



Arizona Department of Agriculture

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**Specialty Crop Block Grant Program
Agreement No. 12-25-B-1655**

**1st Annual Performance Report
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Introduction

On September 24, 2013, the Arizona Department of Agriculture (ADA) entered into a cooperative agreement with the United States Department of Agriculture (USDA), Agricultural Marketing Service (AMS) in the amount of \$1,318,053.18 in FY13 Specialty Crop Block Grant Program – Farm Bill funds to fund seventeen projects specifically designed to increase the consumption and enhance the competitiveness of Arizona Specialty Crops. Projects within the Arizona State Plan include two marketing projects, six education projects and nine research projects and are initially one to two years in duration. The expiration of the grant period is September 29, 2016.

2014 SWAS – A Collaborative Educational Experience

This project was completed on September 30, 2014

Project Summary

The Southwest Ag Summit was conceived with the specific purpose of bringing cutting edge information to specialty crop growers and affiliated people as it relates to arid land agriculture. Yuma is in the middle of well over a million acres of arid land agriculture that has its own specific needs and issues. The land, the weather, the water all requires attention to detail and constant need for solutions to problems that keep surfacing year after year. In our partnership with Yuma County Cooperative Extension and the University of Arizona Research Farm we are able to present current information on real time problems as they develop. With the return of the Field Demonstrations we are introducing hands on solutions to irrigation, tillage, transplanting and automation of labor-intensive cultivation practices. The interaction between growers, researchers, specialists and educators is a catalyst for finding even more solutions as they present their information during our breakouts. It has always been our goal to improve the efficiency and quality of specialty crops.

Project Approach

Our formula for success has been slowly evolving for several years. We have reached a point in our journey that we have a great event and it meets our goals of providing information to industry. Our needs are now to keep improving on the value of the information and to reach out and touch more people.

We focused not only on great sources of information but also on how to spread the word on what we have to offer. We spent a good amount of time with Yuma Cooperative Extension and University of Arizona Ag. Research, putting together a program of pertinent topics and outstanding presenters. Our program of breakouts for this Summit reflect our success:

- Honey Bee Interactive Panel – Bee Health and Pollination
- Integrated Pest Management Regulatory Update
- Fresh Produce Safety
- Mechanical Thinning vs. Hand Thinning
- Risks of Heavy Metals in Desert Vegetables
- Variable Rate Phosphorous Management in Desert Vegetables
- Seeking Genetic Path toward Improved Phosphorous Use in Fertilizer Efficiency in Vegetables

- Control of Weeds and Soil Borne Diseases with Steam and Heat-applications of New Technologies in Vegetables.

Utilizing Arizona Western College's (AWC) larger classrooms for breakouts proved ideal for this. Plenty of room built in technology and personnel well trained in IT. The auditorium was the perfect venue for our Bee Panel. This is an area of agriculture of extreme importance due to science and emotion seeming to clash over the cause of declining bee populations. We brought in an insecticide industry representative, a bee researcher from APHIS, and two beekeepers, one with over 80,000 hives and one with several thousand. The panel and ensuing breakout were excellent in presenting pollinator facts and practices.

The Field Demonstrations brought back portion of the Summit we had to do without last year with our move to AWC and one year due to being rained out. We were able to take advantage of the AWC Land Lab specifically for this purpose. Once again our partnership with AWC grew in a direction we were unsure of earlier. We feel that this event really puts on display equipment that has tremendous implications in improving cultural practices. This year we demonstrated:

- Innovations in sprinkler systems
- Several automatic thinners that have improved greatly in the last two years
- Transplanters from several different manufacturers
- Several innovative tractors and implements
- GPS applications in cultivation

One of our more successful markers for this event was the number of attendees who signed up in advance of the Summit. In the past it was normal for us to have 100 to 200 register and pay on event day. This year we had 795 attendees already registered in advance and only a smattering of 25 or 30 the day of the event. This gave us a pretty secure feeling that we are finally getting out both by reputation of our content presented and our marketing. Our partnerships with Yuma County Farm Bureau (YCFB), Yuma Visitors Bureau (YVB) and California Agriculture Pest Control Advisors (CAPCA) have given us more exposure through their mailing lists, access to members and the YVB marketing program that helps in making the right kind of contact; contact that creates interest and attraction.

This year we added a wrap up Insider Magazine. It was produced to remind attendees of the information presented. It was sent to over 4,000 addresses so it will invariably land in the laps of many that did not attend giving them some information they missed. And hopefully it will attract them to the Summit in 2015. A budget adjustment was requested and approved on September 29, 2014.

Goals and Outcomes Achieved

Each year we use a survey to measure stated goals as well as to give us base information that will assist us in outreach the following year. This survey allowed us to measure some of our goals below.

1. Increase the attendance to the 2014 SWAS Academic programs by vegetable and melon industry members (Goal) by 8% from 525 (Benchmark) to 567 (Target) measured by surveys, registration and attendance lists. (Performance Measure)

Of those attendees who completed the survey, 83.84% indicated that their occupation involves the melon or vegetable industry. Not every attendee completed a survey. When the 83.84% is applied to the total number of registrations (795), we estimate that 667 of the 2014 SWAS participants have occupations that involve the vegetable and melon industry, which would be an increase of 27%.

2. Increase the reach of the SWAS by measuring how likely attendees are to share materials with coworkers and/or staff unable to attend the SWAS (Goal) by 10% from 250 people (Benchmark) to 275 people (Target) measured by survey questions about participants’ sharing SWAS materials. (Performance Measure)

Of the 328 attendees who completed the survey, 134 (40.85%) indicated they planned to share the information with “Staff;” 262 (79.88%) indicated they planned to share the information with “Coworkers;” 40 (12.20%) indicated they planned to share the information with “Media;” and 172 (52.44%) indicated they planned to share the information with “Friends/Family.” (On this survey question, participants were allowed to select more than one answer.) The survey results clearly indicate that participants found the SWAS information very valuable and they wanted to share the information with people who were unable to attend the 2014 SWAS. A total of 302 respondents indicated that they will share materials with coworkers and/or staff, which is an increase of 21%.

3. Increase the attendance to the 2014 SWAS Field Demonstration by vegetable and melon industry members (Goal) by 10% from 200 (Benchmark) to 220 (Target) measured by surveys, registration and attendance lists. (Performance Measure)

Of those attendees who completed the survey, 39.94% indicated that they attended the 2014 SWAS Field Demonstration. 114 out of the 328 people (34.75%) who answered the survey question about attending the Field Demonstration indicated that their occupations involved the vegetable and melon industry. Not every attendee completed a survey. From the survey results, we know at least 114 people whose occupations involve the vegetable and melon industry attended the Field Demonstration. When the 83.84% rate (those who indicated on the survey that their occupation involves the melon or vegetable industry) is applied to the total number of registrations (795) we estimate that 267 of the 2014 SWAS Field Demonstration participants have occupations that involve the vegetable and melon industry. Given the actual survey respondents (114), we fell short of our goal of 220 people. Applying the survey percentages to the total number of participants, we exceeded our goal of vegetable and melon industry members attending the Field Demonstration by 47 people, which is an increase of 33.5%.

4. Increase visits to the SWAS website (Goal) by 25% over the course of six months (October – March) from 4,000 (Benchmark) to 5,000 (Target) by tabulating website visits during the 6-month period. (Performance Measure)

<u>Month</u>	<u>2012/13</u>	<u>2013/14</u>	<u>Increase</u>
Oct.	1160	2969	Up 1,809
Nov.	1241	3022	Up 1,781
Dec.	2170	3927	Up 1,757
Jan.	4291	4764	Up 473

Feb.	5121	6427	Up 1,306
March*	5327	2970	Dn 2,357
Total	19,310	24,079	Up 4,769
Adjusted total excluding March			Up 7,126

This equates to an increase of 24.7% in hits over the six month period comparing 2012/13 to this year 2013/14 well surpassing our goal of 5,000.

