farms here. If customers decide to look for a Christmas tree farm, they will almost always do that through an Internet search.

TCTGA has had a website since the mid 1990's, but it has never been updated. It served as a site for TCTGA members to buy and sell equipment, and learn about seedling sales and upcoming meetings in addition to providing a find a farm feature for potential customers. The sole purpose was not to promote visits to Texas Christmas tree farms, but a map that allowed visitors to select a region and see a static map of the farms and a directory of those farms with links to their websites. However, customers appreciate and rely on interactive maps when searching for farms and business, and incorporating these to the TCTGA website was necessary.

The Specialty Crop Block grant allowed Texas growers to connect with target customers and young families, by providing an up to date website with Google Maps capability, hosting that site on a secure server, and marketing it to potential customers. A multi-faceted social media advertising campaign has also encouraged educators to consider Texas Christmas tree farms as field trip destinations, and has increased awareness of Christmas tree farms in Texas among young families.

### **Project Approach:**

Though the new website design had not yet begun, Facebook ads were designed and purchased during December of 2010. Directing potential customers to the existing website at gave them the opportunity to identify Christmas tree farms in their area.

In the spring of 2011, a request for proposals (RFP) for the design of the new website was distributed to web designers was circulated through other avenues such as email lists. One proposal was accepted and the designer was hired to design a new and updated TCTGA website.

After reviewing the proposals and selecting a web designer, the TCTGA project managers met with the designer and coordinated by phone and email concerning the look of the site. Other project manager tasks included preparing the site map, selecting, acquiring and obtaining permissions for 42 photos and designating their placement on the site, gathering

and writing the content for 16 web pages, contacting TCTGA members to verify the information to be included in their directory listing, entering data with pertinent information on each farm into spreadsheets sorted by region, and working with members who had concerns about the way their farms' locations were displayed by Google Maps. Originally, a password protected member section of the site was planned, so work was also done preparing the content for that section. In the end, TCTGA decided not to use a password protected section. The TCTGA member also prepared quarterly and annual reports on the use of the grant funds.

After researching hosting companies and types of hosting, the project managers settled on a Virtual Private Server (VPS) hosted by a large web hosting company. In September 2011, the site went live.

Facebook ads promoting choose and cut Christmas trees were purchased during the weeks leading up to Thanksgiving 2011. These ads were targeted to Facebook customers whose profiles contained key words indicating that they might be parents or grandparents of young children as well as to those who have interests in the outdoors and the environment. During the summer, ads were run which were directed to educators and promoted Christmas tree farms as a field trip destination.

Later in the project period, the approach shifted as the price of Facebook ads increased dramatically, and the effectiveness, based on click-through rate, seemed to drop. Because of this, the Christmas 2011 campaign was cut short and no Facebook ads were run during the lead up to Christmas 2012. Because ad prices were much lower at other times of the year, the summer educator campaign was continued, and some ads were placed promoting fall activities at Christmas tree farms.

Though the click-through rates were low, about 8 percent of visitors to TexasChristmasTrees.com came there from Facebook, either from a Facebook ad, from the Texas Christmas Trees Facebook page, or from a link on someone's status. It also had been noted by TCTGA members that Facebook did appear to have a positive impact on sales in a different way. Farm visitors were "checking in" on Facebook to Christmas tree farms and they were posting pictures of their visits. We believe that this "word of mouth" advertising through Facebook was extremely effective. Therefore, some of the project funds were used in 2013 to purchase the following 18"x24" corrugated plastic signs for each farm:



Additionally, in 2013 it became necessary for websites to be compatible with mobile devices. The Google Maps on our new website (designed in 2011) no longer functioned properly on

several of the new mobile devices. Therefore, some of the project funding was used to upgrade the mobile capabilities.

**Goals and Outcomes Achieved:**

Website traffic and Christmas tree sales are both indicators of the effectiveness of this project. In the project proposal, it was anticipated that page requests would increase to 133,000 by 2012. The actual results far exceeded this, with page requests of 263,883 in 2012. Website traffic was double that which was predicted in the project proposal. There were almost three times as many unique visitors to the site in 2012 as there were in 2010.

**WEBSITE TRAFFIC**

YEAR	PAGE REQUESTS	UNIQUE VISITORS (APPROXIMATE)	YEARLY % CHANGE IN UNIQUE VISITORS
2010	83,423	11,262	
2011	110,695	14,943	+32%
2012	263,883	30,372	+103%

Christmas tree sales are not required to be reported and anecdotal reports from member growers were used to measure sales. Also, there are many factors affecting tree sales in a given year. For instance, since almost all Texas Christmas tree farms are choose and cut, if an area has rainy December weekends one year, all of the farms in that area would expect to have decreased sales. Almost all growers have reported increased sales for the 2012 Christmas season, with many reports of tree sales increasing 10-20 percent, or more which is supported by the increased website traffic.

**Beneficiaries**

There are currently more than 90 family-owned and operated Christmas tree farms in Texas who are members of TCTGA. In addition to family members, most of these farms hire seasonal labor to help with tree sales. Christmas tree farms typically sell other items along with trees. Cinco Plastics is a company who manufactures Christmas tree stands in the U.S. A Cinco employee said that they had to do two extra production runs in 2012 because they sold out of stands from their first run so early in the season.

According to the 2009 USDA Census of Horticultural Specialties, 28 operations that participated in the census that had sales of at least \$10,000 in Christmas trees in 2009. Those farms sold 74,000 trees, with a total value of \$1,173,000. If those 28 operations had increased sales of 10 percent in 2012 compared to 2009 (which includes the project period), that would be an increase of \$117,300 just in 2012 alone. Once customers visit a Christmas tree farm, they tend to return year after year, so the benefit can be expected to persist.

**Lessons Learned**

Technology changes things at a rapid rate. In 2011, 35 percent of Americans owned a smartphone. In 2013, that number jumped to 56 percent. That has a major impact on the importance of mobile capabilities of websites. The maximum shelf life of a web design is reported to be three years. When making website spending decisions, this must be considered.

Due to the changes in technology, relevant marketing is also constantly evolving. When marketing online, it is important to follow current trends. What worked last year may not be effective this year. The cost of the Facebook ads was \$.99 per click-through in 2010 and went up to \$1.69 per click through in 2011. While that did not seem reasonable, there are marketing effects that cannot be measured. For instance, people may have seen the Facebook ads but not clicked on them, and then later did an Internet search for Christmas tree farms.

In a practical sense, TCTGA learned that it is unwise to utilize strictly volunteers to manage a grant project. The amount of hours required was significant, and a project manager should be compensated. We did not think to include administrative costs in our grant proposal.

### Additional Information

#### Examples of Facebook Ads

##### Science Field Trips



Meet K-5 Science TEKS objectives and have fun on a Texas Christmas tree farm field trip

Leigh Ann Smith likes Texas Christmas Trees.

##### Texas Christmas Trees



Experience the fresh air of the country as you pick out your perfect Texas-grown Christmas tree.

Leigh Ann Smith likes Texas Christmas Trees.

##### Fall Fun



Many Texas Christmas tree farms offer fun fall activities. Click to find a farm near you.

Leigh Ann Smith likes Texas Christmas Trees.

##### Grandkids & Christmas



This Christmas, take your grandkids out to cut a real tree at a Texas Christmas tree farm. Click here to find a farm near you.

Leigh Ann Smith likes Texas Christmas Trees.

##### Hunt a Real Tree



Choose & cut your perfect Christmas tree at a Texas Christmas tree farm. Click here to find a farm near you.

Leigh Ann Smith likes Texas Christmas Trees.

##### Local Christmas Trees



Support a local farmer and keep Texas green. Click here to find a Christmas tree farm near you.

Leigh Ann Smith likes Texas Christmas Trees.

## PROJECT 9: TEXAS RIO STAR GRAPEFRUIT ROUND-UP DAYS

---

**Partner Organization:** TexaSweat Citrus Marketing, Inc.

**Project Contact:** Eleisha Ensign, (956) 580-8004

**Email:** [eleisha@texasweet.com](mailto:eleisha@texasweet.com)

**Date Submitted:** December 2011

**Type of Report:** Final

### Project Summary

In 2008, the annual report<sup>1</sup> from the Centers for Disease Control and Prevention reported that 28.3 percent of Texas residents are obese. The state's obesity problem demands increased public education efforts to encourage healthy eating and physical activity. TexaSweat proposed an educational program targeting Texas school children, media, and parents. This program educated the target audiences on the health and nutrition benefits of Texas Grapefruit and its role in the improvement of eating habits and overall wellness. This three-pronged plan focused on two Texas markets, Austin and Dallas.

The program: 1) engaged students in second through fourth grades through educational events in schools in Austin and Dallas, 2) reached key print and online media through direct outreach, and 3) educated parents through eight in-store retail sampling demonstrations.

### Project Approach

#### *School Outreach*

TexasSweet aimed to bring to life the health and nutrition message of Texas Rio Star Grapefruit in schools through an interactive program and sampling event for second through fourth graders at 20 schools in Austin and Dallas. First, TexaSweat staff and Fleishman-Hillard, a contractual Public Relation agency, designed and created a new grapefruit mascot named T.C. Cowboy (T.C. stands for Texas Citrus). A music video was filmed at a sound stage in Austin. The new T.C. Cowboy mascot, the musician and four children filmed a dance video. The video was edited and 600 DVD's were created and delivered to bring to the school events.

Materials were developed and printed to hand out at the school events including pencils, balloons and T.C. removable tattoos. TexaSweat also provided materials of its own to the students such as activity sheets, book markers, etc. Then TexaSweat created a contact list of schools in Austin and Dallas and worked diligently to contact and offer the program to as many schools as possible. Twenty schools confirmed their presentation.

T.C. Cowboy was set to attend the events, so talent was scheduled and detailed costume and dance instructions were provided to the talent that was to wear the costume. Also, home economists were provided with a comprehensive list of schools, number of samples to prepare (2,500 samples in Dallas and 7,500 samples in Austin), as well as drop off times and locations. Boxes of fruit were shipped from TexaSweat to the home economists office.

---

<sup>1</sup> Centers for Disease Control and Prevention, <http://www.cdc.gov/obesity/data/trends.html#State>

In Dallas, ten school presentations were scheduled. Immediately preceding the week of presentations, one school canceled. Then, on Wednesday, February 9, 2011, Dallas received a snowstorm and all (three) of the schools that were scheduled that day closed. In the end, only six presentations were made to Dallas schools, reaching approximately 450 students. Materials were delivered to all of the schools who cancelled, reaching an additional 565 students.

In Austin, ten school presentations were scheduled but two schools canceled at the last minute. Presentations were made at eight schools, reaching approximately 2,735 students. Materials were delivered to all of the schools who cancelled, reaching an additional 1,050 students.

Project staff received a great response from the students and teachers at all 14 schools. T.C. Cowboy was on hand to greet both students and teachers. A TexaSweets employee gave a 20-minute presentation about Texas grapefruit, including where it comes from, its health benefits, how to eat it, when it is available and how the fruit gets from the grove to the plate. The T.C. Cowboy music video was played. Then grapefruit sections were handed out to the children to sample. The materials including activity sheets, pencils, tattoos, bookmarkers, etc. were distributed to teachers and students. The kids then had an opportunity to take photos with T.C. Cowboy before leaving the assembly. Overall it was a successful program.

The proposed goal of this project was to present to 20 schools and reach approximately 8,000 students and distribute approximately 30,000 pieces of materials. In actuality, 14 schools were presented to reaching a total of 3,185 students with 19,200 pieces of materials distributed. The reason for not reaching the goals were: schools canceled at the last minute as well as a snowstorm in Dallas caused three additional schools to cancel. Also, when project staff was estimating the number of students reached in 20 schools, project staff assumed that they would be presenting to only large public schools. In Dallas, they attempted to book large public schools but were not able to. Ultimately, they were able to book smaller private schools, but this did contribute to a lower total number of students reached.

- *Media Outreach*

Media outreach was a key strategy for reaching the broader consumer audience, including parents, to increase awareness and knowledge of the nutritional benefits of Texas grapefruit. In both Dallas and Austin markets, Fleishman-Hillard contacted print, broadcast, and online media through targeted pitching, grapefruit deliveries and media dinners. Media was invited to attend at least one of the school events in each market, but there was no coverage garnered for the school presentations.

- a. The media dinners were scheduled as follows.
  - i. Dallas
    1. Restaurant: Bolsa
    2. Date: February 9, 2011 at 6:30 p.m.
      - a. (rescheduled to March 3 due to a snow storm in Dallas)
    3. Attendance: 9 food writers attended
  - ii. Austin

1. Restaurant: Fino
2. Date: February 16, 2011 at 6:30 p.m.
3. Attendance: 9 food writers attended

The media dinners in both cities were successful. Both restaurants prepared unique, courses featuring Texas grapefruit. The two dinners received coverage in the Austin American-Statesman, which has a circulation of 143,760. Also, the grapefruit was covered on seven blogs and was tweeted approximately 25 times, giving these two media dinners total impressions of 224,106.

- *Retail Demos*

Grocery store sampling is an important tactic for educating parents when food-purchasing decisions are being made. TexaSweat conducted Texas Rio Star Grapefruit samplings at four grocery stores in each market, reinforcing Texas Grapefruit's messages from school to media to point-of-purchase.

In-store demos were scheduled and conducted on the corresponding weekends to the School presentations. Four stores did 2-day demos at Fiesta Marts in Dallas. In Austin, two Fiesta Marts did 2-day demos and two City Market stores did 2-day demos. The total samples provided were 3,100 and 300 purchases were made.

### **Goals and Outcomes Achieved**

The Expected Measurable Outcomes for this program were to educate and engage Texas students, media and parents, and ultimately to increase sales of Texas Grapefruit.

The proposed goal of this project was to present to 20 schools and reach approximately 8,000 students and distribute approximately 30,000 pieces of materials. In actuality, 14 schools were presented to reaching a total of 3,185 students. 19,200 pieces of materials were distributed. The reasons for not reaching the goals were due in part to school cancellations. Also, when project staff estimated the number of students reached in 20 schools, project staff assumed that they would be presenting to only large public schools. In Dallas, they attempted to book large public schools but were not able to. Ultimately, they were able to book smaller private schools, and this contributed to a lower total number of students reached.

Website, media coverage and sales goal: Website Traffic – Goal: Increased traffic by 3 percent. Traffic to [www.texasweet.com](http://www.texasweet.com) increased 9 percent for the period of Jan. 1, 2011 through March 1, 2011 (the time that the program was actually being presented to the public) compared to the same dates of the previous year. This far exceeded the goal of three percent.

### Media Coverage – Goal: 1.5 million impressions

The two media dinners received coverage in the Austin American-Statesman which has a circulation of 143,760. Also, the grapefruit was covered on seven blogs and was tweeted approximately 25 times, giving these two media dinners total of 224,106 impressions.

Media was contacted to attend school presentations in both markets, but did not receive coverage. When project staff estimated the goals for media coverage, they anticipated having some coverage in at least one of the markets, but this did not come to pass.

Grapefruit Sales – Goal: 5 percent sales increase

**Grapefruit Sales in Dallas and Austin for 2010 and 2011**

<b>Cities</b>	<b>2010</b>	<b>2011</b>	<b>Percentage Difference</b>
Dallas	304,129	291,367	- 4.2% decrease
Austin	33,235	34,143	2.7% increase

The overall shipments may shed some light on why the Dallas market decreased from 2010 to 2011.

**Beneficiaries**

The entire Texas grapefruit industry, including 190 growers and 27 shippers are beneficiaries of this program as well as the Texas students, teachers and parents. Over time, this program will help extend the economic impact of the Texas citrus industry on the Texas economy, which totals as high as \$200 million a year, through consumer awareness and overall buying habits that must be cultivated through education.

This program benefited the Texas grapefruit industry by educating many Texas consumers about the benefits of Texas Grapefruit. 3,185 students were reached, 19,200 pieces of materials were distributed, 3,100 samples were distributed at the grocery store demos, and 224,106 media impressions were made.

**Lessons Learned**

Project staff believed it would be simple to book presentations at public schools; however, booking the schools was the most difficult part of the entire program. Many schools would not consider allowing the program into their schools for various reasons. More than 200 schools were contacted multiple times to only get 20 presentations booked, and some schools canceled the presentation. Staff also noted, that when planning on media participating in these events, one must take into consideration that this type story is not always a priority for news coverage.

## **PROJECT 10: ADVERTISING CAMPAIGNS FOR THE 95 TEXAS CERTIFIED FARMERS MARKETS FOR THE PURPOSE OF INCREASING SALES OF FRESH FRUITS AND VEGETABLES**

---

**Name of Organization:** Texas Certified Farmers Market Corporation

**Project Manager:** Susan Brints, (806) 781-1753

**Type of Report:** Final

**Date Report Submitted:** December 2012

### **Project Summary**

Texas Certified Farmers Market Corporation (TCFMC) is a Texas corporation, made up of 95 member farmers markets across the state. More than 1,000 farmers produce fresh fruits and vegetables and other value-added products for sale at these markets. According to Texas Department of Agriculture (TDA) records, the Certified Farmers Markets in Texas currently have an economic impact of more than \$3 million. The economic impact is calculated based on sales figures reported by individual farmers markets to TDA's Certified Farmers Market program.

This project benefitted both the producers and consumers since few markets can incur typical advertising costs and must rely on word-of-mouth and their year-to-year regular customers for publicizing their markets. The advertising campaign involved TV, radio, newspaper and other types of advertising which were run in the local media markets. TCFMC conservatively projected that this level of advertising expenditure would easily increase market sales by at least 25-35 percent per year, resulting in increasing the dollars spent in the community and boosting economic activity in these areas and keeping the farmers in production.