**March figures skew this percentage because the Summit was in March last year and this year it was in February hence the drop in hits for March, 2014. On an adjusted basis (eliminating March) we show a total number of hits of 7,126 well above our goal of 5,000.*

5. Increase the reach of the SWAS by measuring how many people who attend the three outreach sessions in AZ and CA subsequently register and attend the 2014 SWAS. The goal is an outreach session attendance of 30 people each with a target of 50% attendance rate at the 2014 SWAS measured by registration and attendance lists. (Performance Measure)¹

Due to our failure to capture names of attendees at our bigger meetings we are unable to verify very many attendees that came from outreach meetings. We did see a small increase from outlying areas, but it is not possible to attribute this to those outreach meetings. The smaller meetings did yield a few attendees but the number was not particularly significant.

Beneficiaries

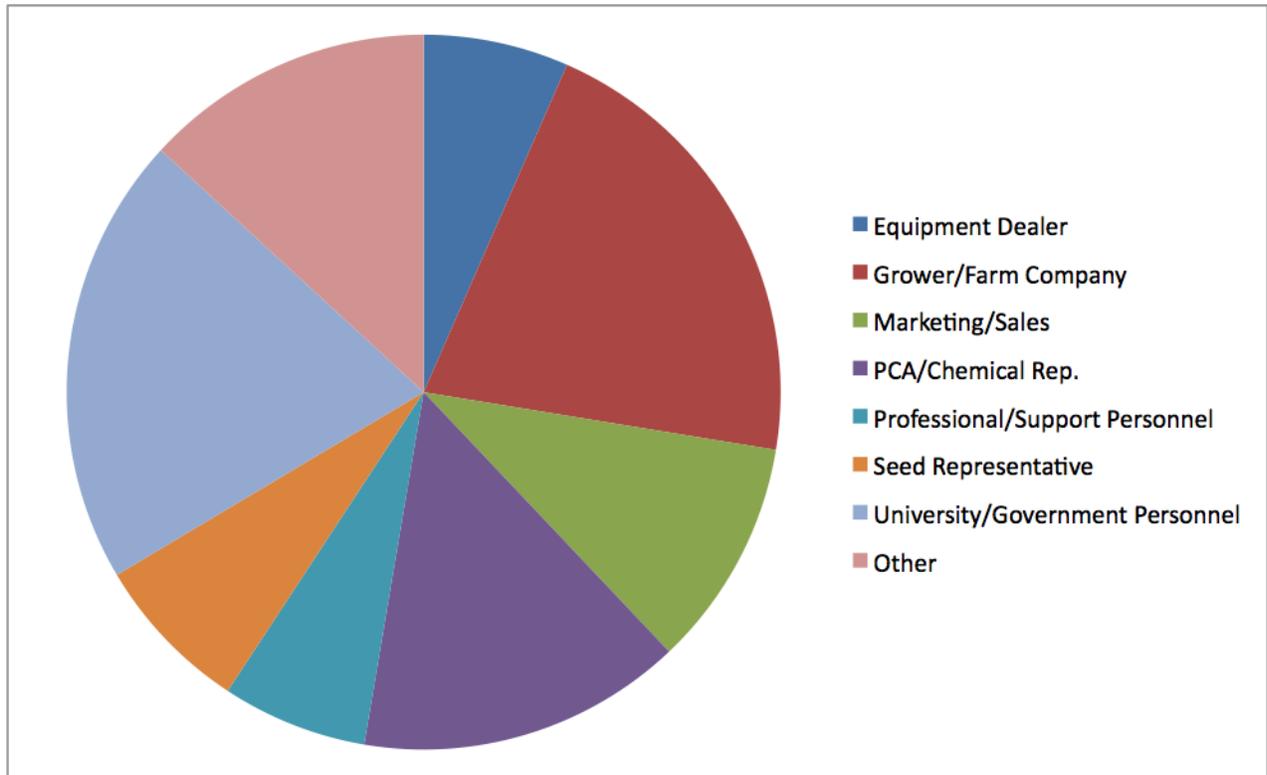
Based on the number of registrants and our survey results, we estimate that at least 2,270 people benefited from the 2014 Southwest Ag Summit. The survey gave us additional information such as occupation and affiliation with the fresh vegetable and melon industry. This will help us grow and reach new markets for attendance for Summits in the future. Question #1 gave us very good indication who we are attracting, who we need to target more.

1.) How would you describe your occupation?

Label	Frequency	Percent	Valid Percent	Cumulative Percent
(Blank)	9	2.74		
Equipment Dealer	21	6.40	6.58	6.58
Grower/Farm Company	67	20.43	21.00	27.59
Marketing/Sales	33	10.06	10.34	37.93
PCA/Chemical Rep.	47	14.33	14.73	52.66
Professional/Support Personnel	21	6.40	6.58	59.25
Seed Representative	23	7.01	7.21	66.46

¹ This failed outcome does not affect the overall outcome of this project.

Label	Frequency	Percent	Valid	Cumulative
University/Government Personnel	65	19.82	20.38	86.83
Other	42	12.80	13.17	100
Total	328	100	100	



Since our objective is to reach produce and melon growers and those affiliated with the industry, this is very basic question as to whether we were hitting our mark. The next question indicates to us that we need to attract more people to the field demonstrations. We know this is valuable but we are just not getting them to the event.

2.) Does your occupation involve the melon or vegetable industry?

Value Label	Frequency	Percent	Valid Percent
(Blank)	2	.61	
Yes	275	83.84	84.36
No	51	15.55	15.64
Total	328	100	

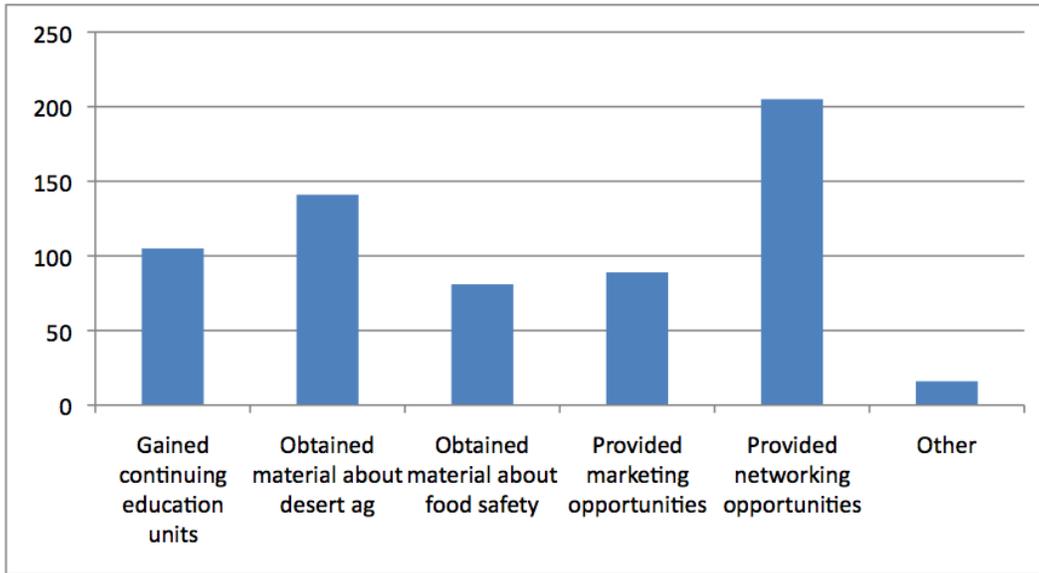
3.) Did you attend the Field Demonstration?

Value Label	Frequency	Percent	Valid Percent
(Blank)	1	.3	
Yes	131	39.94	40.06
No	196	59.76	59.94
Total	328	100	

A very large part of our purpose is to provide valuable information to producers of vegetables and melons. Question number four provided us with valuable feedback on how it has assisted in other ways beside just the presentations. This will also guide us in which direction to continue and in some instances to go in another.

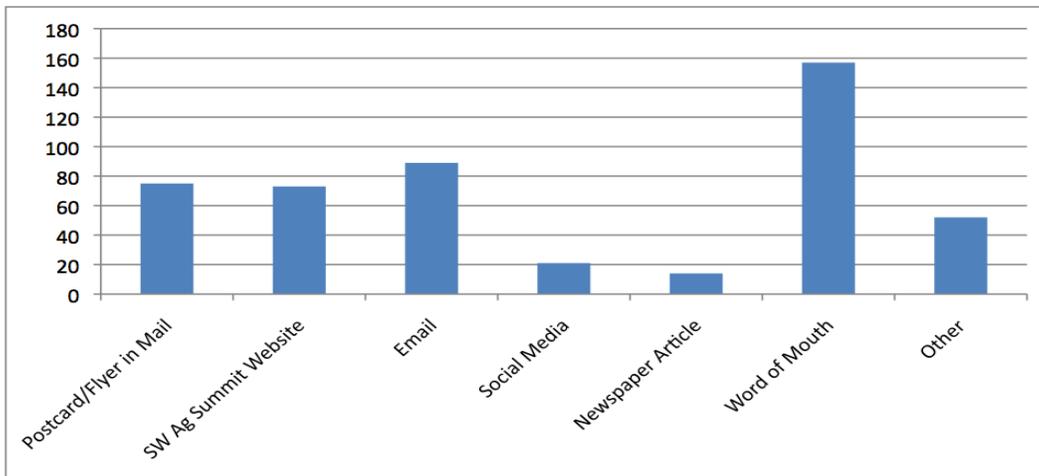
4.) How has the SW Ag Summit affected your occupation? (Multiple overlapping answers)

Label	Frequency	Percent
Gained continuing education units	105	32.01
Obtained material about desert ag	141	42.99
Obtained material about food safety	81	24.70
Provided marketing opportunities	89	27.13
Provided networking opportunities	205	62.50
Other	16	4.88



5.) How did you learn about the SW Ag Summit? (Multiple overlapping answers)

Label	Frequency	Percent
Postcard/Flyer in Mail	75	22.87
SW Ag Summit Website	73	22.26
Email	89	27.13
Social Media	21	6.40
Newspaper Article	14	4.27
Word of Mouth	157	47.87
Other	52	15.85



We have always felt that another mark of success is if they leave the summit and share information learned at the Summit then we are expanding our value on a secondary group. Of course the real proof would be if the secondary market starts showing up at the next conference and becomes part of our primary market. The fact that our attendees signed up in advance I would say that this is a very good indicator that we are doing just that.

6.) How likely are you to share information you obtained from the SW Ag Summit with others?

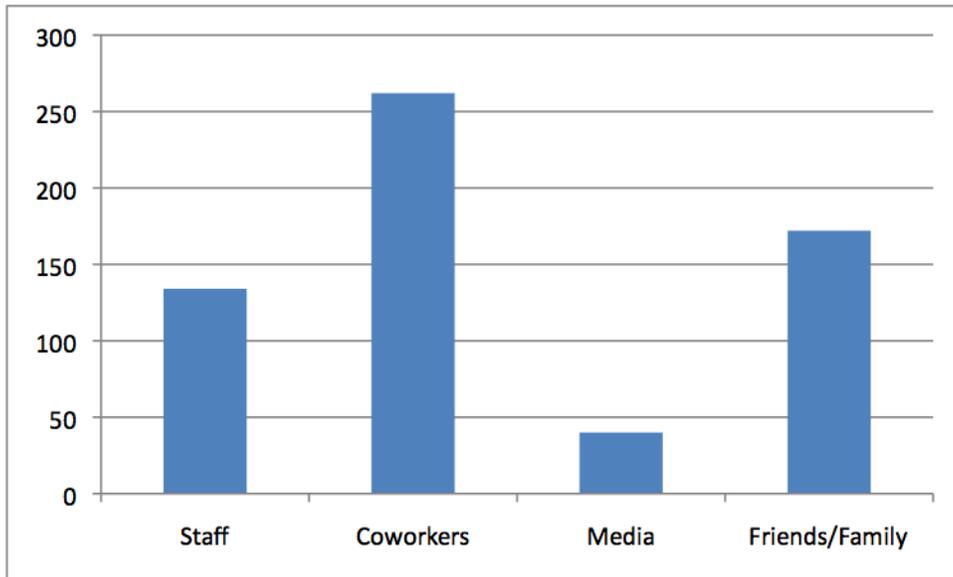
Distribution of answers from “1 Less Likely” to 5 “Very Likely”

<i>Information Sharing</i>	
Mean	4.40
Standard Error	0.04
Median	5.00
Mode	5.00
Standard Deviation	0.78
Sample Variance	0.60
Kurtosis	2.35
Skewness	-1.43
Range	4
Minimum	1
Maximum	5
Sum	1439
Count	327

This question helps us understand just where the information is going when it is shared. Not everyone in a business can take time off but if the primary attendee is getting information from the employed that attends then we are heading in the right direction. If it flows to the media we are getting more bang for our buck in the marketing department.

7.) If you share the information, with whom will you Share it? (Multiple overlapping answers)

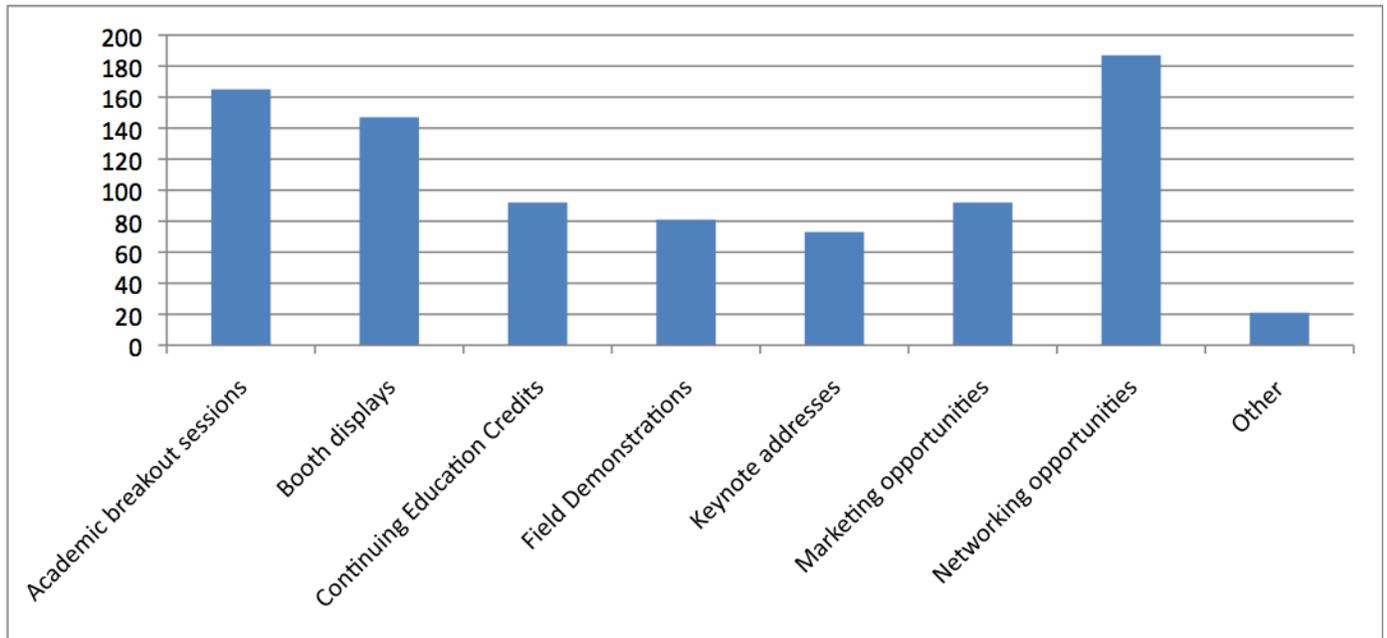
Label	Frequency	Percent
Staff	134	40.85
Coworkers	262	79.88
Media	40	12.20
Friends/Family	172	52.44