It has long been recognized that farmers will produce fresh fruits and vegetables if a market is available to the farmer. Likewise, today's consumers are looking to buy more local, fresh produce. The purpose of this project was to promote public awareness of local TCFMC member markets through the use of local and area media advertising, by publicizing the variety of produce available at the markets, the days and hours of operation, the location of the markets, special events that are held at the markets, etc. By increasing traffic at these markets, the sales of fresh fruits and vegetables increased.

### **Project Approach**

The advertising campaigns for the member markets were multifaceted and geared to inform local communities in Texas of fresh specialty crop fruits and vegetables available at their local farmers markets. TCFMC recognized that the effectiveness of different types of advertising varied significantly between communities and regions throughout Texas. The most effective local media was used in each area.

TCFMC received proposals including budgets from each member Farmers Market Association. Each proposal was screened to insure that only eligible specialty crop programs were promoted with this funding. After review and approval by the TCFMC Board (Board), and TDA's Specialty Crop Block program staff, the member markets incurred the expense of their individual advertising programs. Request for reimbursements of these expenses were

submitted including receipts and copies of the advertisement to the Board. Upon approval of reimbursement requests, these requests were bundled and submitted to TDA.

The individual markets developed their own marketing strategies, taking into account their market location, the size of location, and effectiveness of the marketing strategies reaching the maximum number of customers. Member markets used TV, radio, newspaper, street signage, brochures, and promotional materials for the majority of their advertising methods. Several of the markets placed ads in local newspapers, giving location and daily market hours of operation, as well as a list of the fresh produce that would be sold that week at the market. Many of the market customers look for the newspaper ads for information about the market, specials, programs/activities and produce availability. Banners and signs were also used by the markets to advertise locations. Markets participating in this program commented on the positive feedback from their customers.

### **Goals and Outcomes Achieved**

The individual markets that participated in the advertising grant program all reported positive results. The farmers markets overwhelmingly reported increased sales and attendance in their market locations. Between 2010 and 2011, TDA reports indicate that Certified Farmers Market sales increase more than \$1.9 million. TCFMC strongly feels that a portion of these sales when a direct result of this project.

Project staff hoped that they would have at least 80-90 percent participation by the individual markets in the membership, but did not, for various reasons this type of project was not in the budget for some of the smaller markets.

### **Beneficiaries**

The beneficiaries of this project include the 20 farmers markets that participated with increased sales, the general public who were able to buy fresh and local products, and the local merchants who were able to provide advertising assistance to the farmers markets. Local dollars stayed in the communities and provided positive cash flow for the farmers who brought their produce to the markets.

Consumers will be impacted by increased awareness of the farmers market locations, market hours of operations, types of fruits and vegetables offered, direct interaction with local growers, increased knowledge of local agriculture, increased knowledge of produce preparation, and improved nutrition from eating more fresh, local produce.

### **Lessons Learned**

The majority of the individual markets that used grant funding were more experienced in their advertising preparations, but there were several methods of advertising that had not been used before, and minor design issues had to be addressed. These were easily resolved.

The grant was reimbursable; therefore, the markets' advertising methods were approved before implementation. The project staff helped the markets understand the use of various types of advertising which would be approved by TDA and how to maximize their grant

dollars in their communities. TCFMC plans to implement more programing to help markets better understand marketing principles in the future.

TCFMC project staff plans to allot time during the Annual Meeting in February 2013 to further train markets on advertising media in their market areas, the “how-to” tips on getting the most for your advertising dollars and what is the most effective advertising media for each market’s area. The markets also need more tools to be more effectively the relationship of their advertising dollars, increased customer traffic, and sales.

**Additional Information**

Prior to reimbursement and production of items, program staff of the Texas Department of Agriculture reviewed all art and itemized receipts to ensure all costs charged to the project are necessary, reasonable, allowable and appropriately allocated to additional cost centers if a benefit is shared with non-specialty crops.

A sample of the 4x8 banner used at the Buda Farmers Market:





## PROJECT 11: EVALUATION OF COOL-SEASON AND WARM-SEASON GRASSES FOR SEED PRODUCTION IN WEST TEXAS

---

---

**Name of Organization:** Texas Tech University

**Name of Project Manager:** Richard Zartman, (806) 742-1626

**Type:** Final

**Date Report Submitted:** December 2012

### Project Summary

The Conservation Reserve Program (CRP) was established by the Food Security Act of 1985. This voluntary program is aimed to encourage landowners of highly erodible or environmentally sensitive land to remove it from agricultural production. Landowners agree to establish and maintain an approved permanent cover on enrolled acreage for 10 to 15 years in exchange for annual rental payments and cost-share assistance. The 2008 Farm Bill approved cuts to the CRP that removed approximately 7 million acres of land out of the program nationwide starting October 1, 2009. More than 750,000 acres expired in Texas, most of which are on the High Plains. Only one-third of those contracts will be renewed for three to five years, with an additional 600,000 acres set to expire in the state each year for the next three years (same rate of renewal each year). This left landowners desperate for options to pay for property they cannot afford or sell.

Grass seed production may be a viable and more environmentally friendly alternative to the production of other agricultural crops. Advantages to producing perennial grasses for seed production include no yearly planting costs, reduced soil erosion (yearly tillage operations are not required after grasses are established), reduced chemical and fertilizer inputs, and improved soil texture leading to better moisture penetration. Grass seed production also spreads the work load out more evenly on the farm.

With more than 750,000 acres of CRP land expiring in Texas, landowners are desperate for options to pay for property they can no longer afford. Grass seed production in Oregon is worth over \$250 million a year. With similar climate to Oregon regions, production in West Texas could bolster and help diversify an already strong agronomic market. The enhancement to the seed production industry would also increase employment opportunities throughout Texas. The state of Oregon constructed over 370 seed conditioning facilities in order to process its annual seed crop. These facilities help employ thousands of people. Overall, the production of a perennial grass seed crop would be good for the economy, community, and environment of West Texas. Therefore, the objective of this research is to examine the seed production capabilities of several cool-season and warm-season turfgrass species in West Texas.

### Project Approach

Research was initiated at the Quaker Research Farm in Lubbock, Texas during the spring of 2011. Four cool-season and four warm-season grasses were evaluated for seed production in the field. Cool-season grasses included tall fescue [*Schedonorus phoenix* (Scop.) Holub] ('Tar Heel II' and 'Pure Gold'), creeping bentgrass (*Agrostis stolonifera* L.) ('Seaside II' and 'Mariner'), perennial ryegrass (*Lolium perenne* L.) ('Penguin' and 'Charger II'), and annual

ryegrass (*Lolium multiflorum* Lam.) ('Barvardi' and 'Panterra'). Warm-season grasses included common bermudagrass [*Cynodon dactylon* (L.) Pers] ('Cheyenne' and 'Riviera'), seashore paspalum (*Paspalum vaginatum* Swartz) ('Sea Spray'), zoysiagrass (*Zoysia japonica* Steud.) ('Zenith' and 'Companion'), and buffalograss [*Bouteloua dactyloides* (Nutt.) J.T. Columbus] ('Topgun' and 'Cody'). Cultivars were selected based on enhanced tolerance to salinity. Cultivars were arranged in a randomized complete block design with three replications. All turfgrass species were row planted and irrigation was applied through row-watering to ensure optimal growth and prevent wilt stress.

High temperatures, minimal to no rainfall, very low humidity, and high winds created an environment that was not conducive to grass establishment in 2011. Minimal to no rainfall created high soil and water salinity as well as severely reduced the water table in this area. The low water table made it difficult to irrigate plots and maintain sufficient moisture at the soil surface. Irrigation wells on the research farm malfunctioned from the increased presence of sand, silt, and gravel in the well casing (due to the reduced water table). Seedling plants were also subjected to high salinity levels (due to the reduced water table) causing enhanced desiccation and subsequent death of several of the cool and warm-season grass species. Precautions were taken to try and supply supplemental water to the research plots, but these measures became futile as the severe weather observed in early summer extended throughout the growing season. Therefore, plant mortality was high and no seed crop was produced in 2011.

### **Goals and Outcomes Achieved**

Cool-season grasses (tall fescue, creeping bentgrass, perennial ryegrass, and annual ryegrass) and warm-season grasses (common bermudagrass, seashore paspalum, zoysiagrass, and buffalograss) were row planted in May 2011 at the Quaker Research Farm in Lubbock, Texas. Management practices (fertility, irrigation, weed control, etc.) were performed throughout the length of the trial in order to encourage seed germination and plant maturation. All cool-season grass species germinated over the first two weeks. Survival of cool-season grasses was minimal following germination. Annual ryegrass and perennial ryegrass were the only two cool-season grass species that survived longer than a month. However, surviving ryegrass plants were stunted and establishment was thin. A second flush of germination of all cool-season grass species was observed in early fall (September) when temperatures began to decrease and water (irrigation and rainfall) was more available. Survival of these plants was minimal due to the early onset of freezing temperatures in October.

All warm-season grass species germinated within two weeks of planting with the exception of zoysiagrass. Buffalograss was the only warm-season grass species that survived longer than a month. However, surviving buffalograss plants were stunted and establishment was thin. A second flush of germination of common bermudagrass, seashore paspalum, and buffalograss was observed in early fall (September) when temperatures began to decrease and water (irrigation and rainfall) was more available. Survival of these plants was minimal due to the early onset of freezing temperatures in October.

The target goals of this project were to identify cool-season and warm-season turfgrass species that could successfully produce seed in West Texas. Although no seed was produced in 2011 from any turfgrass species, this may solely be attributed to the lack of uniform establishment and maturation. Seed production may be possible once plants are successfully established. The fact that seven of the eight turfgrass species germinated initially does provide some support to the idea that production still may be possible in West Texas.

### **Beneficiaries**

This research is geared to provide landowners and farmers with more lucrative and environmentally friendly options for agronomic production in West Texas. The enhancement to the seed production industry would also increase employment opportunities throughout Texas. Overall, the production of a perennial grass seed crop would be good for the economy, community, and environment of West Texas.

### **Lessons Learned**

Although several grass species still remain actively growing in the research trial, poor initial germination will require the reestablishment of plots the following spring. The research trial will be planted again in the spring of 2012 (under 2011 Specialty Crop Block Grant) on the Quaker Research Farm in Lubbock, Texas, but plots will be established with the aid of drip irrigation instead of traditional row watering practices. If similar severe weather is experienced in 2012, the drip irrigation will aid in the precise application of water directly to the grass plants allowing for uniform and successful establishment. Row watering will also be available once plants have matured and root systems are presented deeper within the soil profile. Seeding rates of each grass species will also be increased to help offset potential low germination rates. The combination of these new practices should help produce a successful grass crop in the spring of 2012.

### **Additional Information**

Updated 2013: This project continued under the 2011 Specialty Crop Block Grant program. The new project was intended to reestablish research that was lost as well as investigate new tolerances. During the collection of data, Texas continued the longest drought on record which negatively impacted the data. When rain finally came to the area it was a torrential rain storm that washed away the seeds that were replanted, thus there additional data will not be available for the intended beneficiaries.



## PROJECT 12: GO TEXAN WATERMELON TV CAMPAIGN

---

**Partner Organization:** Texas Watermelon Association

**Project Contact:** Ward Thomas

**Email:** [ward@majesticproduce.com](mailto:ward@majesticproduce.com)

**Date Submitted:** December 2011

**Type of Report:** Final

### Project Summary

Texas plays a major role in watermelon production; however, producers still have to compete against out of state melons. In addition watermelons have to compete with other items in the produce section, salad bars and restaurant menus. Much of this is due to consumer perception and brand awareness. Large commodity groups are able to dedicate more money to promote their products.

The overall goal of this campaign was to increase both consumer awareness and sales of Texas watermelons by creating a generic brand awareness campaign. Texas Watermelon Association (TWA) also encouraged consumers to visit restaurants that purchase/serve local produce/watermelons; and promoted the health benefits of eating fresh Texas watermelon.

Timing of the promotion was the key to the success of the project. By targeting the major growing season and holidays, TWA was able to help increase the demand of watermelons when the crop was at its peak and the prices were lower. Timing also made it possible for watermelons to compete with other summer fruits and vegetables.

### Project Approach

The *GO TEXAN Watermelon TV Campaign* for 2011 built on the 2010 campaign and reached more consumers than the 2010 campaign by allocating more funds in the Dallas and Houston markets. This project included concept development, production of television commercials, negotiation of media rates and media buys as well as partnership with the Texas Department of Agriculture to conduct carefully planned retail demonstrations. TDA also produced GO TEXAN stickers, which were distributed to growers and placed on watermelons to increase consumer awareness.

The media plan maximized viewership of the TV campaign by partnering with the Texas Vegetable Association to maximize dollars and leverage TV stations in each market to acquire as much additional exposure with free airtime and ‘added value’. The goal was to increase awareness of the desirability of Texas watermelons over those grown outside the state and to increase sales of Texas watermelons over other produce items. TWA utilized the funding available to contract with Marketing Matters to buy airtime in the following markets: Austin, Dallas, Houston and San Antonio. TWA aired a minimum of three flights (series) preceding the three major summer holidays in each of the four markets.

*Creative Development* – Through discussions with TDA and TWA, Marketing Matters recommended that TWA not use previous creative that focused on various recipes using watermelon and a chef spokesperson. TWA felt it was very important to use the budget to

educate consumers on the nutritional value and the sweetness of Texas Watermelon. Project staff also wanted create media that would appeal to the consumer and primarily targeted mother who would be purchasing produce for their families.

*Creative* – The concept for 2011 was “Watermelon Smiles” A campaign that highlighted the health and taste benefits of local Texas Watermelon. A TV campaign was developed as well as a new logo for TWA. Marketing Matters also updated the TWA website and created on line banner ads.

*Media Plan* – The television campaign for TWA was executed in three different holiday flights, Memorial Day, Independence Day and Labor Day. The markets where TV schedules were purchased included Dallas, Houston, San Antonio and Austin. The media campaign included a 30 and 15 second TV commercial.

**Activities Performed**

ACTIVITY	TIMELINE COMPLETED
TWA Contracted with Marketing Matters to conduct campaign	October 2010
Marketing Matters developed concept and marketing strategy	October 2010 – February 2011
Marketing Matters negotiated and purchased airtime in Austin, Dallas, Houston and San Antonio.	January 2011 – March 2011
Marketing Matters developed :10, :15 and :30 commercials	April 2011
Marketing Matters created banner advertisements, website design for added value	March 2011- April 2011
Commercials and banner ads aired	May 2011 -September 2011
TWA Partnered with TDA to conduct 101 Watermelon demonstrations statewide.	May 2011 – September 2011
Marketing Matters developed banners for added value at Taste of Dallas and organized TWA participation and watermelon eating contest	July 2011

The media budget was \$62,880 for the total campaign allowing for nearly 500 spots with billboard sponsorships. The target demographic was women and moms with an age range of 25-54 years. TV shows such as The Food Channel, HGTV, Oprah and Ellen, as well as morning news were included in the media buy to specifically target a core demographic. The TV schedule was combined with in-store consumer demonstrations that were held at various retail outlets in the four markets.

*Additional Event Marketing – The Taste of Dallas.* As part of the media package that was provided by the local NBC TV station at no additional cost, TWA and TVA were able to be recognized as a sponsor of Taste of Dallas. It was also the 25<sup>th</sup> Anniversary of the Taste of Dallas and TWA benefited from publicity highlighting the event. The Texas Watermelon Association also sponsored events, such as the TWA Watermelon eating contest to gain

exposure. The contest was promoted heavily on the NBC TV station in Dallas, on the NBC station website as well as throughout the Taste of Dallas on site event with banners and posters. The objectives were to uniquely align the GO TEXAN brand and the Texas Watermelon Association with a very reputable and tasteful food event featuring the best chefs, restaurants, artists, kids' activities and music in Texas.

### **Goals and Outcomes Achieved**

Typically, sales of watermelon during in store demonstrations increase an average of 120 percent. With the addition of the TV marketing campaign, TWA expected to see an increase in sales of 200 percent. The TWA and TDA worked with Texas watermelon producers and retailers to monitor sales during and after in store promotions and TV campaign. The information gathered was compared to sales from the previous week before the event occurs to determine a percent increase in sales. Growers also compared their sales to prior years.

The target demographic was women and moms with an age range of 25-54 years. TV Shows such as The Food Channel, HGTV, Oprah and Ellen as well as morning news were included in the media buy to specifically target a core demographic.

### **Results of Activities**

Estimated TV viewing impressions: 2,354,322

*Digital Marketing* – TWA ran banner ads and audio pre rolls of the TV commercial on KVUE in Austin, KXAS in Dallas on the website DigInDFW.com and the Time Warner Cable website.

Total TWA banner and video pre roll impressions: 380,046. Total click throughs: 2662

*Survey of Texas watermelon growers showed the following results:*

Growers reported a percentage increase in statewide sales for 2010 over 2009: 54 percent

Growers reported a percentage increase in statewide sales for 2011 over 2010: 223 percent

This is slightly above the 200 percent increase TWA forecasted.

Retailers reported and average increase in sales of: 128 percent

The reason the grower results were higher than the retail sales is that growers also sell to roadside stands and farmers markets vendors. The sales results at these venues were not tracked.

### **Beneficiaries**

These marketing events benefited more than 200 watermelon producers in Texas. The commercials were viewed in the four large metropolitan areas in Texas, which impacted every retail grocery store, and restaurant in the viewing area. Watermelon demonstrations directly benefitted 101 retail grocery stores and four Texas restaurants. As stated above, growers reported a 223 percent increase in sales of Texas watermelons as a direct result of the marketing campaign.

### **Lessons Learned**

TWA was able to build on the 2009 promotions by researching and finding a better marketing firm to maximize the dollars available to create the best marketing campaign possible. TWA also learned to partner with other commodity groups with similar projects to maximize the purchase of airtime for best results and increase added value.

### Additional Information

Below are links to a few of the video commercials produced.

Video shows the watermelon commercial on You Tube.

<http://youtu.be/LJhpBXR11FI>

Click here to view the 15-second watermelon commercial

<http://www.youtube.com/watch?v=g5GL9xo0MPk&feature=related>

Watermelon website redesign: <http://texaswatermelon.com/>



Texas watermelon banners for display at Taste of Dallas – part of the added value provided by local Dallas TV station:



The Texas Watermelon Association had additional exposure by sponsoring the TWA Watermelon eating contest. The contest was promoted heavily on the NBC TV station in Dallas, on the NBC station website as well as throughout the Taste of Dallas on site event with banners and posters.

Sign up poster



Digital Marketing – TWA ran banner ads and audio pre rolls of the TV commercial on KVUE in Austin, KXAS in Dallas on the website DigInDFW.com and the Time Warner Cable website.





## PROJECT 13: TEXAS VEGETABLE MARKETING CAMPAIGN

---

**Partner Organization:** Texas Vegetable Association

**Project Contact:** Ray Prewett, (956) 584-1681

**Email:** [ray@valleyag.org](mailto:ray@valleyag.org)

**Type of Report:** Final

**Date Submitted:** December 2011

### Project Summary

The Texas vegetable industry competes with many other domestic and foreign markets. With the many choices consumers have, consumers sometimes are unable to identify Texas products or even remember to look for a local Texas product when they are in season. Like many of us, consumers need to be reminded of what to look for at a retail grocery store or restaurant, especially when it is in season.

Funding to create a marketing campaign of this magnitude has always been an issue for producers and the Texas Vegetable Association (TVA). With the increase in production costs, producers and shippers are cutting back on marketing expenses. Some marketing responsibilities are shifting to the association.

In order to maximize the results of the TV campaign, banner ads and retail demonstrations, the promotional efforts took place during peak harvest and availability periods.

The *Texas Vegetable Marketing Campaign* was an opportunity to build on current successes with in-store demonstrations, support local produce consumption in restaurants and tout the health benefits of eating fresh Texas vegetables. To conduct the *Texas Vegetable Marketing Campaign*, TVA partnered with the Texas Department of Agriculture and the Texas Watermelon Association to send the same message to consumers:

- Purchase fresh Texas vegetables at retail grocery store;
- Visit restaurants that purchase/serve local vegetables; and
- Tout the health benefits of eating fresh Texas vegetables at home, work or at a restaurant.

In addition to sending the same message to consumers, the overall goal of this promotion was to increase consumer awareness, sales of Texas vegetables and most importantly increase the value of Texas vegetables.

### Project Approach

The TVA partnered with the Texas Watermelon Association to maximize airtime purchased and with the Texas Department of Agriculture to conduct the retail demonstrations. As a result of the partnership with the Texas Watermelon Association, TVA, through the work of Marketing Matters was able to purchase 25 percent more airtime and reach an additional 2,000 consumer via click-throughs on online ads. By partnering with the Texas Department of Agriculture, TVA was able to coordinate media airtime with TDA scheduled retail demonstrations in all four media markets. TVA also partnered with the Texas Department of

Agriculture's GO TEXAN Restaurant Round-Up to promote local foods including produce at Texas restaurants. Four hundred and sixty-nine restaurants participated in the state-wide event.

Marketing Matters was contracted through a competitive process to plan, negotiate and buy the TV schedules as well as develop a creative strategy for the 2011 campaign. The overall goal of this campaign was to increase both consumer awareness and sales of Texas vegetables. Messages also encouraged consumers to visit restaurants that purchase/serve local produce, and they promoted the health benefits of eating fresh Texas produce at home, work or at a restaurant. The TVA's *Texas Vegetable Marketing Campaign* project included pre-production, production, post-production of cooking vignettes, on-air talent, live TV appearances including media planning, buying and stewardship, airing of cooking vignettes and 15 second and 30 second spots, recipe preparation, food and materials, retail demonstrations and restaurant demonstrations.

*Creative Development* – Through discussions with TDA and TVA, Marketing Matters recommended that TVA use the creative idea that focused on various recipes using Texas vegetables and to promote GO TEXAN. Project staff hired a celebrity chef, The Dining Diva, out of the Houston to be the spokesperson for the Texas Vegetable Association. They also developed live and “look live” cooking vignettes, and 30 second, 15 second and 10 second commercials. TVA and Marketing Matters met to determine which vegetables would be appropriate for the spring and fall campaigns. The celebrity chef was asked to develop four recipes that would be prepared on live TV and on the recorded spots. These recipes were also developed into recipes cards by the TDA and distributed at various retail cooking demonstrations as well as TV studio audiences.

*Creative* – The concept for the 2011 Texas Vegetable Campaign was “Now That’s Fresh!” presenting how Texas vegetables not only taste great, but are healthful, fresh and can be used in many recipes throughout the year. The Dining Diva was filmed at a local vegetable farm walking through the gardens. This scene then transitioned right into the kitchen – promoting farm to table. TVA chose the tag line “Now That’s Fresh!” which was used throughout the campaign driving home the message about fresh Texas produce. All creative materials consistently conveyed to consumers that Texas vegetables are fresh, healthy and taste great.

*Media Plan* – The television campaign for TVA was executed in two different flights, spring and fall. TV schedules were purchased in the Dallas, Houston, San Antonio and Austin markets. The media campaign included a 10, 15, 30 second recorded and two minute live cooking vignette with the celebrity chef.

The media budget was \$64,500 for the total campaign giving nearly 350 spots with billboard sponsorships. The target demographic was women and moms, ages 25-54. TV shows such as The Food Network, HGTV, Oprah and Ellen, as well as local live in studio segments were included in the media buy to specifically target a core demographic. The TV schedule was combined with in store consumer demonstrations that were held at various retail outlets in the four markets.

*LIVE ON AIR* – The Dining Diva was filmed live, in studio, in Houston on “Great Day Houston” as well as in San Antonio on the local FOX affiliate. The segment encouraged customers to tune in and learn new Texas vegetable recipes. The Dining Diva prepared the vegetable recipes live, on the air while promoting GO TEXAN and fresh Texas vegetables in the grocery and at local restaurants. The segments are also housed in archive on Great Day Houston’s website.

*Additional Event Marketing - The Taste of Dallas.* The objectives were to uniquely align the GO TEXAN brand and the Texas Vegetable Association with a very reputable and tasteful food event featuring the best chefs, restaurants, artists, kids’ activities and music in Texas. It was also the 25<sup>th</sup> Anniversary of the Taste of Dallas and TVA benefited from additional publicity for the event. The Texas Vegetable Association was promoted as a sponsor with signage at the event. With the help of TDA, an on-stage demonstration was conducted by a chef preparing fresh Texas vegetables.

*Digital Marketing* – TVA ran banner ads and audio pre rolls of the TV commercial on KVUE in Austin, KXAS in Dallas and a banner ad on the cooking page of [www.DiginDWF.com](http://www.DiginDWF.com).

The total TVA banner and video pre roll impressions were 477,995 while the total click-throughs were 2,662.

### Activities Performed

ACTIVITY	TIMELINE COMPLETED
Contract with Marketing Matters	October 2010
Worked with Molly Fowler, “The Dinning Diva” to develop four recipes using Texas onions and Texas cabbage and other Texas vegetables	October 2010 – February 2011
Negotiate air time in the four major markets in Texas (Austin, Dallas, Houston, San Antonio)	January 2011 – March 2011
Marketing Matters developed live and ‘look live’ cooking vignettes, and produced :10 second, :15 second, and :30 second spots for each flight to air in the four markets.	October 2010 – April 2011
Marketing Matters worked with media buyers to air recorded cooking vignettes in the Austin, Dallas, Houston and San Antonio markets	April 2011 – May 2011
During each of the active flights – April and May, TDA worked with growers, retailers and chefs to conduct in store demonstrations at retail outlets and restaurants in the 4 major media markets	April 2011 –May 2011
TVA worked with the Texas Department of Agriculture and retailers to collect sales information	May 2011 – June 2011
Ran additional media	June 2011 – October 2011

## Goals and Outcomes Achieved

Typically, sales of Texas vegetables during in store demonstrations increase an average of 120 percent. With the addition of the TV marketing campaign, TVA expected to see an increase in sales of 200 percent. TVA worked with TDA and Texas vegetable producers and retailers to conduct 250 retail demonstrations and monitor sales during and after promotions. For each retail demonstration conducted, the grocery stores provide a report detailing the increase in sales of vegetables over previous weeks when demos and the TV campaign were not being conducted. Based on reports submitted by the participating retail grocery stores the sales of Texas vegetables increased between 65 percent and 1,263 percent for an average of 228 percent. The following chart list the different in-store demonstrations conducted along with the results.

Month completed	Products demonstrated	Retail Chain	Number of stores	Number of samples	Percent increase in sales
April 2011	Onions	Fiesta	35	7,000	182 %
May 2011	Herbs	Wheatsville Coop	1	200	15 %
January 2011	Spinach, grapefruit	Central Market	4	800	1,263 %
February 2011	Spinach, grapefruit	Fiesta	35	7,000	88 %
June 2011	Mushrooms	Central Market	16	4,000	250 %
May 2011	Onions	Whole Foods	16	4,000	53 %
April 2011	Cabbage, onions, spinach	Whole Foods	16	4,000	65 %
June 2011	Herbs, cabbage	Fiesta	25	7,000	146 %
January 2011	Greens	Whole Foods	16	4,000	125 %
June 2011	Onions, bell pepper, tomatoes	HEB	25	5,000	200 %

## Beneficiaries

These marketing events benefited more than 400 vegetable producers in Texas. In addition to benefiting the members of the Texas Vegetable Association, the TV marketing campaign also benefitted small vegetable producers that sell their products directly to consumers. The message about buying local Texas produce was carried to consumers across Texas.

The message “Look for Texas produce at your favorite retail grocery store and ask for it at your favorite restaurant” was impressed on 2,124,188 million-television viewers. In addition, promotions indirectly impacted sales at more than 3,500 retail grocery stores, and 150 Texas restaurants.

Based on reports submitted by the participating retail grocery stores the range of increase in sales of Texas vegetables was between 65 percent and 1,263 percent for an average of 228 percent.

### Lessons Learned

Even though results were good, TVA felt that the promotions could be improved. By making them fun and exciting, it would draw more viewers to watch but most importantly it would work to help more viewers remember the benefits of buying local Texas produce. Future promotions will feature kids and families enjoying fresh and nutritious Texas vegetables. More work and collaboration to mark Texas produce could have a positive effect on the sale of Texas Vegetables. Even though the retail stores did a great job labeling the Texas produce it would have carried a stronger message if the produce itself were labeled.

### Additional Information

Dig In DFW

<http://www.youtube.com/watch?v=PvQSN4PnnJk&feature=colike>

Television Commercial set in Houston

KHOU Commercial in Houston

<http://www.youtube.com/watch?v=wG2AIJblyQ&feature=colike>

Banners created for Taste of Dallas



Online banner ads





## **PROJECT 14: ALTERNATIVE COMMERCIALIZATION PATH FOR SPECIALTY CROPS: PROMOTING STONE FRUITS AND PECANS BY TARGETING HIGH VALUE MARKETS ORIENTED TO HUMAN HEALTH**

---

**Partner Organization:** Texas A&M University

**Project Manager:** Dr. Luis Cisneros-Zevallos

**Contact Information:** [lcisnero@tamu.edu](mailto:lcisnero@tamu.edu); phone: (979) 845-3244

**Type of Report:** Final

**Date Submitted:** March 2013

### **Project Summary**

The overall goal of this project was to establish an alternative commercialization path for stone fruits and pecans targeting high value markets oriented to Human Health. The approach is to use the health promoting properties of horticultural commodities as marketing tools to reach these alternative markets. This report covers the first year of a proposed four year project. The specific goals of the four year project included the generation of scientific information on health promoting properties related to chronic inflammation and events of metabolic syndrome like obesity and cardiovascular disease (Year 1), Type 2 diabetes and varietal selection using in *in-vitro* studies (Year 2), validation in *in-vivo* studies using animal models (Year 3) and establishing a pool of buyers in the alternative markets and a strong extension component to outreach and disseminate the successful story to other stakeholder including different grower associations, industry associated to alternative markets and consumers (Years 3 & 4). In this first year report, project staff are able confirm that stone fruit and pecan polyphenols have anti-inflammatory properties in different cell lines including adipocytes, macrophages, vascular endothelial cells and anti-obesity effects by modulating adipogenesis.

### **Project Approach**

The study was divided in two stages. First, a study was conducted on the effects of stone fruits on fat accumulation on adipocytes and anti-inflammatory properties in adipocytes, macrophages and vascular endothelial cells (HUVEC). Second, researchers studied the effects of metabolites of hydrolyzable tannins from pecans on fat accumulation of adipocytes and anti-inflammatory properties in adipocytes and macrophages.

Staff have characterized the phenolic profiles of different stone fruits (nectarines, peach and plums) finding 4 major phenolic groups including chlorogenic acid derivatives, anthocyanins, quercetin derivatives and catechins. Profiles and amounts present are dependent on fruit type and variety. Chlorogenic acid (CA) and a rich anthocyanin extract (RAE) which contained a mixture of anthocyanins, quercetins and catechins derivatives were selected to perform the bioassays in this study.

Researchers have tested the effects of CA and RAE on pre-adipocyte differentiation as well as adipogenesis and anti-inflammatory effects on adipocytes. Results indicated that RAE exerts effects on inhibiting adipogenesis (fat accumulation) and inflammation (mature cells challenged with LPS), while CA showed no effects. Both fractions did not inhibit pre-adipocyte differentiation. On the other hand, when RAE and CA were applied to

macrophages and HUVEC cells challenged with LPS, mainly CA showed anti-inflammatory properties while RAE had no major effect.

Two metabolites of ellagic acid, urolithins A and B were selected to perform the bioassays in the study with adipocytes. Both, urolithins A and B, are metabolized by gut microflora from hydrolysable tannins as those present in pecans. In previous studies large amounts of hydrolysable and condensed tannins were found in different varieties of pecans. Project staff tested the effects of ellagic acid, urolithins A and B on pre-adipocyte differentiation as well as adipogenesis. Results showed that neither of these compounds affected differentiation (Pref-1 gene decreased for control and treatments). However, ellagic acid and urolithin A inhibited adipogenesis (fat accumulation) through a reduction in GLUT 4 gene expression which is associated to a decrease in glucose uptake, while urolithin B did not affect adipogenesis.

Project staff continued working with both metabolites of ellagic acid, urolithins A and B, to perform the bioassays with adipocytes, focusing on inflammation. The effects of ellagic acid, urolithins A and B were tested on adipocytes challenged with lipopolysaccharide (LPS) which is a trigger of inflammation. Results indicated that urolithins A and B reduced levels of nuclear phosphorylated NFkB. Gene expression of cytokines and proteins associated to the inflammation process indicate that urolithin A inhibit TNF $\alpha$  and iNOS, urolithin B inhibited only iNOS and ellagic acid inhibited TNF $\alpha$ , IL-6, iNOS and MCP-1. None of these compounds inhibited the gene expression of COX-2. The underlying mechanisms of these results are still under study.

Work continued with ellagic acid, urolithins A and B, in macrophages challenged with LPS. Results indicated that reactive oxygen species (ROS) are reduced in an early stage (3 h) by urolithin A and in a late stage (24 h) by both urolithins A and B.

Furthermore, urolithin A showed a reduction in NO production and levels of TNF- $\alpha$ , IL 1- $\beta$  and prostaglandin PGE2. Urolithin B showed similar trend on those same markers but did not affect NO production. In general, ellagic acid did not show an anti-inflammatory effect in macrophages.

### **Goals and Outcomes Achieved**

In this report corresponding to year 1, staff studied the effects of stone fruit and pecan polyphenols against some components of the metabolic syndrome. Cell models including adipocytes were used to determine effects in differentiation, fat accumulation and inflammation representing events in fat tissue. In addition, we studied inflammation in macrophage cells and Human umbilical vein endothelial cells (HUVEC) associated to atherosclerosis events. The inflammatory response in all these cells is a complex event, which is closely interrelated among them.

Results indicated that stone fruit polyphenols have multiple functions and could potentially work against the metabolic syndrome in different fronts simultaneously. For example, RAE inhibited adipogenesis or lipid accumulation by modulating key transcription factors, c/EBP $\alpha$  Ppary and Ppar $\alpha$  and reduced the inflammatory response in adipocytes or fat cells by

modulating transcription factor NFkB and gene expressions of different pro-inflammatory cytokines. On the other hand, chlorogenic acid inhibited the inflammatory response in macrophages and HUVEC cells by modulating transcription factor NFkB and gene expressions of different pro-inflammatory cytokines and adhesion molecules associated to chronic inflammation and atherosclerosis.

Similarly, for pecan polyphenols, staff tested the effects of ellagic acid, urolithins A and B on pre-adipocyte differentiation as well as adipogenesis. Results showed that neither of these compounds affected differentiation (Pref-1 gene decreased for control and treatments). However, ellagic acid and urolithin A inhibited adipogenesis (fat accumulation) through a reduction in GLUT 4 gene expression which is associated to a decrease in glucose uptake, while urolithin B did not affect adipogenesis.