Question 8 gives a solid direction for next year. Networking is at the top of the reasons to come and even though it is a spontaneous part of the event it is important to get them in the door and keep them after they get here. It is obvious the breakout sessions also brings them in the door along with the booth displays. Booth displays are not part of the grant but if it helps to get them into the breakouts it is a move in the right direction. Once again the Field Demonstrations show that they need outreach.

8.) Why did you attend the SW Ag summit? (Multiple overlapping answers)

Label	Frequency	Percent
Academic breakout sessions	165	50.30
Booth displays	147	44.82
Continuing Education Credits	92	28.05
Field Demonstrations	81	24.70
Keynote addresses	73	22.26
Marketing opportunities	92	28.05
Networking opportunities	187	57.01
Other	21	6.40



Lessons Learned

This was our second year at AWC and the first year back with the Field Demonstrations. It was our first panel for an opening session that moved into a breakout yielding tremendous attendance. This was our first year where almost all the attendees were pre-registered. This was the first year that stepped out into the neighboring communities trying to attract attendees. So what are our lessons learned:

- Our collaborative partners are a very important part of our success. The venue at AWC brings professionalism, consistency, and plenty of room to grow. The outreach that we have through shared contacts with YCFB, CAPCA, and the Arizona Crop Protection Association are a real part of our success. Our continued marketing through the YVB is essential in involving a strong part of this community.
- Panels are a very strong way to start our Thursday program. Bringing in the heavy weights of the bee industry signaled to our customers that we have an important topic here and we want you to come be a part of it.
- Those that attend tremendously value Field Demonstrations. We just need more to show up. We have work to do here to make this successful.
- We know from feedback our program was late getting posted on the web page. This will not happen again. We will be posted by mid-December!
- When we go outside our community we will need to get names, addresses, and emails to reinforce the information we presented about the Summit.
- Networking, even though it is outside the purview of the grant it is a very important piece of our success and attendees need time to discuss information and create thought for new information.

We are very pleased with where we are today with the Southwest Ag Summit. I believe that this was a great leap ahead for us and we are poised for more growth for a very long time. It is most important that we stay focused on content, feedback from our customers, and stay out in front of

our issues that continue to arise in the production of specialty crops. This project enhances the competitiveness of specialty crops which leads to their increased consumption.

Contact Persons

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Additional Information

Gross program income attributed to specialty crops is estimated at \$47,228.00 and comes from registration fees and sponsors. Gross income is utilized to fund expenses not covered by the Specialty Crop Block Grant such as \$14,780 for meals for the day and half event and another \$15,340 to cover other costs also not covered by the grant. The estimated net program income for the 2014 SWAS of \$16,694 will be reinvested into the 2015 SWAS helping us to sustain Southwest Ag Summits goal to further improve the competitiveness of the Arizona specialty crop business. We do this by educating growers and industry members alike on emerging and upcoming challenges.

Continuation of GHP/GAP Certification Training and Promotion Program

Activities Performed

First Quarter (Oct. 2013 – Dec. 2013) Activities:

- An Instructional Specialist (Karen Edwards) was hired on 1 October on an as-needed basis.
- A GHP/GAP refresher was delivered on 3 October to 22 fresh produce warehouse operators in Nogales, Arizona.

Second Quarter (Jan. 2014 – March 2014) Activities:

- None

Third Quarter (April 2014 – June 2014) Activities:

- A GHP/GAP training workshop was conducted in Prescott, Arizona (Yavapai County) on April 29, 2014. There were 21 workshop attendees.
- Currently, there are 19 GHP/GAP certified growers/handlers/shippers in Arizona

Fourth Quarter (July 2014 – September 2014) Activities:

- A Group GHP/GAP exploratory meeting was held in Prescott, AZ (Yavapai County) on August 12, with 15 attendees.

Problems and Delays

First Quarter (Oct. 2013 – Dec. 2013) Activities:

- Interest among those seeking GHP/GAP certification has been lacking since spring, 2013 and only 1 training workshop was conducted since April, 2013. The program is not meeting expectations or goals. Greater emphasis on marketing, recruitment and networking is required.

Second Quarter (Jan. 2014 – March 2014) Activities:

- Interest among targeted participants in Arizona is limited
- A greater proactive approach in marketing, recruitment and networking is required

Third Quarter (April 2014 – June 2014) Activities:

- Interest among those in GHP/GAP Certification continues to lag

Fourth Quarter (July 2014 – September 2014) Activities:

- While we are excited about initiating a Group GHP/GAP program in the northern part of Arizona, overall GHP/GAP training in Arizona continues to have limited interest at the moment.

Future Project Plans

- A Group GHP/GAP organizing meeting is slated for November 12, 2014 in Prescott, Arizona.
- Continued marketing, recruitment and networking activities to bring awareness to the program.

Funding Expended To Date

A total of \$1,103.99 has been expended as of September 30, 2014. The ADA is monitoring this project closely to determine if expenses will increase and to identify an alternate use for the funds if necessary.

Edible School Gardens

Activities Performed

First Quarter (Oct. 2013 – Dec. 2013) Activities:

- Developing an interactive on-line application that is user-friendly

Second Quarter (Jan. 2014 – Mar. 2014) Activities:

- Opened grant: <http://www.csgn.org/grants/dashboard>
- Worked with AZ Department of Education to promote grant. Sent out email and link to all AZ Dept. of Ed's email list.

Third Quarter (Apr. 2014– June 2014) Activities:

- Continued to promote grant; answered questions from the teachers as they completed applications; followed-up with those who had started but didn't complete
- Extended application deadline beyond summer months

Fourth Quarter (July 2014 – Sept. 2014) Activities:

- Reviewed and selected grant winners. Seventy-four schools applied; 50 were awarded grants along with the Arizona Gardens for Learning Book, Producepedia bookmarks and seeds. Each grant recipient agreed to respond to report and survey requests.
- The 50 schools awarded report to have approximately 28,331 students enrolled. On average schools have 50 students per school participating in the garden which would meet the goal of reaching 2,500 students.

Problems and Delays

There have been no delays with this project.

Future Project Plans

- Visit schools; create awareness for press opportunities
- Create follow-up on-line survey
- Collect, record and publish survey results

Funding Expended To Date

A total of \$75,000.00 has been expended as of September 30, 2014.