When these compounds were tested against inflammation in adipocytes, results indicated that urolithins A and B reduced levels of nuclear phosphorylated NFkB and the gene expression of cytokines and proteins associated to the inflammation process. Furthermore, these same compounds showed anti-inflammatory properties in macrophages by reducing levels of protein expression of different pro-inflammatory markers.

### **Beneficiaries**

These results are promising and indicate that stone fruit polyphenols and metabolites of pecan polyphenols have potential health promoting properties against the metabolic syndrome. Researchers have identified chlorogenic acid and a rich anthocyanin extract to be responsible for these effects. These compounds are present in most stone fruits including plums, peach and nectarins. Research in pecans has shown that urolithins A and B, metabolites of ellagic acid are responsible for similar anti-obesity and anti-inflammatory effects.

The information obtained was submitted as papers in scientific journals (Journal of Agricultural and Food Chemistry and PLOS ONE) during 2013. Although staff expected four papers to be published in 2013, only 3 papers were submitted and they are all still under the review process.

In addition, a press release generated through Texas A&M University is still under evaluation to determine its impact on advertisement effects (e.g. dollars equivalent to advertisement generated by the press release will be reported by the end of the production season of 2013). For example, a press release of a single work on health properties of stone fruits against breast cancer was issued on June 19, 2010, as of September 2010 the press release showed 116 clips in the internet that had a total circulation of 11,921,886 and a value of \$124,501. A press release is anticipated to be issued once the above papers are published.

The information generated could be used as the basis for promoting stone fruits as a healthy food. The generated data supports our initial proposal hypothesis that stone fruit polyphenols work against the metabolic syndrome through their anti-inflammatory properties (year 1). This information will be used in the project staff second year proposal (year 2) which aims at studying how these polyphenols work against insulin resistance and type 2 diabetes (part of

the metabolic syndrome events). The information generated in years 1 and year 2 will support research with animals to confirm findings (proposal for year 3). Once the animal studies have been performed staff will proceed with the marketing work on the fourth year through the promotion of these products as healthy foods in coordination with different grower associations (proposal for year 4).

Project staff was not successful in securing year 3 funding during Texas' 2013 round of funding. They estimate that if that proposal did receive funding (Year 3), they should be able to promote stone fruits and pecans in alternative high value health markets including the cosmetic, functional foods and dietary supplements markets. There are two grower associations and two companies interested in these alternative markets. Project staff envision that growers will benefit by obtaining better price for their products in these new markets while companies in these alternative markets will benefit since they will have access and utilize fundamental research from this project as marketing tools. All, including growers and companies as well as consumers will benefit by the press release which will create awareness of the health promoting properties of these selected specialty crops.

### **Lessons Learned**

In general, the only limitation was the unexpected departure of a research associate that delayed the project. Project staff has taken the appropriate measures to avoid these problems in the year 2 project.

**Partner Organization:** Texas Vegetable Association

**Project Contact:** Ray Prewett, (956) 584-1681

**Email:** [ray@valleyag.org](mailto:ray@valleyag.org)

**Date Submitted:** December 2011

**Type of Report:** Final

### **Project Objective**

With the pending implementation of the Food Safety Modernization Act (FSMA), there are many questions about how this legislation will impact producers and how it will be implemented. It is critical for the stakeholder industries to be actively engaged in the FSMA implementation process and work together with State and Federal government in developing a functional system that meets the needs of all impacted industries.

The primary objective of this grant project was to create awareness and encourage dialogue between producers, government agencies and other stakeholders by conducting a statewide food safety conference and a regional traceability conference. In order to achieve this objective, the planning team for the conferences secured some of the leading experts in their respective fields to speak at each event. Presenters at the conferences included food safety experts from the private and public sectors including FDA, Department of State Health Services, Texas A&M AgriLife Extension and the Texas A&M University System.

### **Project Approach**

#### *Statewide Food Safety Conference*

Texas Vegetable Association (TVA) and Texas A&M AgriLife Extension partnered to develop the content and coordinate the logistics in the implementation of a statewide food safety conference, and a regional traceability workshop/conference.

Early in the year, the primary focus was to develop and execute the plans for the statewide food safety conference. Priorities included a number of activities:

- Date determination
- Agenda development
- Speaker selection and invitation
- Venue identification and contract negotiation and accommodations
- Outreach and marketing plan development
- Contacting potential attendees, sponsors and exhibitors
- Production and distribution of marketing materials

TVA's first challenge was selecting a date that would not conflict with speakers, attendees and other major conferences. With the dates finalized, TVA worked with a convention booking specialist to locate and evaluate various venues and pricing options.

Once a tentative agenda and a venue were selected, invitations for registration were sent out in mid-March. Registration was handled through both an online system and by traditional mail/fax. The online registration was hosted by Constant Contact, which has an event marketing tool to facilitate the registration process of attendees.

Having never held a food safety conference, it was difficult to ascertain the level of interest, but ultimately it was decided 150 attendees would be a reasonable target. TVA and Texas A&M AgriLife Extension met on a biweekly basis to discuss status updates and assignments in contacting potential attendees, sponsors and exhibitors for the conference.

Some of the outreach efforts that took place included creating press releases for the conference and contacting media outlets to work on advertising. Media outlets such as The Produce News and Southwest Farm Press printed articles and updated their websites with conference information. TVA and Texas A&M AgriLife Extension also made a large number of cold calls to potential attendees on a regular basis.

Throughout the process, speaker selections were made; individuals were contacted for availability and input for the agenda and confirmed. Speakers included:

- Todd Staples, Texas Commissioner of Agriculture
- David Lakey, Texas Commissioner of Health
- Gale Prince, Sage Food Safety Consultants
- Susan Tennyson, DSHS
- Linda Gaul, DSHS
- Emilio Escobar, FDA
- Rick Hill & Jeff Brechler, J&D Produce
- David Gombas, United Fresh Produce Association
- Jane Broussard, EPA
- Elsa Murano, TAMU
- Debra Callan, DSHS
- Gary Acuff, TAMU
- Brad Stufflebean, Home Sweet Farm
- Scott Horsfall, California LGMA
- Richard de Los Santos, TDA
- Juan Anciso, Texas A&M AgriLife Extension
- Suresh Pillai, TAMU
- Tyler Campbell, TAMUK
- Renata Ivanek-Miojevic, TAMU
- Marcel Valdez, Texas A&M AgriLife Extension

In the final weeks leading up to the conference, meetings were held with the planning committee to update them as to the status of total registrants. With the help of the planning committee, and heavy emphasis on contacting potential registrants via email, phone, and mailouts, numerous registrations came in during the final two weeks before the conference, and as well as a number of registrants who signed up at the door. In addition to working on attracting registrants, the planning committee met to confirm topics for key note speakers, make final agenda adjustments and last minute travel arrangements.

TVA and Texas A&M AgriLife Extension held the Texas Food Safety Conference at the Hilton Austin, on May 11, 2011. The conference turnout was successful with more than 150 conference participants in attendance.

Texas A&M AgriLife Extension developed a thorough survey that was handed out to participants at the conclusion of the event. Survey results were based on a scale of 1-5, with 1 being not at all, and 5 being excellent. Based on an analysis by Texas A&M AgriLife Extension, average scores showed that nearly every category was rated at a 4 or better as far as content and execution of the conference. Attendees also provided written comments that were reviewed by the TVA and Texas A&M AgriLife Extension staff and will be used to help plan future conferences, including the Regional Traceability Workshop.

#### *Regional Traceability Workshop*

A conference call with the planning committee was held to discuss the details for the second food safety conference, focusing on traceability and recalls. The planning committee meeting was composed of representatives from several organizations including, TVA, Texas Citrus Mutual, Texas Department of Agriculture, Department of State Health Services, United Fresh Produce Assoc., Sage Food Safety Consultants, and Texas A&M AgriLife Extension. The planning committee agreed that the best option was to have the event in conjunction with the 2011 Texas Produce Convention (TPC) as a pre-conference workshop. The event was named the Food Safety Traceability & Recall Management Workshop.

TVA and Texas A&M AgriLife Extension staff worked together to advertise the event to potential attendees. Targeted groups included all potential TPC attendees, Food Safety Conference attendees and others. There were regular meetings held with Texas A&M AgriLife Extension to stay abreast of registrant updates, and share workload for conducting marketing activities. A number of teleconferences were held with event stakeholders and speakers to help develop the content of the meeting.

Although staff originally estimated only 30-35 attendees for the traceability workshop, it was attended by approximately 90 participants, exceeding expectations. This was a tremendous achievement in terms of turnout, but it required a change in the format of the event to become more of a presentation style event, as opposed to hands on activity based workshop.

The workshop was led by industry experts Gale Prince and David Gombas, who have first-hand experience and knowledge in the subject. Prince and Gombas both helped develop exercise material for the workshop.

Texas A&M AgriLife Extension developed a survey for the event, which attendees were asked to complete at the end of the workshop. Scores were based on 1-5. Average results ranged from 4.18 to 4.5, based on both content and logistics of the event. This confirmed that the event was an overall success and provided knowledge and value to attendees.

### **Goals and Outcomes Achieved**

The Food Safety Conference had over 150 attendees, which met the planning committee's expectations in terms of attendance. There was an incredible amount of positive feedback that was given by speakers and conference attendees, both verbally during the conference itself, and after the conference, in person, by email, and as documented in the post conference survey conducted by Texas A&M AgriLife Extension. Based on a scale of 1-5, with 1 being "Not At All", and 5 being "Completely", average content scores ranged from 3.7 to 4.02, and the overall rating for the conference itself was a 4.5. These scores indicate positive feedback in general, with some room for improvement going forward.

The regional Traceability Workshop was a great success in terms of numbers and feedback. With approximately 90 participants, the attendance rate far exceeded the planning committee's expectations. Also, average feedback scores for content ranged from 4.13 to 4.3, and the overall rating for the conference was a 4.48.

From a qualitative standpoint, the conferences went off very well, with a tremendous amount of information being disseminated to the conference attendees, which was the primary objective of the events. There was also a significant amount of networking between producers, researchers, regulatory officials, and industry representatives that will facilitate future collaboration in driving the FSMA implementation process.

Surveys were provided to attendees for both the Statewide Food Safety and Regional Traceability Conference. There were questions with regard to logistics and content, but there were also questions that helped measure attendees level of knowledge before and after the event, as well as a question, which addressed respondents' opinion as to whether or not there was increased awareness associated with a food safety and traceability conference.

With respect to the "increase in awareness of 100%" for the two events, on the post event surveys project staff asked if participants had an increased awareness if each of the events was continued. Both surveys indicated that 100% of the participants felt that if these Food Safety and Traceability Workshops were continued Food Safety awareness and implementation will increase. This tells project staff that 1) both the food safety and the traceability conferences helped attendees raise their awareness of food safety and traceability issues, and 2) that there is a continued desire for future conferences to further increase awareness and knowledge of food safety related issues.

In terms of "a change in knowledge of at least 50%", there was a 38% increase in level of knowledge at the statewide conference, and an 18% increase in the level of knowledge at the traceability conference. Although these percentages fell short of the 50% targeted increase, the conference organizers and attendees were pleased with the overall results, especially considering that these were the first statewide conferences of their kind. Considering that

there was not a good benchmark for food safety knowledge levels prior to these events, it was evident from reviewing survey responses that attendees felt that they already had a relatively high level of knowledge before the conferences, which in turn would explain the lower than expected increased change in knowledge level. In developing future conference content, project staff may consider raising the technical detail in terms of what is presented to conference attendees.

### **Lessons Learned**

One of the lessons learned was the need to minimize scheduling conflicts with other conferences, which may impede some individual's ability to attend. There were a few conflicting industry events that may have impacted the Food Safety Conference.

Project staff also learned that it is difficult to estimate interest and attendance for a first-time event. With FSMA being a new topic, it was difficult to gauge potential participation. The conference venue needed an estimated number of attendees as well as an estimated number of overnight rooms and food/beverage budget. In hindsight, project staff should have decided to err on the side of lower attendance for a first time conference, prior to locking in a number with a large venue such as the Austin Hilton.

### **Additional Information**

TVA believes that overall, attendees left the meetings with a strengthened understanding of the coming changes to their respective organizations as it relates to the FSMA. These conferences also helped bring together industry representatives, growers, researchers, and government officials, which will be invaluable as the FSMA implementation process moves forward.



## PROJECT 17: PEACH PRODUCTION IN HIGHTUNNEL

---

**Name of Organization:** Texas Fruit Growers Association

**Project Manager:** Dan Roher, [danrohrer3@gmail.com](mailto:danrohrer3@gmail.com) (512) 463-6908

**Type of Report:** Final

**Date Report Submitted:** December 2012

### Project Summary

The Texas Fruit Growers Association (TFGA) set up a high tunnel project for tree fruit in Texas. The purpose was to use hoop type structures to protect early blossom of tree fruit from spring freeze damage and hail injury and create earlier production for the season when peaches are in short supply and high priced. Project staff also observed whether the controlled environment in a high tunnel reduced insect and disease pressure.

### Project Approach

“Chinese protected structure peach production” was used as a model to set up the project. The Chinese have been using this type of production system since the 1970’s on large acreage with the assistance of university experts from the U.S., although it has not been tried in the U.S. for peaches. To start, varieties of peach, apricot, and low chill sweet cherries that had lower winter chill requirements were chosen over the varieties normally grown at each of the site areas. This enabled staff to create blossoms 3 to 4 weeks earlier than in open orchards. TFGA obtained the cooperation and space for the demonstration sites from four successful peach producers. Each of the caretakers was responsible for the construction of the TFGA high tunnel, planting trees and structure maintenance. Sites were positioned in three different USDA climate zones ([www.planthardiness.ars.usda.gov/](http://www.planthardiness.ars.usda.gov/)) including 8a, 8b and 7b. The Project Manager (PM) assisted with construction and provided information to the growers as each season progressed. Other entities assisting or cooperating included Tree Fruit Specialists, Monte Nesbitt and Jim Kamas of Texas A&M AgriLife Extension, Dr. David Byrne, Peach Breeder of Texas A&M University, Dr. Desmond Layne of Clemson University, Dr. Curt Rom of University of Arkansas, Hill Country Fruit Council, and Dr. Greg Lang, a Sweet Cherry Specialist at Michigan State University. Dr. Byrne, Dr. Rom, and Dr. Layne had previously visited some of the Chinese sites and were instrumental in providing counsel and setting up this project.

The planned structures had two rows of trees 12 feet apart with tree spacing 4 feet on the row in a 200 foot long tunnel with drip irrigation for water and nutrients. Variations included cherry trees at 3 foot spacing and one peach tunnel with three rows that would be closer to the Chinese high density to compare for this project’s production methods. Peach trees were trained in a V shape and cherry in a slender spindle upright growth rather than a bush type. The structures were covered with specialized plastic in January after the lower winter chill hour requirement was met. The earliest peach blossoms occurred by January 20, 2012, about 4 weeks earlier than normal for that variety. The increased heat (growing degree days) kept the trees growing more than a month ahead of schedule till harvest time. For 2011 planting, TFGA obtained only about half of the plant material (bareroot trees) because of the lead time required for propagating special varieties. Each structure was at least 50 percent planted in

2011 and peaches finished planting in 2012. A portion of the early cherry varieties were propagated in 2012 but will not be ready for replant until 2013. With the cost savings on the initial setup, TFA was able to expand the project to include a citrus site in 2012. With the Citrus Greening disease, the high tunnel unit may be an alternative production system in higher chill localities. Green Leaf Nurseries donated Satsuma plant material for this trial. All growers used drip irrigation similar their other orchards they maintained. Two used drip-in tubing and two used the flat T-tape type.

At the start of the project Texas A&M AgriLife Extension estimated cost of the economic analysis to be around \$1,500 - \$1,800, however when it was requested after the first crop in 2012, the cost estimate went above \$10,000. The cost of this analysis was too much to be included in this project and too high for TFGA to absorb. If new Specialty Crop Block Grants funds are available, TFGA would apply to have this aspect completed.

Grower Selection: An advertisement was placed in the TFGA Newsletter and AgriLife Extension AgNews. Project staff only received one inquiry so they looked for recommendations from other orchardists and Extension specialist. Candidates selected were current peach growers, had some greenhouse experience if possible, were willing to be experimental, and would be able to absorb the financial costs of failure if project did not work. Staff also looked for climate diversity in different USDA climate zones.

For the site identification, the grower name and city is listed for summary and 2012 yield recorded:

- Studebaker, Stonewall- trees planted 1-28-11, not headed at planting and pushed for maximum growth. One peach variety and apricot pulled at end of 2011 growing season for inadequate growth. **Yield 22 lb./tree**
- Childress, Cross Plains- 2-20-11 planting trees headed and started early scaffold branch training in June so growth not as rapid in 2011 as Studebaker. Cherry samples planted also. **Yield 7 lb./tree**
- Cooper, Fairfield- last trees planted on vigorous soil and modified tree training. Several Satsuma varieties planted also. **Yield 7.2 lb./tree**
- Rohrer, Fredericksburg- trees planted 2-14 and 15-11 headed at planting and scaffold training thru the season. Cherries high headed at planting but did not develop adequate lower branching so retrained in 2012 growing season. A few cherry clusters on but no yield till 2013. Peaches grown using only organic fertilizer and pest control so less vigorous. **Yield 10.8 lb./tree**
- Matt, Tomball- Citrus trees planted in 2012, TFGA purchased high tunnel 5-12. Possible small Satsuma yield in 2013.

Tree measurements were taken in November, 2011 to determine if trees could carry any fruit load in 2012. The tree dimensions appeared adequate for a 6 to 8 lb. fruit load per tree on three sites and higher on Studebaker site. This information shows crop load above the initial goal. The tree measurements for 2012 were taken in November at the end of the growing

season. All growers indicated that less pest control was needed in high tunnel production than trees in outside orchards. Results are not detailed enough to show exact percentages.

### **Goals and Outcomes Achieved**

Goals achieved include:

1. Results from this project indicate that this high density production method can be viable in Texas.
2. Fruit under high tunnel production has the potential to be marketed 4 weeks earlier than field production.
3. Marketable fruit can be produced on 1 yr. old trees.
4. Lower insect and disease threats in the high tunnel system reduce chemical inputs.
5. Early planting even if only 14 days is very beneficial on first year growth.
6. Mites and mildew increase is possible in high tunnel vs. open field.
7. V shaped training on peaches appears to be most optimal tree shape for this system.
8. Cotton Root Rot in cherries can be a problem even on peach interstem rootstock.
9. High tunnel systems are more conducive to chemical free or organic production.
10. Hail on 5-7-12 at Rohrer site caused 50 percent loss on outside trees while no damage was noted in the high tunnel.

All sites had some reduction in pest control because the fruit was harvested early and the fruit did not need protection in June and July. Studebaker applied normal dormant oil, then a Bravo Imidan combination at shuck split, no fungicide or insecticide treatment after that. No additional sprays such as Pyrethroids or Malation, so this site saw an approximate reduction of 60 percent reduction. Cooper and Childress were not as experimental so they used their regular early season spray and only reduced about 25 percent because of shorter crop time on tree. Rohrer attempting to be chemical free, used only a dormant oil, insecticidal soap and neem oil, and a 99 cent bottle of hydrogen peroxide for pest control. That showed approximately a 90 percent pest cost reduction over an outside organic peach tree orchard. Trees inside tunnels had no "free water" or rain on the fruit so almost no disease incidence. Condensation from the plastic covering is a possibility for disease but did not occur in 2012.

### **Beneficiaries**

This demonstration project has shown a new production possibility for the 200 plus peach producers and new growers in Texas. With NRCS now accepting applications for high tunnels, the concept is more workable. The next steps include setting up an economic analysis for handling the capital and labor costs, more peach variety trials, and evaluation of low cost structures.

The information presented in this report was submitted in article in TFGA Spring newsletter which is sent to about 100. Grower meetings at Cross Plains, Tomball, and Fredericksburg sites had a total of approximately 200 participants. Additional power point presentations were given in Wichita Falls in April 2011 for North Texas and Oklahoma growers. In additional project staff has been invited to present to Texas Organic Farmers & Gardeners Association's annual meeting in February 2013. An information summary is on

[www.Texaspeaches.com](http://www.Texaspeaches.com) for Hill Country Fruit Council, as well as TFGA website. <http://www.texasfruitgrowers.org/>.

### **Lessons Learned**

When purchasing special variety material, it is essential to allow ample lead time for propagating the plant varieties.

Growers interested in new technologies will contribute time and effort to demonstration plots.

### **Additional Information**

A professional article is being prepared after the November 2012 tree measurements for publication in national fruit grower magazines. Dr. Desmond Layne, Clemson University, wanted to write about this in his Stonefruit column in American Fruitgrower, this has been delayed because he transferred from Clemson to Washington State University last month and is getting his new department set up. Marla Camp, editor of Edible Austin, is waiting for 2013 year's cherry blossoms and wants to do an article on low chill cherries. Dotty Noble, a writer for Fruit Grower News is working on the peach article for them. We had taken some photos and staff is waiting for additional information request if not an onsite interview.



First peaches picked April 13, 2012. Photo also shows V training.

## PROJECT 19: CREATION OF INFORMATIONAL MATERIALS AND SUPPORTING ADVERTISING CAMPAIGN

---

**Partner Organization:** Texas Department of Agriculture

**Project Manager:** Richard De Los Santos, (512) 463-7472

**Email:** Grants@TexasAgriculture.gov

**Type of Report:** Final

**Date Submitted:** December 2012

### Summary

The purpose of the Texas Department of Agriculture's (TDA) marketing project was to increase the awareness of Texas specialty crops at the consumer level. In addition the project was intended to increase consumption of Texas produce and sales of horticulture plants through both consumer-and producer-driven projects. These projects reflect a continuation of projects previously funded with specialty crop funds. The impacts from creation and distribution of information regarding Texas plants, produce, Christmas trees and "Market to Menu" events, combined with timely media advertisements, were measured through TDA-conducted surveys of growers, producers, restaurants and retailers. TDA expected to see the following results:

1. A 10 percent increase in sales of Texas plants during marketing events timed with the distribution of informational materials.
2. A 15 percent increase in sales of Texas produce during marketing events timed with the distribution of informational materials.
3. A 5 percent increase in sales at local Christmas tree farms as a result of information distributed on the location of Texas Christmas tree farms.

### Project Approach

#### *Plant Tag Development*

In an effort to create awareness of Texas plants at the consumer level, TDA created Texas Superstar<sup>®</sup>, Texas Local Florist and Herb growers plant stakes and hang-tags. TDA worked closely with producers and retailers to place the tags and stakes on the plants before the consumers purchased them. TDA also attended consumer and trade events to inform consumers, producers and retailers about the availability of the plant stakes and hang tags. TDA promoted tags at Great Big Texas Home and Garden Show, Texas Nursery and Landscape show and Texas State Florist Association show.

#### *Information Development*

TDA created additional information to support both the *Plant Tag Development* project and the *TV campaign*. To help identify retail florists and nurseries TDA designed, produced and distributed 1,200 coroplast signs to promote the Texas Local Florist plant stakes. In addition, 400 coroplast signs to promote Texas Superstars<sup>®</sup> were designed, produced and distributed to 400 retail nurseries in Texas.

TDA produced a GO TEXAN Christmas Tree Farm brochure to help consumers locate Texas Christmas tree farms and was made available to all consumers online at [www.gotexan.org](http://www.gotexan.org). Work supplemented effort completed by the Texas Christmas Tree Growers Association, which included a photographer to take photos of Christmas Tree farms and events for use in the Christmas Tree brochure.

Information was developed to support the produce industry and *Healthy Produce in Restaurants* promotion. Project staff worked with a local chef to create 15 recipes with photos featuring Texas pecans, peppers, carrots, onions, corn and sweet potatoes. TDA designed and printed 35,000 pecan recipe books and distributed them to consumers and chefs at the different culinary educational events and produce demonstrations. Four different Texas vegetable recipes were designed and developed and were featured and distributed at retail vegetable demos in conjunction with the Texas Vegetable Association's TV campaign. TDA printed and distributed 30,000 of these recipes which featured Texas spinach, onions, olive oil, mixed greens, broccoli, squash, green beans, corn and mushrooms.

TDA also targeted consumers at local farmers markets by creating supporting materials for TDA's Market to Menu Program developed with specialty crop funding. TDA developed *Market to Menu* bags, tablecloth and banners to inform attendees at farmers markets that fresh fruit and vegetable demonstrations were being conducted.

#### *Texas Superstar<sup>®</sup> and Texas Local Florist TV Campaign*

TDA created a media/advertising and promotional campaign to support the *Plant Tag Development* and *Information Development* projects. The goal for each of these projects was to increase consumer awareness and sales of Texas specialty crops. TDA worked with Phillips Production to create the following:

- Texas Superstar radio and TV commercials:
  - a) Three :30 second TV commercials in English
  - b) One :15 second TV commercial in English
  - c) One :30 second TV commercial in Spanish
  - d) Three :30 second English radio commercials
  - e) One :30 second Spanish radio commercials
  
- Texas Local Florist radio and TV commercials
  - a) One :30 second TV English commercial
  - b) One :30 second TV Spanish commercial
  - c) One :15 second TV English commercial
  - d) One :30 second English radio commercial
  - e) One :30 second Spanish radio commercial

TDA purchased airtime to run all commercials statewide, including space to run Texas Superstar<sup>®</sup> commercials on Dig In DFW. The commercials began airing May 15, 2010 and continued through June 15, 2010.

#### *Healthy Produce in Restaurants Promotion*

TDA promoted Texas produce in local Texas restaurants through the GO TEXAN Restaurant Program. TV airtime and web advertising space was purchased to promote healthy eating in restaurants in Corpus Christi, San Antonio, Austin and Houston. TDA worked with the 318 restaurants to distribute recipes to consumers and further promote Texas produce. TDA also developed the Market to Menu events in which 12 local chefs partnered with 12 farmers markets to develop dishes using Texas produce. The promotions allowed consumers to sample dishes prepared with Texas produce available from growers at their local farmers market. Participating restaurants also purchased produce from the local markets which were incorporated into special local dishes served in their restaurants.

## **Goals and Outcomes Achieved**

### *Information Development*

Retail and grower surveys indicated a 5 percent increase in sales as a result of using the Texas Superstar<sup>®</sup> plant and hang tags combined with the media promotions. The Texas Local Florist website saw a 125 percent increase in hits as a result of using the plant stakes and hang tags. Despite the increased website traffic, retail florists did not report any increase in sales. Due to cities and counties pushing limitations for homeowners to not establish landscaping and placing water heavy restrictions, TDA was not able achieve its goal to increase sales of Texas Superstars<sup>®</sup>. It is also believed that tough economic times also decreased the sale of flowers through therefore TDA was not able to meet the goal of increasing sales for the Texas Local Florists program. TDA's herb promotions were directed at helping small producers by identifying their products with the Herb plant stakes. Unlike the Texas Superstar<sup>®</sup> and Texas Local Florist promotions, the Herb plant stakes did not have supporting promotional efforts. As a result growers did not report an increase in sales of Texas herbs.

Although the goals of the Texas Superstar<sup>®</sup> and Texas Local Florists program were not met, the marketing campaigns were successful in creating awareness opportunities. As mentioned above, by combining the plant tag development with the retail sign development and the media campaign, TDA was able to help the horticulture industry with increased sales of 5 percent.

### *Information Development*

The Christmas Tree Brochure was useful in helping consumers find Texas Christmas tree farms. Unfortunately Texas was at the start of one of one of the worst droughts in Texas history and many Christmas tree farms were unable to harvest their trees. The survey indicated that only a 5 percent increase in sales was achieved opposed to the targeted 10 percent.

### *Healthy Produce in Restaurants Promotion*

Twelve farmers markets and 12 local Texas chefs from restaurants in several areas throughout Texas participated in the promotion to introduce local Texas produce into restaurants. TDA partnered with participating markets to distribute 3,400 samples of specially prepared produce and recipes to consumers. Farmers markets participating in reported an average of 27 percent increase in attendance to the markets and an average of 27 percent increase of sales of Texas produce.

The produce promotions in partnership with retailers and restaurants were successful. Producers reported an average of 59 percent increase in sales at the larger wholesale market. Smaller producers selling directly to the consumer only experienced a 27 percent increase in sales of produce.

### **Beneficiaries**

The projects developed by TDA with the use of Specialty Crop funds benefitted producers, retailers, wholesalers, chefs, restaurants and the consumer. More than 500 large scale producers of fruits and vegetables and more than 50 farmers market producers benefited from the statewide produce marketing campaigns.

The Market to Menu project directly benefited 12 local Texas chefs and more than 3,400 consumers. TDA promoted Texas produce in 318 local Texas restaurants and their customers through the GO TEXAN Restaurant Program. The Texas Superstar and Texas Local Florist promotions benefited more than 400 retail nurseries and florists and 15 plant producers.

### **Lessons Learned**

In order to increase market outreach and to reduce cost, TDA contracted with a state contracted broadcaster group to purchase the state-wide airtime. This meant that the commercials reached all areas, including rural Texas. Although extended reach into rural communities is good, these areas were not exposed to the other promotional activities which only targeted metropolitan areas. Future media campaigns such as this will only focus on metropolitan areas where retail promotions are being conducted.

Texas produce demonstrations and projects exceed expectations and continue to result in successful promotions. With a new interest in healthy living, consumers are willing to try new things when it comes to their diet providing an opportunity to showcase the array of fresh Texas produce that is available to consumers.

### **Additional Information**

Link to Christmas tree brochure:

[http://www.gotexan.org/Portals/1/doc/pdf/publications/ChristmasTree2011\\_online3.pdf](http://www.gotexan.org/Portals/1/doc/pdf/publications/ChristmasTree2011_online3.pdf)

Texas Superstar hang-tags and plant stakes



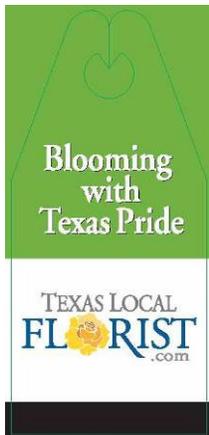
Texas Superstar nursery signs



Herb plant stakes



Texas Local Florist Tags and Florist Sign





# Vegetable Recipes

## Texas Vegetable Lasagna

- Serves 10**
- 10-12 Oz. Fresh lasagna noodles, cooked al dente
  - 6 T. Unsalted butter
  - 4 Cup. Minced Texas sweet onion
  - 4 Canola. Sliced Texas mushrooms
  - 4 Tsp. Salt
  - 1/2 Cup. Dry mustard
  - 1/2 Cup. All-purpose flour
  - 3/4 Cup. Milk
  - 1/2 Cup. Hot sauce
  - 1/2 Cup. Fresh grated Parmesan cheese
  - 2 T. Minced Texas parsley or basil
  - 1 Tsp. Texas broccolini florets, cooked tender-crisp
  - 1 Cup. Shredded carrots
  - 1/2 Large. Red bell pepper, sliced
  - 1 Cup. Grated Monterey Jack cheese
  - 1 Cup. Grated cheddar cheese



COMPLETION FOOD SERVICES  
TEXAS DEPARTMENT OF AGRICULTURE  
**GO TEXAN.**

**P**reheat oven to 350°. Grease a 9 x 13-inch rectangular baking dish. Place a layer of noodles across the bottom of the pan. In a sauté pan, melt butter over medium heat. Add onions and mushrooms, and sauté until the onions are tender and the mushrooms have begun to brown. Stir to soft, dry mustard and flour. Cook over medium heat about 1 minute. Add the milk and stir until the mixture boils and begins to thicken. Remove from heat and add hot sauce, Parmesan cheese and parsley or basil. Layer half of the broccoli, carrots, and red bell pepper over the noodles in the bottom of the pan. Sprinkle with one-third of each type of cheese. Spread about 1 cup of the sauce over the vegetables, then repeat. Top with another layer of noodles. Layer vegetables, cheeses, and sauce as before. Top with one final layer of noodles. Cover with the remaining sauce and sprinkle with the remaining cheese.

Bake uncovered for 40 minutes until hot and bubbly. Let rest about 10-15 minutes before serving.

Recipe provided by Melly Fisher, The Dining One

www.getexan.org

## Texas Vegetable Confetti

- Serves 4-6**
- 1 Medium Texas carrot, peeled
  - 1/2 Large. Red bell pepper
  - 1 Medium Texas zucchini
  - 1 Medium Texas yellow squash
  - 4 Ounces. Fresh Texas green beans, cut into 1/2 to 3/4-inch pieces
  - 1 Egg. Texas onion, shredded and silks removed, and kernels cut from the cob
  - 2 Texas green onions, thinly sliced
  - 1/2 Cup. Unsalted butter
  - Salt and pepper to taste
  - 2 T. Canola oil with minced Texas cilantro, or parsley if desired



COMPLETION FOOD SERVICES  
TEXAS DEPARTMENT OF AGRICULTURE  
**GO TEXAN.**

**D**ice carrot, red bell pepper, zucchini and yellow squash into 1/2 to 3/4-inch cubes. Combine with the remaining vegetables. In a large skillet or sauté pan, melt the butter over medium-high heat. Add vegetables and cook, stirring often, until the vegetables are tender-crisp, about 7-8 minutes. Season with salt and pepper, garnish with fresh herbs and serve immediately.

Recipe provided by Melly Fisher, The Dining One

## Texas Vegetable Salad with Herb Dijon Vinaigrette

- Serves 6**
- Herb Dijon Vinaigrette:**
- 1/2 Cup. Tarragon wine vinegar
  - 1/2 Cup. Shaligagan Dijon mustard
  - 1/2 Cup. Texas honey
  - 2 Small. Shallots, finely minced
  - 1/2 Cup. Light Texas olive oil
  - 3 T. Minced minced fresh Texas herbs (parsley, tarragon, thyme, basil or dill)
  - Salt and pepper to taste

- Salad:**
- 5 Cup. Minced spring greens
  - 1 Cup. Shredded Texas cabbage
  - 1/2 Cup. Halved grape tomatoes
  - 2 Medium. Beets, washed, peeled, and cut into wedges
  - 1 Cup. Texas broccolini florets, cooked tender-crisp
  - 3 Texas baby yellow squash, cooked tender-crisp and halved
  - 4 Ounces. Baby carrots, cooked tender-crisp, and halved
  - 4 Ounces. Texas small whole green beans, cooked tender-crisp
  - 4 Ounces. Chopped goat cheese or feta

Recipe provided by Melly Fisher, The Dining One

www.getexan.org

COMPLETION FOOD SERVICES  
TEXAS DEPARTMENT OF AGRICULTURE  
**GO TEXAN.**

**T**o prepare vinaigrette: In the bowl of a food processor, combine vinegar, mustard, honey and shallots. Process until smooth. With the machine running, add light Texas olive oil in a slow, steady stream. Transfer to a bowl, stir in fresh herbs, and salt and pepper to taste. Chill until serving time.

**T**o prepare salad: Toss the salad greens and cabbage with enough dressing to coat. Top with the vegetables, lightly drizzle with a bit more vinaigrette, then top with cheese. Serve at once.