Fruit and Vegetable Learning Garden Phase II

Activities Performed

First Quarter (Oct. 2013 – Dec. 2013) Activities:

- Began design and construction docs

Second Quarter (Jan. 2014 – Mar. 2014) Activities:

- Rousseau and EPS (Landscape) met at Zoo to finalize plans and what additional resources funds would be needed.
- Began AZ farmer videos – filming in Yuma and Phoenix

Third Quarter (Apr. 2014– June 2014) Activities:

- Completed Farmer video
- On May 14, 2014, Will Rousseau, Zoo and WGF personnel met to discuss what was to be covered under the grant and what WGF and Rousseau Farming would need to do. We discussed a plan for construction, video presentation, and farmer visits.

Fourth Quarter (July 2014 – Sept. 2014) Activities:

- Video showing at the gardens and Producepedia bookmarks are being distributed to Zoo visitors (15,000 distributed to date, per zoo staff)
- Planting and school activities continue

Problems and Delays

First Quarter (Oct. 2013 – Dec. 2013) Activities:

- We are a little behind because we are determining additional activities to enhance the project that may possibly be funded by other partners. We expect to catch up during the next quarter.

Second Quarter (Jan. 2014 – Mar. 2014) Activities:

- On track to complete build/install by July 2014
- On track to complete video by May 2014

Third Quarter (Apr. 2014 – June 2014) Activities:

- Some delays with building and installation. Working on updated schedule.

Fourth Quarter (July 2014 – Sept. 2014) Activities:

- Continue delays with building. Challenges with budgeted items: it is clear that seats and shade are necessary for an enjoyable experience for the students to hear the farmers and the lessons. This is where we need to focus. There are funds in the grant budget to print materials that would not be as effective as improving the experience of the visitors with shade and benches. In addition, the print pieces – the Producepedia bookmarks – cannot be traced back to improved website traffic because there is no way to distinguish the source of the traffic. We are drafting a recommendation to amend our budget and expect to have the construction done by August 2015.
- Farmer visits have been delayed until early 2015 due to scheduling conflicts with the farmers and groups/schools visiting the zoo

Future Project Plans

- Re-group with the team to determine costs
- Finish Phase II of Zoo garden
- Monitor website traffic
- Distribute marketing materials on AZ produce
- Conduct farmer visits to classes at Learning Garden
- Coordinate with farmers and zoo to schedule farmer talks starting early 2015

Funding Expended To Date

A total of \$7,875.00 has been expended as of September 30, 2014. Expenditures are slow due to delays in construction of Phase II. The ADA is working with the sub-grantee to make sure any budget adjustments are for allowable costs only.

Virtual Arizona Experience: Promoting Specialty Crops

Activities Performed

First Quarter (Oct. 2013 – Dec. 2013) Activities:

The first quarter of the grant was largely spent gathering information. Rowena Davis has compiled information and amassed contacts with some of the growers, distributors, and public educators involved in Arizona agriculture, following up on the work performed by Randi

Bellassai before the funding period started. Davis harvested a list of 72 growers of the eleven specialty crops covered in the block grant (sweet corn, apples, chili-type peppers, pumpkins, Medjool dates, olives, lemons, Romaine lettuce, honey, viticulture grapes, and lavender) publically listed by the Arizona Farm Bureau and tagged U-Pick and farm event locations for future contact. When reviewed, these growing locations will be incorporated into the Arizona Specialty Crops Map.

A discussion was held between tech expert Ryan Clark (who stopped working for the Arizona Geological Survey (AZGS) in December 2013), Mike Conway, and Rowena Davis to discuss potential specialty crop map layouts and the optimal ways for building and hosting the map. Guidelines were established as follows:

- the map will contain layers for each specialty crop;
- Each layer will contain growing locations (farms) and locations for procuring that crop (distribution locations);
- Restaurants that purchase the crop directly from the grower are included as distribution locations and will be specially marked as restaurants when available;
- Farmers markets that operate as distribution locations will be included;
- Events will be specially marked;
- Information contained in map pop-ups on growing locations include hours of operation, photo (if available), address/location and link to website (if available);
- “Added value” pieces that will appear outside the map but are tied to a particular map layer are under discussion.

Map layers will be added as the crop web pages are unrolled. The timing for unrolling crop pages coincides as closely as possible to a crop’s harvest and seasonal availability.

Filming the 2nd Annual Medjool Date Festival. On November 15-16, Davis and Arnulfo Bermudez traveled to Yuma, Arizona to film the Second Annual Medjool Date Festival, spending one night in Yuma to film the festival when it started at 8:00 a.m. The result will be a 5-minute video showcasing and promoting the festival. Davis acted as primary coordinator, conducting interviews, getting permissions, and scheduling people and staging the shoot. Bermudez operated the camera. Pre-festival research led to enough information to create several pages dedicated to dates. Festival interviews were fruitful and interesting, with great footage of date growers, members of the Bard Valley Date Growers Association, the Yuma Heritage Festival Coordinator, and festival attendees, as well as a trip to Date Pack, the world’s largest date packing facility. Pre-festival interviews involved members of the Bard Valley Date Growers’ Association.

Reviewing the festival footage and drafting a creative brief resulted in a script that focuses on: 1) the significance of dates to Arizona agriculture; 2) the local population’s celebration of this crop; and 3) local population’s efforts to raise awareness about dates in the region.

Subsequent festival filming will be structured in much the same way. In addition, each video will define what constitutes a “specialty crop” and will emphasize the “specialty crop” status of that commodity.

Upcoming Events. In late November/ early December, I contacted organizers of the Oro Valley Farmers Market, which is part of the Heirloom Farmers Market, the group which has hosted the small Citrus Festival at the Oro Valley Farmers Market every January that we proposed to cover in the grant application. The coordinator was unsure that the citrus festival would take place that year but that efforts were being made to promote a large festival in Tucson called “Viva La Local,” which covered many crops.

With the status of that festival uncertain, efforts were made to locate another suitable lemon festival. A search returned the “Arizona Parade of Golden Fruit and Nuts Carnival,” a promotional group active around the Southeast Valley (Gilbert-Chandler area) but attempts to contact this organization were left unreturned.

In December, a suitable page layout and required information for the eleven specialty crop pages was drafted. Components of each specialty crop page include:

- Basic statistics
 - average total production (yield) in Arizona
 - total acreage in cultivation (avg. since 2009)
 - average water use per acre
 - total number of farms
 - average size of farm
 - significant changes in production over the past ten years
 - number of people employed by industry
- Harvest season/growing process
- Description of agricultural history in state
- Description of facilities or businesses built as a result of the cultivation of this crop
- Slideshow: Crops and farms or – a year in the life cycle of a crop
- Video (AZGS Original) history and festival/local awareness;
- Description of crop-related event(s) – brief
- Recipe: crop recipe or other use (with image);
- Map showing crop distribution in Arizona (static image of layer and link to map)

Goal: Collect and compile information on specialty crops, farmers markets and AZ restaurants (October 2013- March 31, 2014)

Status: On Schedule (see above) – specialty crops and farmers markets information has been compiled; AZ restaurants that utilize specialty crops from local farms have not been compiled but will be when contact is made with the farmers to ask for pictures and additional information.

Goal: Lay Out Pages (October 1- December 31)

Status: On Schedule. Web page structure and the information to be conveyed on each page has been determined. In addition, the main components of the Arizona Specialty Crop Map has been discussed. However, very little actual crop information beyond growing locations has been compiled. The majority of this information will be gained when AZGS starts to build the Arizona Specialty Crops Map and begins to contact individual farmers.