**Variation:** Use a variety of vegetables - cooked baby new potatoes, steamed Texas zucchini, tender-crisp asparagus, blanched sugar snap peas. Use any vegetables in season.

Recipe provided by Melly Fisher, The Dining One



## Texas Sweet Onion, Spinach, & Gruyere Tart

- Serves 8-10**
- 1 Pie crust to fit a 9-inch pie pan (shaded/white, chilled, and thinly sliced)
  - 2 Pounds. Texas sweet onions, peeled, and thinly sliced
  - 8 Ounces. Fresh Texas baby spinach, coarsely chopped
  - 1/2 Cup. Heavy cream
  - 2 Large. Eggs, beaten
  - 2 Tsp. Fresh basil or 1/2 tsp. dried
  - 1 T. Finely minced Texas flat-leaf Italian parsley
  - 1/2 tsp. Ground nutmeg
  - 5 Slices. Bacon, cooked crisp and crumbled (or 1 Cup. dried bacon, optional)
  - 1/2 Cup. Grated Gruyere cheese
  - 1/2 Cup. Grated Parmesan cheese



COMPLETION FOOD SERVICES  
TEXAS DEPARTMENT OF AGRICULTURE  
**GO TEXAN.**

**P**reheat oven to 375°. Ease the pastry into pan and flute the edges. In a large sauté pan, melt 2 tablespoons butter over medium heat. Add sliced onions, and sauté until they are fully caramelized, about 20 minutes. Stir frequently - especially as the onions begin to brown. In another skillet, melt the remaining 2 tablespoons butter. Add spinach. Cook until the spinach is wilted. Squeeze thoroughly in a large mixing bowl with together heavy cream, eggs, heavy cream, nutmeg, and parsley. Season with salt and pepper. Stir in onions, spinach, and bacon if using. Spoon into the pie shell. Top with grated Gruyere cheese. Sprinkle with Parmesan. Bake until set (about 35 to 40 minutes), and a knife inserted in the center comes out clean. Let rest 10 minutes. Slice and serve warm. Serve with a salad for a complete meal.

Recipe provided by Melly Fisher, The Dining One



**Partner Organization:** Texas Department of Agriculture  
**Project Manager:** Richard De Los Santos, (512) 463-7472  
**Email:** Grants@TexasAgriculture.gov  
**Type of Report:** Final  
**Date Submitted:** December 2012

### **Project Summary**

The purpose of the Texas Department of Agriculture's (TDA) marketing project was to increase the awareness of Texas specialty crops at the consumer level through consumer, retail and chef education. The development of culinary workshops using fresh Texas produce, the development of child nutrition projects and informational materials, as well as the development of retail educational events, directly enhance the consumption of fresh fruits and vegetables. TDA developed the following success measures and goals:

1. An increase in produce purchases in participating restaurants by 5 percent through fresh produce consumption at restaurants after chefs attend culinary workshops and chef tours.
2. An increase in sales of fresh produce by 15 percent via produce purchased at retail grocery stores and farmers markets during educational events.
3. A 10 percent increase in sales of fresh produce at the markets as a result of fresh produce purchased at farmers markets during the children demonstrations and after distribution of informational materials.

### **Project Approach**

*Development of culinary workshops to train chefs on the use of fresh Texas produce.*

TDA conducted 86 culinary workshops to train chefs and consumers on how to cook with Texas produce in their homes and restaurants. TDA partnered with: Olives Festival, Farm to Plate, Pecan Festival, HEB, Whole Foods and Fiesta to conduct these workshops. The produce that was featured during the different workshops included the following: pecans, olives, squash, peppers, onions, watermelons, cantaloupes, grapefruit, oranges and tangerines. TDA provided chefs with information on availability of Texas produce, selection, storage, handling, sources, ordering instructions and additional cooking tips. After the educational period, the chefs created flavorful dishes and shared them with the consumers. TDA shared expense with "Project 19: Creation of Informational Materials and Supporting Advertising Campaign" to cover the cost of pecan recipe books and the vegetable recipe cards to distribute to chefs at each of the workshops.

*Producer training to educate growers on marketing opportunities through chef tours and retail training events.*

TDA conducted 11 regional chef and grower tours and training events in Lubbock, Dallas, Houston, Austin, San Antonio and the Rio Grande Valley. Growers educated more than 60 chefs on produce availability, seasons and selection. Crops growing on the farm included arugula, tomatoes, eggplant, squash blossoms, and a variety of other fruits and vegetables.

The chefs shared their preference with the producers regarding the different types of produce they would like seen grown, packaging and delivery methods.

*In-store consumer demonstrations to educate consumers on how to use fresh produce in the kitchen.*

Retail produce demonstrations continue to yield excellent results. The average increase in sales was 59 percent. This is much higher than the 15% expected. Samples distributed at the time consumers were shopping for their groceries increased the likelihood they would make the purchase. TDA conducted 199 retail demonstrations with Texas produce in 15 different retail chain stores, such as HEB, Whole Foods, Central Market, Fiesta and United in Texas. TDA also printed stickers to identify Texas produce during the demonstrations. Types of produce showcased in the different demonstrations included: watermelon, cantaloupe, peaches, onions, herbs, citrus, mushrooms, honey, olive oil, blueberries, honey dew melons, and mushrooms.

*Farmers market demonstrations educating children on produce availability and nutrition benefits of fresh produce.*

TDA conducted the Agriculture is Your Culture – A Kids View project in which TDA coordinated eight children’s educational farm tours. These tours benefited more than 300 children. The children were able to see how crops are grown, had the ability to harvest some of the crops as well as taste the crop straight from the TDA designed and developed bags, table cloths and banners to use at these events. Partners coordinated with local growers willing to work with the children and host them on their farms.

### **Goals and Outcomes Achieved**

*Development of culinary workshops to train chefs on the use of fresh Texas produce -* Producers did not see an increase in sales of 10 percent as expected with this project. Many restaurants purchase their produce from larger produce distributors who do not identify products as “Texas Grown”. As a result restaurants only purchase based on price. The culinary workshops reached more than 100 chefs and 20,000 consumers. The partners were able to distribute 20,000 samples of a variety of fruits and vegetables prepared by local Texas chefs. Restaurants did not submit reports indicating any increase in sales as a result of the promotions.

*Producer training to educate growers on marketing opportunities through chef tours and retail training events.*

At the time the surveys were taken, chefs reported that the tours were very informative and that they intend to purchase fresh Texas produce from the farms on the tour. Producers responded that they delivered produce to some of the restaurants they met on the tour but to date, had not seen any increase in overall sales of produce.

Restaurants did not submit reports indicating any increase in sales as a result of the promotions. The retail training did give project staff a better opportunity for results. Growers surveyed indicated that their sales to stores increased 18 percent and retailers reported a 59 percent increase in sales of Texas produce.

*In-store consumer demonstrations to educate consumers on how to use fresh produce in the kitchen.*

As mentioned the retail produce demos are necessary to continue to educate consumers on the benefits and availability of fresh produce. The average increase in sales was 59%. This is much higher than the 15% expected.

*Farmers market demonstrations educating children on produce availability and nutrition benefits of fresh produce.*

Students received a hands-on experience of science concepts discussed in class. Farmers, however, did not see any consumers returning to their market to purchase produce. The 10% sales increase was not met.

### **Beneficiaries**

TDA partnered with more than 15 retail grocery chains and event coordinators to reach 100 chefs, 20,000 consumers, 300 children benefiting more than 500 produce growers in Texas.

### **Lessons Learned**

Education continues to be the most requested item by consumers and producers. Studies have shown that an educated consumer feels more comfortable about their purchasing decisions and are more likely to be repeat customers. This is important for the growth of the produce industry. It is important that TDA continues to partner with producers, retailers and chefs to provide educational opportunities. TDA also needs to re-evaluate the participants in the projects so that better reporting of results by participants can be obtained. Evaluation of produce purchases by restaurants needs to be improved by working closer with produce wholesalers to identify Texas produce and including the wholesalers in promotional activities.

### **Additional Information**

Stickers created to identify Texas Produce





## **PROJECT 21: GOOD AGRICULTURE PRACTICES (GAP) CERTIFICATION ASSISTANCE PROGRAM**

---

**Name of Organization:** Texas Department of Agriculture

**Project Manager:** Mindy Fryer, (512) 463-6908

**Email:** Grants@TexasAgriculture.gov

**Type of Report:** Final

**Date Submitted:** December 2012

### **Project Summary**

The purpose of the Good Agricultural Practices (GAP) Third Party Audit Assistance program was to incentivize new Texas Specialty Crop producers to participate in a 3<sup>rd</sup> party audit to become GAP certified. Auditors were encouraged to work with TDA to contact producers directly. Texas specialty crop producers, including fruit and vegetable, citrus, pecan, peach and berry producers were encouraged to become GAP certified by providing cost assistance of completing and passing the GAP food safety third party audit.

### **Project Approach**

Consumer safety has become one of the most critical and highest priority issues for the produce industry, both at the production level and throughout the supply chain. An effective and cost-efficient production system to minimize the risk of creating contamination and improve consumer safety will be beneficial for consumers and producers.

TDA worked with several members of the produce industry to develop a program that would incentivize new Texas specialty crop producers, that had not previously participated in a third party food safety audit, to become GAP certified. Project staff developed a grant program that would work directly with third party audit companies to reach out to Texas specialty crops producers and offset the cost of a completed GAP audit. TDA contracted with PrimusLabs and NSF International to administer this program. In addition to partnering with TDA, PrimusLabs partnered with Texas Produce Association (TPA) and Texas Vegetable Association (TVA) to hold GAP trainings to help qualify growers for eligibility. Three courses were offered on December 14, 2011, February 13, 2012 and May 14, 2012 to coincide with key performance dates.

### **Goals and Outcomes Achieved**

Staff developed a request for proposals to solicit assistance from private third party audit companies to reach approximately 100 specialty crop producers in Texas and provide a cost share to offset the cost of GAP or GHP audits.

TDA contracted with two audit firms, PrimusLabs and NSF International; however, the project was not successful. Only four audits were submitted to TDA for reimbursement.

### **Beneficiaries**

By partnering with the audit companies TDA believed it would be able to reach a group of producers that previous marketing and training efforts could not access. Improving food safety in vegetables requires everyone involved in the food system from farm to fork

understands how they are involved in the process and what they can do to protect fresh vegetables from contamination.

### **Lessons Learned**

Facility audits were in higher demand than field audits, making it hard during the first part of the grant period to find participants. Some growers may have been intimidated by the process and felt it was too complicated. PrimusLabs felt setting up GAP courses would be a good venue to explain the process of becoming eligible for the audit credit and for those growers who needed training to qualify. Texas Produce Association and Texas Vegetable Association helped to advertise the courses; however, few responded and a total of one course was offered and completed.

**Final Report:** Diaprepes Eradication - Dooryards

**Project Manager:** Ray Prewett, (956) 584-1772

**Submitted by:** Texas Citrus Mutual

**Term of Agreement:** December 2012

### **Project Objective**

Texas Citrus Mutual's (TCM) objective was to contain the spread of Diaprepes Root Weevil (DRW) and reduce the overall impact in infected groves as much as possible. This project supplements the 2009 Specialty Crop Block grant Project 21: Diaprepes Eradication – Groves.

It should be noted that two projects were awarded for the control of DRW, one for dooryards (this project), and one for groves (2009 SCBGP). Based on the funds available, and that several of the dooryards in the impacted areas would also be considered commercial groves, because they have 2 to 6 acres of managed citrus, the two projects were managed as one effort focusing on the impacted commercial groves, and the dooryard/groves, in order to get the greatest impact.

DRW was first detected in McAllen, Texas on March 16, 2001. In October of 2008, DRW was detected in the Bayview area, and in December of 2008, it was detected just outside the initial quarantine area in McAllen, Texas. Based on these findings, and considering that eradication efforts had been ongoing since 2001, it was evident that eradication did not appear to be working.

Texas Citrus Mutual put together a technical working group in July of 2011 to review the program components, historical results, visit impacted groves, discuss alternative plans, and develop a new direction for the program. Based on the working groups decisions and historical information, the project objective was now focused on containing and preventing the further spread of the DRW, which if uncontrolled, can cost growers as much as \$250 per acre annually for treatment, or worse, decline and death of productive groves due to the combined impact of root damage and phytophthora bacteria infiltrating the damaged root system.

### **Project Approach**

A diaprepes technical review took place in July, 2011 with several researchers, government officials and industry representatives. These included and a number of key citrus growers in the Rio Grande Valley, including the two most impacted by diaprepes.

Based on all the facts and grove tours, the consensus of the team was that the current goal of eradication was not going to be feasible, and that the focus needed to shift to a containment strategy. The technical review team discussion focused on how to utilize the Specialty Crop Block grants in a way that Texas could attain some longer-term effectiveness, as opposed to only conducting periodic chemical treatments. Per the recommendation of the technical review team, a long term sustainable program that does not solely focus on chemical

applications in the quarantine zones needed to be developed. After 10 years of trying to eradicate the diaprepes weevil, interested parties continue to see a slow spread of diaprepes damage within citrus groves within the quarantine zones in Texas. This is not to say the eradication effort was in vain, in fact the treatment efforts have had a positive impact on helping suppress the spread of the weevil. Unfortunately, the team determined that eradication is unrealistic considering the limited resources and difficulty in killing the diaprepes weevil.

In July and August of 2011, TCM worked with Dr. Clay McCoy, and then in early January 2012, TCM worked with Dr. Mamoudou Setamou to complete a Recommended Action Plan for Diaprepes Control. This document was partly the result of the findings of the technical review team, but more so utilized the expertise of the TAMUK Citrus Center and Dr. McCoy, to provide detailed recommended action items for citrus groves impacted by, and in the vicinity of DRW infested areas. The document was finalized in mid-January 2012 and was presented at a meeting of the Texas Citrus Producers Board (TCPB) for adoption on January 16, 2012. TCPB made a motion to endorse those recommended action items, and this was also utilized as a method to help encourage impacted growers within the quarantine to follow the guidelines to help manage diaprepes, which not only would benefit that grower, but help protect the industry as a whole by limiting the spread of the weevil.

The recommended action items focused heavily on utilizing a mesh groundcover fabric that would help break the life cycle of the weevil, as the adult feeds on, and lays eggs in, the tree canopy, then the larvae emerge, burrow deep into the soil and feed on the root system, causing severe damage. Ultimately adults emerge from the soil, climb back up the tree and the cycle starts over. The fabric placed across the grove floor is a dual action means of breaking the life cycle, both preventing larvae from burrowing down into the ground and preventing adults from emerging up from the ground.

During late 2011 and the first quarter of 2012, Texas Citrus Mutual and Dr. Mamoudou Setamou conducted grove visits with the impacted growers in North McAllen and Bayview. During these visits, Dr. Setamou provided treatment recommendations, and discussed the successful impacts of the ground cover control method. Based on numerous visits, the grove owners/managers came to the agreement that with a labor cost share, and if ground cover materials were provided, they would agree to do the installations.

#### **Goals and Outcomes Achieved:**

In 2009, approximately 2 acres of citrus groves in Bayview, Texas were installed with ground cover barrier as a means to reduce diaprepes populations. The Bayview groves showed a severe decline and had a large infestation of diaprepes. After the installation of the fabric, the groves have shown significant overall improved health. At the same time, the infested groves that did not receive the ground cover treatment continued to show decline as diaprepes populations persisted and spread. Similar applications have been successfully utilized in Florida and the Caribbean to reduce impact of diaprepes by helping to break the life cycle of the weevil.

The goal for this project was to install ground cover in at least 15 acres of commercial and residential citrus groves in McAllen and Bayview to reduce the diaprepes population and improve the overall health of citrus groves. As previously mentioned, the areas impacted by DRW were primarily commercial, and the dooryard situations most impacted were homes that had between 2 and 6 acres of solid citrus tree plantings, making it a unique situation, where the significant dooryard settings could be managed like commercial citrus. These were the primary areas of concern and focus, where the project could get the most significant results for the dollars available.

### **Beneficiaries**

To date, in the Bayview area, approximately 11 acres of citrus have been installed with the ground cover fabric, with the grower reporting reduced weevil catches, and significantly improved tree health. In addition, approximately 2 additional acres were planted with young trees, in raised beds and ground cover fabric in place, and a strict treatment plan. These trees would typically be extremely susceptible to DRW damage, but are healthy and strong.

In the McAllen area, TCM has commitments on 10 acres on two different groves that been heavily impacted by diaprepes. The labor cost share funds have been disbursed, and the fabric and anchoring pins have been purchased and are staged, ready to be installed. The ground has already been partially prepped for fabric installation, although there were a couple of setbacks due to weather issues and spray program timing issues, but it is estimated that the final 10 acres of installation in the McAllen area will be completed by the end of July 2012, if not sooner.

Ultimately, a total of 22 acres of commercial/residential grove acres will to covered by this program which will provide at least 3 to 5 or more years (depending on life of ground cover) of good ongoing control helping to break the life cycle of the weevil, and significantly reduce DRW populations. This greatly reduces the risk of the spread of the weevil to other citrus producing areas.

The Texas Citrus Producers Board held a meeting on January 16, 2012, with 22 people in attendance, 11 of which were growers. All of the attendees received a copy of the recommended action plan that was developed by Dr. M Setamou for review and adoption.

The motion was stated such that growers who had groves known to be infested with DRW should follow these recommended actions to the best of their ability. In return, those growers may be considered for financial assistance by TCPB to help them continue to combat DRW infestation even after the TDA Specialty Crop Block Grant funds had expired.