Goal: Start Building Pages

Status: Behind Schedule – As of December 31, no pages have been built on the Arizona Experience website that pertain to specialty crops. However, the necessary information and required contents are largely in place.

Goal: Schedule and film applicable festivals (October 2013-June 30, 2014)

Status: On Schedule - Not only has the Medjool Date festival been filmed, but footage has been evaluated and a creative brief and script have been generated that will establish the general format and information parameters presented for each crop festival video.

Goal: (Project Outcome) engaging over 1,000 participants in discussions and activities on specialty crops and related agritourism.

Status: We have received film waivers from 15 festival participants and have personally spoken with at least 20 others during the Second Annual Date Festival in Yuma.

Our chief collaborators, the Arizona Farm Bureau, played a significant and important role in making initial contacts and gathering information on a number of Arizona farms and distribution locations. Arizona Farm Bureau and Fill Your Plate provided information on growing locations for all selected specialty crops. However, personal contact has been minimal. It is expected to increase in subsequent quarters. The Bard Valley Date Growers Association and the Yuma Visitors Bureau have both been very helpful in providing material, interviews, media, and information for the Medjool Date video.

Second Quarter (Jan. 2014 – Mar. 2014) Activities:

Discussed project needs and parameters, including specialized specialty crop statistics, with the Arizona Farm Bureau. Statistics for their crop census, completed every 5 years, are coming out in May. The Arizona Experience is waiting until that information is published to have the most current information possible for use on the specialty crop pages. (Information includes: crop yields, average total production and average small farm production. In discussion with the Arizona Farm Bureau on benefits of getting a Special Request for information on farms under 10 acres producing specialty crops. This information will be used on individual web pages and on the crop map.)

Added over 25 more addresses and potential sites to be featured on the specialty crop map to the total crops (new source: Good Food Allies Good Food Finder)

Traveled to Yuma to film two days of the Yuma Lettuce Days festival. Created creative brief and started reviewing footage.

Connected with personnel at Local First to seek a list of restaurants and other distribution points for specialty crops grown by local farms to be featured on the map and recipes to be featured on the website.

Construction of internal map architecture and population with farm location, crop, and distribution point information that will be imported to a mapping program when map appearance and details are decided upon.

Further researched possibilities and templates for map appearance. Have narrowed map down to two choices but are establishing extent to which customization is possible.

Comparison:

Construction of pages has not yet occurred, though more information has been gathered.

Construction of the map has not yet occurred.

One additional (relevant) festival has been filmed ahead of schedule.

Partner Contributions:

Intended: Arizona Farm Bureau to give us specific statistics upon request once they are released in May. Local First Arizona to supply names and information of distribution points.

Progress Toward Outcomes:

Baseline target was to feature 31 You Pick Farms on a specialty crop map. By adding farms with Farm Stands and country stores (though they do not offer U-Pick Options, they are still a specialty crop agritourism destination) we increased the number to 37 PLUS 30 wineries.

In addition, the project is ahead of their filming schedule by 2 videos. This shift in initially stated accomplishments occurs for two reasons. 1) It's good to get footage as soon as possible so we aren't gathering information at the last minute, especially when these events occur only once a year. 2) We are waiting for the new crop census from the Arizona Farm Bureau to present the most current information, so while we are behind schedule with page building, work continues on the project at a steady pace.

Targets:

No targets have yet been achieved.

Third Quarter (Apr. 2014– June 2014) Activities

In Q3 the team traveled to and recorded two crop festivals, the Southeast Arizona Winegrowers Festival held at Kief-Joshua Vineyards in Sonoita (April) and the Lavender Festival held at Red Rock Lavender Ranch in Concho (June). Footage from the events has been transcribed, and a script for the Winegrower's festival is in the final stages.

This quarter, the project manager and outreach chief worked extensively with two GIS specialists to discuss map options and produce a prototype, or beta, specialty crops map. Internal goals are to produce two or more maps, including a separate Wine Trail map (reported goal is to create one map) to best represent the eleven specialty crops specified in the project.

AZGS made strong connections with partners this quarter, including outreach to the Arizona Winegrowers Association to collaborate on a separate wine trails map, outreach to the Arizona Department of Tourism to promote videos and map when it is ready, and outreach to Local First to discuss using their connections to create a map of local restaurants who use specialty crops in their menus and farmers markets where specialty crop items are available.

Goals/Targets:

Goal: Schedule and Film Applicable festivals

Status: On Schedule – Wine and Lavender Festivals have been filmed. These are the only two festivals scheduled to occur during Q2.

Goal: Edit and Produce Films

Status: On Schedule – Footage of Medjool Date Festival, Yuma Lettuce Days, Southeast Arizona Winegrowers Festival, and Lavender Festival has been labeled and transcribed. Final script for Medjool Date festival is produced, Arizona Winegrowers Festival script is being edited, and scripts for Lettuce Days and Lavender Festival are in early stages of production.

Goal: Internal testing of Specialty Crops Map

Status: On Schedule – Beta version of specialty crops map has been produced. The map depicts the location of all verified U-pick farms and farm stands in Arizona selling the following specialty crops (medjool dates, romaine lettuce, lemons, honey, lavender, olives, apples, pumpkins, chili-type peppers, and sweet corn) with information including hours of operation, crops available (for multiple crops), and directions to the farm from the user's location (this was not listed in original goals). The map is designed to be used on mobile devices as well as computers.

The team is working on outreaching to farms to gather images, setting a timeline feature to the map to denote crop seasonality and availability due to times of year, and creating original icons for the map.

In addition, the team will create a wine trails map in collaboration with the Arizona Winegrowers Association (who represent the Verde Valley as well as the Sonoita and Willcox area winegrowers) to depict the location, hours, and nature of sources of Arizona wine agritourism experiences.

Goal: Build Web pages

Status: Behind Schedule – Layout for pages has been established, as has place and presentation on the site. Page elements such as images and information are being gathered but construction has not started on the pages yet due to the urgent status of other agency projects. The team does not see this as a serious threat to the established schedule, as collection of the page elements are the most important part of constructing a page.

Goal: (Project Outcome) engaging over 1,000 participants in discussions and activities on specialty crops and related agritourism.

Status: Since Q1 we have filmed over 100 participants in discussions and activities on specialty crops and related agritourism.

Partners:

AZGS has formed a new partnership with the Arizona Winegrowers Association to collaborate on an interactive map for locally produced wine oriented agritourism experiences (tasting rooms, wineries, and vineyards). The AZGS is producing a contribute form that the Winegrowers Assn can use to collect and input information collected by the Winegrowers Assn. The elements of the contribute form were developed in collaboration with the Winegrowers Assn.

Arizona Local First has agreed to send out a request to their contacts soliciting information from restaurants who use locally produced specialty crops in their menus and remains interested in helping in any other way they can.

Progress Toward Outcomes/Extension Goals:

Outcome of construction of an interactive map that shows the location of at least 31 agritourism opportunities is in the final stages of construction after the first round of testing. The project expects to exceed the minimum requirements of this map by creating at least two crop maps (one featuring over 31 agritourism opportunities and one featuring AZ wineries, tasting rooms, and vineyards), extending the interactive features on the map to include directions from unique location and a time feature that depicts seasonality of a crop. In addition, the team is engaging new collaborative partners of the Arizona Winegrowers and discussion of promotional uses with the Arizona Office of Tourism. Engagement during the four festivals from Q2-Q3 has resulted in an additional 100 participants being filmed talking about specialty crops and the festival.