In addition to the growers on the TCPB, the recommended action was also shared with TCM board grower members, and especially those growers who were impacted by DRW.

### **Lessons Learned**

One of the biggest challenges in this process was convincing some growers in the McAllen to agree to install the landscape fabric. The reasons are numerous including the likelihood that several of these groves will soon be developed into high end residential or commercial

properties. Also, several of the sites have homes expressed were concerns about the aesthetic aspect of installing the fabric and plastic. Cost of installation and cost of future removal remains a high concern for some of the growers.

In the future, project staff will hold meetings and stay in touch with these growers and homeowners to educate them and work to educate the growers in on the importance and impact this will have on the industry.

There is a need for ongoing enforcement of the quarantined areas to ensure that city brush hauling and residents of those areas adhere the necessary restrictions and help prevent the unintended spread of the weevil. TCM will continue to work with TDA to ensure these efforts continue.

### **Additional Information**

DRW will likely continue to persist as an ongoing issue in South Texas. The nature and life cycle of the insect make it incredibly difficult to control. Ongoing efforts will need to be made to help continue to monitor, survey, and suppress growing DRW populations. Project staff will continue these types of efforts in conjunction with Texas A&M University-Kingsville, Texas Citrus Producers Board, TDA and USDA where possible.

*A Recommended Action Plan for Diaprepes Control in Texas Citrus* was approved by The Texas Citrus Producers Board. A full copy of the action plan may be received by contacting Texas Citrus Mutual at, (956) 584-1772.

**Partner Organization:** Texas Citrus Mutual

**Project Manager:** Jacob Sosebee, Jon Dale

**Contact Information:** (956) 584-1772

**Type of Report:** Final

**Date Submitted:** September 2013

### **Project Summary**

Huanglongbing (HLB) or citrus greening, a disease caused by bacteria that attack the phloem tissue, is the most clear and present danger facing the U.S. citrus industry today, with no known cure. As the industry's Texas representative, Texas Citrus Mutual (TCM) is working to slow the disease's advance across the state's only citrus production area until a solution is found. Even before HLB was first detected in Texas (January 2012), TCM was reaching out to growers via an existing website with detailed information regarding the disease ([www.texascitrusgreening.org](http://www.texascitrusgreening.org)). The key message then and now is preventative treatment of the disease's vector. However, given the area's mosaic of land use along with a strong penchant for residential citrus in both established and new residential development, it was quickly realized that grower efforts alone would not be sufficient to slow HLB's spread. Thus, involving the general public, specifically Rio Grande Valley (RGV) homeowners, was identified as a requisite next step in countering the disease. While TCM's existing partnerships with outreach-oriented agencies (e.g., Texas A&M AgriLife) have produced viable results in the pursuit of HLB awareness among the local public, an internet-based information hub would by nature reach a much larger audience. In this way, the industry's mission could maintain a coordinated front against the disease by focusing passive information resources and man hours where each would be most effective.

### **Project Approach**

MPC studios of Harlingen was contracted to design a website specifically directed at homeowners in September 2012. The intent was to provide dooryard citrus owners and other stakeholders (e.g., master gardeners) with timely information on the disease in Texas. To this end, the content can be broken down into three main areas that are expected to have the most relevance to the homeowner situation. The Texas Department of Agriculture quarantine zone is identified, illustrated and regulations pertaining to citrus plant movement out of this area are provided. Next, the disease's vector, the Asian citrus psyllid (ACP), is described at length and viewers are 1) left with a clear understanding of how this insect transmits the disease from infected to healthy trees and 2) how best to approach ACP control within the dooryard setting. The latter is an important consideration since acceptable products and treatment application methods used to deliver the product vary widely between commercial and residential end-use. Finally, the visual symptoms of HLB-infected trees are also described and illustrated in detail within the site, especially as they relate to leaf characteristics (e.g., shape, coloration) and mis-shapen fruit. Regarding this last area, the viewer is encouraged to submit leaf and/or ACP samples to the Texas A&M-Kingsville Citrus Center in Weslaco to verify the presence of HLB at their particular location. The site also includes a photographic key to help homeowners distinguish HLB symptoms from other maladies that may be simultaneously present on their citrus trees (e.g., greasy spot).

The website ([www.citrusalert.com](http://www.citrusalert.com)) became operational in December 2012, with limited modifications completed in January 2013. When necessary, TCM will update the website's content to reflect additional information regarding the disease's spread, any expanded regulations and disseminate additional research findings that could inform homeowner response and awareness in the RGV. Contact information in the form of email and phone numbers are provided for TCM and other cooperators (e.g., Texas A&M AgriLife Extension).

MPC was also contracted to perform several updates to the existing "grower" website, especially as they related to findings obtained from the ongoing Area-wide ACP control program. Included here was dormant spray windows that growers were expected to use during the November 2012 to February 2013 period.

### **Goals and Outcomes Achieved**

As outlined in the proposal, the goal for this project was to increase HLB awareness among growers, home owners and other industry stakeholders in Texas by disseminating detailed information via the new website and through improvements to the existing website. Monitoring of website traffic for the year to date (January through August) on both websites indicates that approximately 31,000 hits were made on the sites. Assuming approximately 4,000 hits per month, traffic is likely to increase by slightly less than 25 percent by year's end, which is half of what was targeted

Additionally, we estimate the number of direct contacts made by TCM and cooperators via referral from the internet sites to be approximately 85 since February 2013. The value of these contacts cannot be underestimated since verification of HLB presence outside of the quarantine is, at this point, just as likely to be a product of interaction (e.g., dooryard tissue sample collection) with this subset of site viewers as it would be to come from larger, agency-sponsored surveys. Direct contacts further TCM's message by empowering individuals within the community to assess their own property's situation with respect to the disease. Further, and in perhaps the most direct analysis, these contacts verify that the website is serving its intended use by quickly becoming an accepted way of disseminating practical information on HLB to public.

### **Beneficiaries**

The prime beneficiaries of this website product are the Texas citrus industry's approximately 300 growers and the State's citrus-growing public, primarily in the RGV. The industry benefits from a more generalized homeowner awareness of their situation and the potential exists for at least some of these same homeowners to begin regular treatment of their own trees for ACP control. Additionally, in the short term, if a homeowner submits tissue for HLB testing at the Citrus Center (as recommended on the website) and positive results are found, this will also benefit industry by informing the tissue sampling and ACP control measures of growers near the find. Further, in the event of positive tissue detection in a backyard, both industry and homeowners will also benefit from tree (read inoculum) removal. For their end, homeowners receive critical information on the disease's progression and what they can do to personally protect their investment. The USDA-APHIS-PPQ and TDA agencies also potentially stand to benefit from the website, especially in the event that a

website referral leads to a positive tissue find outside of the existing quarantine, in which case the quarantine zone would need to be expanded to enforce regulatory compliance.

### **Lessons Learned**

Through this project, staff has learned that a sizeable portion of the RGV public is receptive to preventing or at least finding the disease in an effort to preserve both their own dooryard trees and the region's commercial industry. This is a positive development since, comparatively speaking, the industry is only in the early stages of what promises to be a protracted struggle with HLB and is also why it was critical to begin building an awareness of the disease before it becomes more widespread. While the vast majority of dooryard trees in the RGV are characteristically left untreated for ACP and most other citrus pests, we also found that there is a strong sense of dedication to the idea and culture of maintaining citrus within the landscape. This is no doubt a reflection on the region's historical identity and even in parts of the RGV where groves have long since given way to development, many homeowners continue to view the region's remaining production with pride. There has also been a small amount of contact via the website with concerned citizens from Central and North Texas. Many of these individuals share these same sentiments.

### **Additional Information**

Where short-term (1-3 years) growth in traffic to the websites is concerned, staff only expect an increase in the coming years as updates reflect advances and other local media formats (e.g., TV interviews and radio) complement TCM's outreach mission by stressing awareness of HLB among the public.



## **PROJECT 24: FOOD SAFETY EDUCATION AND BUYER TOUR OF TEXAS PRODUCE**

---

**Partner Organization:** Texas Vegetable Association & Texas A&M AgriLife Extension Service

**Project Manager:** Ray Prewett, Texas Vegetable Association

**Contact Information:** ray@valleyag.org , (956) 584-1772

**Type of Report:** Final

**Date Submitted:** October 2013

### **Project Summary**

Food safety is such a critical issue for the produce industry in Texas, therefore the Texas Vegetable Association (TVA) felt there was a need to increase buyer awareness and knowledge about the Texas produce industry. The science of food safety is complicated and new research results are developed at a rapid pace and in order for Texas to do more TVA planned to create a webinar series, a food safety conference and a buyers tour. In addition, TVA sought to evaluate the current competitive state of the fruit and vegetable industry in Texas to identify challenges and opportunities.

### **Project Approach**

#### Webinars

Initially the purpose of using webinar technology was to help alleviate the distance between TVA members across the state of Texas and help recruit top food safety officials to participate in TVA food safety meetings, primarily the discussion and coverage of the new Food Safety Modernization Act proposed produce and preventative controls rules. The annual software subscription was purchased through TVA and grant partner, Marco Palma, Texas A&M University Agricultural economist. Marco was chosen to assist in the administration of the TVA webinars due to his proficiencies with the technology. TVA and Marco held two organizational meetings to discuss the necessary steps required to execute a successful webinar. TVA began planning to host the food safety webinar and have two different remote locations in Weslaco and Uvalde, Texas. By having the remote locations it was intended to encourage greater participation by alleviating the burden of individual participants in knowing how to set up and use the technology. With the uncertainty of when exactly the proposed rules were would be officially released, TVA members continued to pursue the webinars by tentatively lining up qualified speakers. The proposed rules were finally officially released in January 2013. TVA decided to allow fellow produce organizations and industry partners to have time to digest the massive and ambiguous rules. By the time that produce community felt comfortable enough to start releasing comments and discussing the potential impacts of the rules, TVA decided to table the webinar until after TVA's 2013 Food Safety Conference was completed in May 2013. The conference granted TVA a sufficient amount of information from industry officials that were well educated on the proposed rules and gave TVA enough confidence in executing the webinars soon after the conference. Unfortunately, due to untimely personnel turnover, TVA was not able to execute the webinar before the end of the grant period.

#### Food Safety Conference

The 2013 Texas Food Safety Conference was planned to be conducted after the success of the 2011 Texas Food Safety Conference. The event was held in Austin, Texas to encourage growers and allied industry from the entire state to participate.

Originally, the 2013 conference was to be executed in the same fashion as the previous conference, but with the unfurling of the FDA Food Safety Modernization Act proposed "Produce and Preventative Controls Rules" in January 2013, the emphasis was changed to focus on how the rules will impact growers and shippers. Marketing materials, such as signs, posters and mail-outs, were designed and created for the conference and marketed through the mailing lists. More than 300 invitations were extended to growers, packer/shippers, allied industry vendors, university faculty, and state organizations.

The conference was organized to address general concerns, discuss specific potential changes in food safety practices in the proposed rules, and have an official overview provided by a Food and Drug Administration official. Proposed changes, such as water quality testing and audit requirements, were addressed by Texas A&M AgriLife Extension Vegetable Specialist, Juan Anciso and University of California Extension Research Specialist, Trevor Suslow. Guest speakers at the conference included Texas Agriculture Commissioner Todd Staples, Dr. David Lakey of the Department of State Health Services, and Tom Stenzel, United Fresh President.

During the conference, TVA and Texas Department of Health and Human Services officials recorded comments, concerns, and questions that were documented and reported to respective state and federal agencies.

Overall, the 2013 Texas Food Safety Conference was successful by having approximately 75 participants that were comprised of Texas growers, packers and shippers, university faculty, and state employees. TVA also formed an industry group from conference attendees that will formulate Texas industry specific comments and help provide vital feedback to FDA officials seeking industry input.

#### Buyers Tour

A Texas buyers tour was planned to showcase the quality and strategic placement of South Texas produce. TVA organized and coordinated a planning group that was comprised of 10 packing shed sales managers and industry leaders. A list of 20 top retail and food service operations was created that included retailers such as H-E-B, Hardies, United Supermarkets, Safeway, Whole Foods, Sysco, and Walmart. The planning group developed a tour agenda and set up visits to Paramount Citrus, J&D Produce, and Val Verde Vegetable. In order to expose the unique buying opportunity of South Texas produce, the planning group also decided to include two visits to import facilities.

TVA's primary purpose was to feature the efficiencies and benefits of combining Texas produce with existing import produce that the buyers have traditionally purchased. TVA executed the recruitment of the buyers through marketing efforts such as email marketing and direct phone conversations. The initiative was received well by the buyers which expressed great interest and shared value in combining Texas produce with import produce.

Unfortunately, due to the nature of the retail produce industry the contacted buyers had very limited openings in their schedules. TVA was not successful in getting any commitments to participate in the tour. Once an invitation was declined by a buyer, TVA representatives conducted a brief survey to determine if the initiative held any value and what could be done differently to guarantee a successful project in the future. The survey included questions such as, "do you see value in a South Texas focused tour? What individuals from your company should be contacted in the event of another tour? What time of year are you more likely to commit to an event like this?" TVA officials regard the responses as genuine and indicative of the value of a South Texas focused tour.

#### Strength Weakness Opportunity Threat Analysis (SWOT) - Strategic Plan

The Texas A&M AgriLife conducted a SWOT analysis to assess the strengths, weaknesses, opportunities and threats to the vegetable industry. Similarly, an external SWOT analysis was conducted with the Texas vegetable and fruit industry. The Texas produce industry plan was to develop a short and long-term analysis of the internal programs in order to better serve the needs of the fruit and vegetable industry in Texas. Meetings and workshops were plotted on a timeline between TAMU AgriLife and growers/shippers.

#### Goals and Outcomes

##### Webinars

Food safety is vitally important to TVA's membership and TVA officials strove to provide multiple opportunities for members to experience extensive coverage of the new FSMA proposed rules. The webinar technology was to be used to overcome geographical challenges and enhance meeting effectiveness. TVA planned to have their first series of webinars with two remote locations. The goal for the first webinar was to have 50 percent of TVA membership and 30 nonmembers participate in the webinar. TVA then planned to follow up the 2013 Food Safety Conference with another webinar with the industry group to form Texas produce industry specific comments. Of the 15 people that were assigned to the group, TVA planned to have a minimum of 75 percent participate and have at least one representative from the various commodity groups be in attendance. TVA recruited and tentatively set the speakers for the webinars but was never able to fully execute the food safety webinars. Untimely staff turnover occurred during the period that was scheduled which prevented the webinars from taking place. By the time TVA was adequately staffed the grant period for the webinars had ended.

##### Food Safety Conference

The overarching goal of the 2013 Texas Food Safety Conference was to educate industry participants on the new Food Safety Modernization Act proposed rules. Once the industry had time to digest information about the proposed rules, TVA decided that the 2013 Food Safety Conference was the perfect opportunity to develop Texas specific comments on the rules and to submit them to the Food and Drug Administration, The Texas Department of Agriculture, and United Fresh, which already had a team of representatives formulating comments. TVA set goals of increasing participant knowledge by at a minimum of 50 percent and provide a clear and concise summary of the rules in order to prepare TVA members and conference participants for potential impacts of the proposed rules. Of the approximate 50 individuals that participated in the exit survey, 90 percent responded that

they have food safety programs in place on their farms and/or packing facilities and therefore have a working knowledge of food safety procedures. The survey reflected an 80 percent increase of knowledge of the FDA Food Safety Modernization Act proposed rules. This increase was in large part due to the ambiguous nature of the proposed rules and the FDA's refusal to discuss specific components of the rules. Texas DHHS and TVA officials recorded over 20 questions that were to be reviewed, answered, and posted to the official FDA question and answer website. TVA also formed a working group of 15 Texas industry representatives that were to form state specific comments. The conference also provided valuable networking opportunities among the Texas produce industry and allied industry. It was clear that the Food and Drug Administration officials were actively seeking grower support and input to enhance and/or make amendments to the rules. Both growers and federal and state officials were pleased with the progress that was made at the conference.

#### Buyer's Tour

TVA's primary goal for the Buyer's Tour was to showcase the unique value of purchasing produce from south Texas producers and gauge the retail market's receptiveness of touring and networking with local producers and their operations. TVA also set out to generate an excitement amongst Texas growers about future business growth opportunities that will come with a greater focus on the area by major retail organizations. TVA's planning group set out to recruit and establish relations with 10-15 major retailers. They also had plans to develop marketing material to send out to 20 retailers that were not able to participate, summarizing the success of the event and to create excitement and increased participation for the next tour. TVA reached its goal of contacting and generating feedback from the 20 retailers that were identified at the planning event but unfortunately was unsuccessful in executing the actual tour. The feedback generated by TVA's efforts reflect the growing interest in retailer's focus on South Texas. The retailers acknowledged logistical benefits of purchasing mixed loads of Texas and Mexico produce and believe that their companies will begin to increase the amounts of shipments and business efforts through the Rio Grande Valley due to those efficiencies. Surveys collected from potential participants indicated that the majority did in fact see value in a south Texas tour. However, survey input on when such a tour could be held to best fit their respective schedules demonstrated that there was no clear-cut time of the year that would be ideal.

Although TVA was unsuccessful in recruiting buyers to participate in the tour, it is fairly evident that TVA and its partners need to continue efforts in advertising and marketing the unique benefits that South Texas holds to the evolving retail market.

#### SWOT Analysis/Strategic Plan

The goal of the workshops and meetings that have taken place so far was to discuss critical issues, both positive and negative, of the vegetable and fruit sectors in Texas. Together at the meetings that have occurred so far, growers/shippers worked hand in hand with Texas A&M AgriLife Extension to discuss approaches to vegetable improvement and sustainable crop production, economic feasibility and profitability, marketing strategies, and insuring the food safety of vegetables from the field through packing, storage and transport.