Fourth Quarter (July 2014 – Sept. 2014) Activities:

In Q4, the Arizona Experience (AE) team filmed three additional crop festivals: the Camp Verde Cornfest in July, the Apple Harvest at Apple Annie's in early September, and the Salsa Fest (related to chili-type peppers) in late September. In July, we traveled from Camp Verde to Flagstaff to scout for farmers markets and festival opportunities.

The team was not able to secure a spot to present the Specialty Crop map at the Arizona Office of Tourism, but we were able to present a "soft opening" of the map to Arizona's STEM educators and innovators at a booth at the Arizona Innovation Summit on August 14. The Summit is a collaboration between the Arizona SciTech Festival, the MIT Enterprise Forum Phoenix, and the Arizona Commerce Authority. We chose to present the map at this venue because it offered us a chance for informal feedback from both the business community and the education community. The Arizona Experience site not only showcases the state's tourism opportunities and its business and enterprise; it is a valuable resource for educators. Since its inception, the site's creators have strived to present material, especially interactive material that is both engaging to the general public and in the classroom. Some of our pages contain companion lesson plans that have been approved by the Arizona Department of Education; in fact, our existing section on agriculture contains both downloadable crop cycle handouts and a lesson plan about eating fresh, local foods. With the development of the specialty crop map, we intend to leverage our position as a resource for educators to promote the map's use in the classroom as a tool for where students and their families can go to eat locally and learn more about local agriculture, as well as where teachers can find field trip opportunities for hands-on education. Educators and innovators both seemed interested in the potential use of the map we have constructed. By far the most positive feedback we received was on the map's ability to create a route from your location, which can be viewed on a mobile device and thus act as a navigational tool. Educators were also impressed by the listing of field trip opportunities. Both suggested adding Farmers Markets as a supplemental layer. We hope to work with, or at least gain feedback from, the Arizona STEM educators in the deployment and use of the Specialty Crop Agritourism Opportunities Map.

In addition, we have deployed a fillable form to all the Arizona winegrowers. This form lets them create a login and independently add their information and images to a master database, which will then be deployed by appearing as points in the Arizona Wine Regions map constructed by the Arizona Experience. After consulting with the Arizona Winegrowers coordinator, Patti King, it was agreed that the most efficient way to round up the information and maintain it was to put control of the information into the hands of the winemakers and business owners themselves. This has the advantage of saving administrative time and keeping hour or product changes at the businesses up to date and dynamic.

Partners

Partner contributions this quarter were from the Arizona Winegrowers for input on the Wine Regions form, and outreach opportunities discussed with the Arizona SciTech Festival and various STEM educator groups.

GOAL: Schedule and film applicable festivals

Status: On Schedule – Filmed the Camp Verde Corn Fest (July), Apple Annie’s Apple Harvest festival (Sept 6); and the Graham County Salsa Festival (September 27-28).

GOAL: Release Crop Map and garner user feedback and traffic

Status: Somewhat on schedule – Map is undergoing “soft release” and early user/tester feedback gathered, but has not been deployed or unveiled with press promotion. Official release is held off as we search for opportunities to work with the Arizona Office of Tourism and other relevant agencies to garner the most press and interest.

GOAL: Release Specialty Crop Profiles

Status- Behind Schedule- Cyberinfrastructure for pages has been created and information has been compiled, but release is held off, again for reasons related to press and attention.

GOAL (not originally included in project proposal): Prepare additional Wine Regions map

Status: On schedule – more or less. Basic cyberinfrastructure for map has been created and features have been selected. Online fillable form has been deployed to winegrowers.

GOAL - complete rough cut of date video

Status: On Schedule- Rough cut has been completed and is being honed and polished.

GOAL: Complete script for Lettuce Days and Lavender Festival

Status- On Schedule- Video content has been curated and best clips have been isolated.

Progress Toward Outcomes/Extension Goals:

We have made great progress toward gathering information and footage and constructing the cyberinfrastructure necessary to deploy a successful project. We are making both expected connections within the tourism and agriculture communities and are branching out to gain traction within the educational community. We look forward to debuting the map to more feedback—and more potential partners and publicity in the tourism industry on November 16, 2014.

Problems and Delays

First Quarter (Oct. 2013 – Dec. 2013) Activities:

Challenge: So far, the project's major challenge has been its inability to locate a citrus festival to celebrate lemons. The Oro Valley Lemon Festival has been put off indefinitely. This has occurred because the Heirloom Farmers Market (typical producers of the Oro Valley Citrus Festival) is working on a much bigger festival called Viva La Local occurring in Tucson in April 2014.

Solution: Negotiating with the Heirloom Farmers Market (typical producers of the Oro Valley Citrus Festival) to incorporate lemons into the Viva La Local festival occurring in Tucson in April 2014. This is a new crop festival; therefore was not included in the initial grant proposal, but conversations with the Heirloom Farmers Market personnel indicate that this festival will be a significant display of local crops and local vendors and deserves coverage.

So far, all stated objectives seem reasonable.

Second Quarter (Jan. 2014 – Mar. 2014) Activities:

Delays:

The AZGS dedicated mapmaker designated for the project is leaving her job, so she will not be constructing the map.

The anticipation of brand new, current crop data to be released in the May 2014 crop census will offer relevant and incredibly up to date information. This is not a problem – indeed, it is an asset – however, it does mildly offset project timing. We still believe we will be able to make all stated deadlines at this time.

Mitigative Actions:

Detailed discussion with the mapmaker in terms of best ways and options to proceed and are scheduling meetings with other mapmakers. AZGS still has the skill set to build an original map. We are evaluating the transfer of equivalent personnel hours and exploring options that allow for the construction of a customized map in ArcGIS online, weighing the benefits of each option while we decide exactly what we want the map to convey and how we want it to function. We are constructing a general spreadsheet to collect as much information as possible in a format that can be readily exported to a mapping program.

We are moving forward with filming, scripting, and developing crop festival films to move forward with work in other areas.

Outcomes:

On schedule

Third Quarter (Apr. 2014 – June 2014) Activities:

Census information was not as detailed as anticipated. Due to the inability to see the amount of crops grown by county, the map is unable to feature a breakdown of specialty crop acreage by

county. There may be limits on additional single crop information due to the lack of detailed census data. The map has compensated for this lack of data by adding the additional features of 1) interactive unique direction to a point on the map from user location 2) adding a seasonal timeline to map.

Targets are still attainable.

Fourth Quarter (July 2014 – Sept. 2014) Activities:

Delays/Challenges:

Due to some internal construction issues, it was necessary to go through several iterations of the fillable form to make the wine map deployable to outside users. We were put somewhat behind schedule in deployment of the form though it has now been deployed and appears to be problem free. In addition, initial test results of the form's usability were minimal. We expect that it will be challenging to engage winegrowers to fill out the form. To mitigate this, we are prepared to schedule space at their annual event or look into other opportunities to present to them in person the benefits and necessity of filling out this form and offer them a summary of the finished product and a demonstration of the map's capabilities.

Future Project Plans

As our relationships with the agricultural community develops, we look forward to working more with the education communities in addition to the tourism and agribusiness communities for promotion and dissemination of the Agritourism Opportunities map. We anticipate finishing up filming festivals, focusing on script and video production, finalizing pages and gathering partners and press opportunities to promote the Agritourism Opportunities map and crop pages.