Strategic planning started with the SWOT analysis performed by TAMU AgriLife. TVA reached out to growers independent of TAMU's effort. Twenty growers and shippers participated in the Rio Grande Valley meetings and 16 growers and shipper participated in the Wintergarden meeting, along with members of Texas AgriLife. Detailed charts and graphs were drawn during the interactive discussions between the grower/shippers which was lead by Marco Palma, Texas A&M University Agricultural Economist. Overall, the TVA SWOT analysis found that one of the real keys to future success in both the short and long-term will be improved communication between vegetable shippers/growers and the research community. Without this measure, most agreed that opportunities for growth would be limited. The analysis also uncovered the grower's need to improve strategies to capture more of a share in both inter and intra-state markets.

The next meeting on the timeline for the strategic plan, as our industry refers to it, will be in October 2013. The result of the strategic planning process has been very positive. The next step in the process will be to combine the SWOT with the results of the industry meetings held.

## **Beneficiaries**

### **Buyer's Tour**

TVA and its members benefited from the valuable market research that was conducted. Approximately 200 TVA members received direct benefit from the project. The market research benefits them by providing insight into the challenges their industry is currently facing. The project results also underscores the need for members to stay engaged in developing events within the industry with the ultimate goal of advancing profitable growth on multiple fronts.

The market research obtained was provided in the form of a handout and was distributed to 200 TVA members.

The data that was received has proven valuable in helping TVA and its partners pursue a multiple day, regional produce convention that will have a buyer's tour, educational sessions, and a trade show. The South Texas produce industry will feel the economic benefits of a greater focus by major retail operations. Consumers will have increased choices of Texas produce in their stores. Retail operations will experience increased logistical efficiencies and be able to provide their customers with more domestic/ locally grown produce.

### **Food Safety**

Producers and allied industry benefited from the information that was obtained from the conference, helping prepare them for the potential changes that will have be made in order to be compliant with the new rules. Producers at the conference were also educated on how to incorporate Hazardous Critical Control Points (HACCP) concepts into their existing programs, helping reduce potential contamination points in their facilities. State officials were able to network with many of the producers and companies that they are charged to regulate which will help with future regulatory efforts. Consumers will greatly benefit from better educated producers and food handlers decreasing the likelihood of food borne

illnesses. The Food and Drug Administration will benefit from an educated and informed producer base. The producers will be better prepared for cultural and operational changes required of them by the new FMSA rules thereby increasing a greater adherence and acceptance.

#### SWOT/Strategic Plan

Texas vegetable industry and its members benefited from the SWOT analysis/ strategic plan process by developing the draft plan, “Growing the Future: The Texas Vegetable Strategic Plan.” This draft plan is intended to be a guide to the investment of research and education resources of TAMU AgriLife. The plan is to develop efficient and effective means of communicating between vegetable producers, vegetable industry organizations and research. Extension teams formed around the problem and the solutions identified in the SWOT/strategic planning process to insure their success. As the timeline of this analysis has been continuing, it is a consensus as an industry that it is a definite benefit to continuing forward with this plan.

The focus of the Texas domestic vegetable industry is to use the results of the SWOT/strategic plan to take advantage of the growing market for Texas vegetables. Texas is one of the fastest growing states in the U.S and if we can solve some challenges identified in the SWOT/strategic plan the Texas vegetable industry has great potential for growth.

#### **Lessons Learned**

The Texas Vegetable Association learned that putting together a buyers tour is more challenging than was expected. More lead time was needed to have a successful event with buyers. TVA also received important feedback from the buyers on sourcing product from Texas. TVA initially thought that a tour of the Texas growing and packing operations would be sufficient to obtain the participation of buyers. However, they learned it was necessary to include a broader range of events and activities to make it worthwhile for buyers to visit and learn more about the Texas produce industry. As a result of this feedback, the industry is now planning to attract the buyers by having a full complement of activities including educational session and a trade show as well as a buyers tour.

#### **Additional Information**

“Food Safety Conference Offers Texans Strategy”

[www.thepacker.com/fruit-vegetable-news/Foodsafety-conference](http://www.thepacker.com/fruit-vegetable-news/Foodsafety-conference)

Interview and article by Pamela Riemenschneider; published 4/25/13



## **PROJECT 25: A SURVEY TO DETECT CITRUS GREENING DISEASE IN THE CITRUS GREENING QUARANTINED AREA**

---

**Partner Organization:** Texas Department of Agriculture (TDA) is the primary partner organization; secondary partner organizations include USDA-APHIS-PPQ and Texas A&M University Kingsville Citrus Center.

**Project Manager:** Jose Sanchez, Regional Director

**Contact Information:** Texas Department of Agriculture, Valley Regional Office; Jose Sanchez, Regional Director; Phone (956) 787-8866; 900-B East Expressway 83, San Juan, TX 78589 Fax (800) 909-8167.

**Type of Report:** Final

**Date Submitted:** April 2013

### **Project Summary**

The most damaging disease of citrus crops, citrus greening (also known as Huanglongbing or HLB), was detected for the first time in Texas in an orange grove near San Juan, on January 13, 2012. Consequently, the Texas Department of Agriculture quarantined a 5-mile radius area surrounding this disease find. The project surveyed approximately 1,400 sentinel dooryard citrus trees within the quarantined area to find out if the disease is present elsewhere in the quarantined area. Survey teams comprised of TDA and USDA personnel who examined the sentinel dooryard host trees, primarily citrus trees, for citrus greening disease symptoms and collected foliar tissue samples from trees that demonstrated symptoms consistent with citrus greening disease. Samples of the Asian citrus psyllid (ACP), the vector of the citrus greening, also were collected and analyzed to determine if these insects were infected with the disease organism. Pathologists from the Texas A&M University Kingsville Citrus Center analyzed the samples. The survey objective was to reveal if citrus greening is present at additional sites within the quarantined area. Since the project was a joint effort between USDA and TDA, citrus groves located within the quarantined area also were surveyed. Survey results disclosed trees infected with citrus greening in the initial detection grove, a second grove across the street from the initial detection site, and a residential landscape adjacent to the original detection site. The implications are that the quarantined area currently is of appropriate size and that regulatory actions are appropriate to slow or prevent spread of the disease. As follow-up, ongoing survey activities are needed for both the quarantined area and the rest of the citrus zone.

### **Project Approach**

TDA determined on January 13, 2012, that citrus greening was present in an orange grove near San Juan, Texas. Immediately, in order to prevent spread of the disease, TDA declared an emergency quarantine of a 5-mile radius around the initial detection site and placed all citrus plants inside the quarantined area under seizure. Once the quarantine had been established, it was imperative to determine whether other citrus trees or any ACP inside the quarantined area were infected. It was determined that this objective could best be accomplished by surveying ACP and citrus trees occurring in the quarantined area. Day-to-day logistics were jointly run by TDA and USDA personnel; with overall coordination residing in the agency headquarters offices in Austin. The project objective was to survey

approximately 1,400 sentinel dooryard citrus trees, citrus groves and ACP within the 5-mile radius quarantined area. To accomplish the objective, survey teams comprised of TDA and USDA personnel examined approximately 1,400 sentinel dooryard host citrus trees for symptoms of citrus greening and collected foliar tissue samples from trees with symptoms consistent with citrus greening. Samples of ACP also were collected and analyzed to determine if the vectors of ACP were infected. At any dooryard locations where ACP were encountered, a psyllid sample was collected. Additionally the survey crews were instructed by USDA to take at least two vegetation samples per day even if the trees did not exhibit symptoms consistent with citrus greening. Each plant tissue sample and each ACP sample was numbered and data were taken as to the precise location where of the sample had been collected. Pathologists from the Texas A&M University-Kingsville Citrus Center (TAMUKCC) analyzed the plant tissue samples and ACP samples. TDA's staff at the department's Valley Regional Office in Juan prepared weekly activity reports of the survey and emailed or otherwise distributed to interested parties, including USDA and TDA staffs and Texas Citrus Mutual. The weekly activity reports included the number of dooryard citrus plants surveyed, the number of plant tissue samples collected, the number of ACP samples collected, and results of the sample analyses. The report also gave cumulative numbers, so progress over the time could be tracked.

### **Goals and Outcomes Achieved**

Over a sampling period of 73 days, the project surveyed a total of 1,445 dooryard citrus plants in the quarantined area and collected a total of 1,217 Asian citrus psyllids (ACP) for laboratory testing for HLB. ACP were collected for testing at 84.2 percent of the sampled locations. Also, the project collected a total of 166 tissue samples from citrus plants for laboratory testing for HLB. An average of 19.9 dooryard citrus locations was sampled per day. A total of 1 positive vegetative sample was collected and 0 positive ACP samples were collected during the sampling period, September 1 through December 31, 2012; some samples of plant tissue and of ACP still are pending. The survey results clarified that the disease currently is detectable (1) in plants in the grove where citrus greening was initially detected; (2) in the grapefruit grove directly across the road from the original site; and (3) in a residential landscape immediately adjacent to the two groves. As a result, there is no current justification for expanding the quarantined area beyond its original boundaries; this means that the number of citrus producers, citrus production nurseries, citrus retail nurseries, and homeowners that are directly impacted will be minimal. Citrus production nurseries outside of the quarantined area will continue to be able to sell their citrus trees interstate, unconstrained by USDA's citrus greening quarantine requirements. The survey results also justify regulatory steps taken to avoid artificial spread of the disease that could result from the unrestricted movement of citrus fruit and citrus trees within and out of the quarantined area. The survey results were shared with various agencies dealing with production, regulation, marketing, research, and outreach, such as, USDA-Plant Protection and Quarantine, Citrus Health Response Program (CHRP), Texas A&M AgriLife Research and Extension, Texas A&M Kingsville Citrus Center, Texas Citrus Mutual, Texas Citrus Growers Association, county extension agents and community groups in the Greater Rio Grande Valley, including the Citrus Zone. The information was also disseminated at the Texas Nursery and Landscape Expo held at Houston from August 16-19, 2012 and to the citrus growing states at the 2012 Southern Plant Board Meeting, held at San Antonio, Texas.

The survey and sampling information was provided to citrus growers during the Texas Citrus Mutual annual and semiannual meetings of citrus growers at the Texas A&M Citrus Center in Weslaco, Texas. In addition TDA's CHRP inspectors provided information to the registered nursery and grower operations, making them aware of the Asian citrus psyllid and citrus greening during the nursery inspection and sampling. There were no positive finds for citrus greening. Therefore the quarantine was not expanded.

### **Beneficiaries**

In the citrus zone of Texas, citrus trees abound in home landscapes of all price ranges. On most city blocks across the Lower Rio Grande Valley, including mobile home parks for part-time residents, many of the homes proudly plant one to many citrus trees. Furthermore, a recent statewide survey by TAMUKCC disclosed that throughout Texas, from the Lower Rio Grande Valley in the south, El Paso to the west, the Louisiana border in the East and beyond Dallas in the North, countless Texas homeowners grow citrus trees that, by law, must have been produced in Texas. That demand is met by 982 widely dispersed Texas citrus nursery tree retailers and 76 Texas nursery tree producers. In northern parts of the state, citrus nursery tree production is accomplished in greenhouses during the cold winter months. All of these homeowners, retailers and producers will continue to have ready access to "produced-in-Texas" citrus nursery trees, without further restrictions than are imposed by current quarantine requirements. Because currently there is no cure for citrus greening and because fighting an established statewide infestation of citrus greening would be enormously expensive and adversely impact commerce, the beneficiaries of the project are all of these citrus fruit producers, citrus nursery tree producers and retailers, owners of dooryard citrus plants, and consumers of Texas citrus. Citrus growers, citrus industry, the nursery industry, residents with dooryard citrus and the public at large have benefited from the project because it addressed detection of citrus greening disease through monitoring, complemented regulatory actions to contain inoculum and control the vector (Asian citrus Psyllid), and heightened public awareness of the disease, its symptoms, spread and detrimental effects on citrus production in the state.

### **Lessons Learned**

Timely, well-planned and well-coordinated survey activities can effectively delimit the extent of HLB in a quarantined area and serve as powerful adjuncts to management decisions, allowing efficient deployment of finite resources. As demonstrated in this survey, federal, state, educational and industry coordination and interaction can maximize the efficacy of a HLB quarantine.

### **Additional Information**

After a host first becomes infected with Citrus greening, the disease remains undetectable during a latent period of that may last 1-3 years. In order to detect Citrus greening in trees where the disease may have been latent during the survey period and to prevent breakouts from the quarantined area, ongoing follow-up surveys of both the quarantined area and the rest of the citrus zone are needed.



**Partner Organization:**

Primary: Texas Department of Agriculture

Partner: Whole Foods and Koch Ranches

**Project Manager:** Richard De Los Santos

**Contact Information:** Richard.DeLosSantos@TexasAgriculture.gov

**Type of Report:** Final

**Date Submitted:** October 2013

**Project Summary**

The Texas Department of Agriculture (TDA) has tremendous success working with retailers through the agency's GO TEXAN program and specifically in specialty crop promotional activities. This project was intended to take the TDA/Retailer partnership to the next level, enhancing the retail participation in the GO TEXAN program's efforts to promote Texas specialty crops, thus increasing producer sales and product value. Many specialty crop producers and growers do not sell directly to the end consumer and rely on retailers to sell their products. By strengthening a retailer incentive to purchase and promote Texas specialty crops, Texas growers will have the opportunity to: build upon and strengthen established retailer relationships; increase the volume of products sold to Texas grocery store retailers; and increase consumer awareness and purchases of Texas specialty crops.

Working with the GO TEXAN marketing team, participating retailers were required to incorporate the GO TEXAN certification mark into their specialty crop promotions and source specialty crops from Texas growers. It was required that the promotions contain one or more of the following measurable components:

- In-store specialty crop demonstrations to provide customers the opportunity to try before they buy. Sales figures were recorded before and after demonstrations to track results.
- As part of the comprehensive strategy to reinforce the GO TEXAN message and increase GO TEXAN certification mark recognition, specialty crop advertisements, in-store flyers and other signage and displays were utilized. The number of times the GO TEXAN certification mark was utilized per flyer, plus the number of unique flyers developed using the GO TEXAN mark, was measured during this promotion.
- GO TEXAN specialty crop coupons provided data regarding quantity of purchases made and consumer interest level. Retailers were required to submit the number and type of GO TEXAN coupons used by consumers.
- Specialty crop online advertising (such as social media ads, web banners, etc.) utilized by retailers were targeted to specific demographics and regions. A primary benefit of utilizing this platform was the immediate analytical data provided. This data was measured throughout the promotion.

The plan also allowed for the GO TEXAN marketing team to collaborate with selected retailers on the customized design and production of marketing materials such as bin signs, banners, posters, grocery bags, grocery cart signs, bin wraps, shelf strips/shouters and table covers. Due to a variety of different signage used, TDA was unable to create a design that was universal. A

portion of this project was not completed prior to the deadline. Promotion-specific signage was created instead in cooperation with participating retailers.

### **Project Approach**

The first step in this project was to develop the Request for Applications. This step of the project was initiated on schedule; however internal procedures delayed the announcement of the opportunity until April 2013. TDA evaluated four applications and selected two retailers to conduct the retail promotions. Development of marketing materials and the bid to select and produce promotional in-store materials for retailer partners was started once the two retailers were notified. Due to a variety of different signage being used, TDA was unable create a design that was universal. A portion of this project was not completed. TDA was able to create 10 different produce posters to provide to retailers.

The two retailers conducted their promotional activities, which included 120 product demonstrations, coupons and advertising. Product displays, advertising and online ads resulted in the GO TEXAN mark being displayed a minimum of 60 times. Most importantly, more than 12,000 consumers were provided the opportunity to try the Texas grown specialty crops before they made their purchase. Retailers collected data and provided TDA with reports to determine the success of the promotions.

### **Goals and Outcomes Achieved**

The goals of this project were to incorporate the GO TEXAN certification mark into retail-chain-specific marketing programs to quickly identify produce and/or tree nuts from Texas in order to increase customer awareness and sales of Texas specialty crops and to increase the total volume of Texas produced specialty crops purchased by Texas retailers.

**Target:** The stated target was to increase the volume of sales by 10 percent at participating locations. According to the reports provided by participating retailers, the project resulted in an 18 percent increase in sales during the period.

**Benchmark:** Specialty crop sales grew by 25 percent in 2011. In regard to the specific retailers that replied to the RFA, historical data was not available at the time of the proposal but was collected during the project period.

**Performance Measures:** TDA worked with retailers to collect data regarding the purchase of Texas specialty crops during this promotion. TDA had also planned to collect sales data from growers to determine an increase in sales volume but were unable to do so. Per the RFA, growers did not have to agree to provide sales information to the department, only the retailers (who received the funds for the promotions) were required to do so. A change to this process will be considered for future projects, if appropriate.

**Monitoring:** TDA worked with retailers to record specialty crop sales prior to, during and after the promotional events to determine success of the retail promotions. All participating retailers met the requirements outlined to ensure only specialty crops benefited from the retail promotions.

### **Beneficiaries**

Two retail outlets and 20 producers benefited from these promotions. Most importantly, more than 12,000 consumers were provided the opportunity to try the Texas grown specialty crops before they made their purchase.

### **Lessons Learned**

The development of the Request for Application caused a delay in starting the project. In addition, the two staff members assigned to the project left the department during the project. This delayed the project further. We will need to allow more time in the future.

### **Additional Information**

Photos attached