- Present project, including Agritourism Experiences Map, to Arizona Office of Tourism on November 16, 2014
- Seek press partners (from tourism, education, and business) for deployment of Agritourism Experiences Map
- Finalize videos and deploy specialty crop pages
- Deploy Agritourism Experiences map
- Measure the Agritourism Experience Map traffic
- Promote Agritourism Experience Map and specialty crop pages
- Report on results

Funding Expended To Date

A total of \$33,702.86 has been expended as of September 30, 2014.

Arizona Agriculture: Bee's Amazing Adventure

This project was completed on September 30, 2014²

Project Summary

Arizona Agriculture: Bee's Amazing Adventure is a children's literature book that brings farming and ranching in the Grand Canyon state to life, exploring the state's rich agricultural

² On April 1, 2014, a timeline extension to September 30, 2014 was granted by the ADA to the sub-grantee.

diversity through the eyes of Pee Wee Bee. Delighting elementary-aged children as she flits from field to field, Pee Wee shares fascinating facts about agriculture that stimulate young minds, helping school children understand the integral role that agriculture plays in Arizona's economy. Filled with carefully researched information and eye-catching photography. *Bee's Amazing Adventure* is a trusted classroom and library resource that interactively captures the essence of Arizona agriculture with emphasis on the specialty crop industry.

Arizona Agriculture: Bee's Amazing Adventure will be utilized for many years during the University of Arizona College of Agriculture and Life Sciences Cooperative Extension's (UA CALS CE) Agriculture Literacy Days program. This book was written because there was no elementary level children's book about Arizona's agriculture industry.

Project Approach

During AZ Ag Literacy Days, individuals involved in the agriculture community volunteer to go into one or more classrooms during the school's fall quarter with special emphasis during the three school days prior to Thanksgiving. Every teacher that has a volunteer go into their classroom to read the book receives a copy for their classroom library. Volunteers are encouraged to bring in items representing their agriculture operation. For example, a beekeeper may bring honey sticks or a nurseryman may bring in plants. This practice is called "multi-sensory learning" and research shows the comprehension of students is increased.

The concept of using an outside speaker with visual aids should increase the student's knowledge about, and consumption of Arizona's specialty crops. Volunteers in AZ Ag Literacy Days were asked to collect benchmark data on the students. This included a pre-test documenting student knowledge about and consumption of specialty crops. Participating teachers then administered a follow-up consumption survey to the students one week after the volunteer had read the book in class.

Monica Kilcullen Pastor, Associate Programmatic Area Agent, UA College of Agriculture and Life Sciences Cooperative Extension (UA CALS CE): Served as PI on the grant facilitating the writing, editing, and publishing of the children's book; coordinating the development of marketing materials including book marks, flyers, website, and book trailer with the publisher; sharing the process of publishing a children's book at one National Conference; and coordinating the interactions with the partners.

Brandon Moak, Program Coordinator, Sr., UA CALS CE: Served as AZ Ag Literacy Days Program Manager to coordinate day-to-day logistical functions of the program, working with volunteers and teachers; as technology expert to facilitate streamlined communications with educators, develop and implement effective electronic evaluations, and coordination of reports.

Five Star Publishing, Linda Radke, President: Providing award-winning book production, consultation and marketing services, the Five Star team assisted UA CALS CE with editing, publishing, printing, website development, logo design and corporate/product branding. Setting the bar for industry excellence, Five Star Publications and Little Five Star are recognized as leaders in creativity, innovation and customer service.

Goals and Outcomes Achieved

UA CALS CE coordinated efforts with the authors, Maricopa County Farm Bureau (initial funder), and the publisher in the development of the children's book. This included input into the book layout, photos, website design, Facebook page, and securing book endorsements.

Twenty-five volunteers registered to read a digital version of the children's book to 104 classrooms throughout the state as part of the 2013 Arizona Agriculture Literacy Days. Almost 3000 students participated in the event. Books were mailed to each of these classes once it was printed. On September 23, the 2014 AZ Ag Lit Days began receiving volunteers' registrations to visit and read in classrooms during this fall quarter (October 20 – December 19). As of October 30, a total of 18 volunteers had registered to read in 59 classrooms of which 12 have already received a visit. Data is still being gathered to determine the number of students reached thus far and will continue to be gathered to determine the overall number of volunteers, classrooms, and students. This data will be compiled at the completion of the 2014 AZ Ag Lit Days which is after the required submittal date of this report.

Received and analyzed data from volunteers and teachers for the 2013 AZ Ag Literacy Days. **(See Appendix A)** Results indicate that students' knowledge regarding Specialty Crops grown in Arizona increased significantly for five of the seven commodities (lettuce, melons, nuts, citrus, and eggs).³ There was no significant change in students' knowledge regarding chile peppers or honey. A possible explanation for this is that students were already aware that chile peppers were grown in Arizona. It may also stand to reason that children struggled to conceptualize honey as a commodity grown in Arizona due to it not living or growing as do the other commodities. There was no significant increase in students' consumption of Specialty Crops. This may be due to the fact that students have very little decision making in what food is brought into their homes. What youth choose to eat may be more reflective of the eating habits of the adults in their lives. It is conceivable that students' desire to eat specialty crop foods did increase, but that these foods were not made available to the students.

The book has received two awards and applications have been submitted for additional awards. It was named a finalist in the USA Best Book Awards in the *Children's Educational* division. It was also awarded the *Story Monster Approved* designation from a judging panel comprised of youth. Award applications have been submitted to garner additional recognition. Applications, along with copies of the book, have been submitted to One Book AZ; 2014 Animals, Animals, Animals Book Festival; and the Children's Book Council for three categories: Outstanding Science, Notable Social Studies, and Children's Choices. The book was selected for the Children's Book Council Hot Off the Press program and was featured on their website homepage on 9/2/2014. Publisher's Weekly listed the book in their news article about new children's books for Fall 2014.

Several notable individuals voluntarily submitted endorsements of this book. Two are prominently displayed on the back cover. They include the Honorable Jeff Flake, United States Senate, Arizona and Dr. Denton Santarelli, Superintendent of Peoria Unified School District and

³ Eggs were included in the list of specialty crops submitted in the State Plan. It appears that this error was missed by both the ADA and AMS and was not communicated back to the sub-grantee. Therefore, the survey in Appendix A included questions and results for eggs as though they were a specialty crop.

ASA Superintendent of the Year in 2012. Other individuals include Carolyn Warner, founder and president of Corporate Education Consulting and former AZ Superintendent of Public Instruction; Lella K. Martin, elementary school teacher; and Susan Maland, administrator of academic support, past principal, and English department chair for Glendale Union High School District.

The book has been promoted through a variety of digital media, which includes the book's website (arizonaagriculturebook.com), the Book Trailer (<https://www.youtube.com/watch?v=biA6DacnisM>), the book's Facebook page ([ArizonaAgricultureBeesAmazingAdventure](#)), and a spot on PBS children's show, *Super Why!* which aired November 6, 7, and 10-12. Additional promotional materials include pre-order and order flyers and order forms which are displayed in the front office of UA CALS CE in Maricopa County, and these, in addition to book marks and pencils, are distributed at educational events and during educational presentations. An ad has also been placed in Bear Essential News' November issue: *Farm-to-Face: Where Does My Food Come From*.

The educational events and presentations in which the book was promoted include the Tucson Festival of Books with approximately 1000 visitors to the booth over two days; five Farm-City Partnership breakfasts with over 300 attendees; school garden event in Bullhead City, AZ; National Farm to cafeteria Conference; Dia de Los Niño's with over 500 visitors to the booth; American Association of Agricultural Educators Conference; SNAP-Ed Partners conference; Summer Agricultural Institute; and three School Garden Food Safety trainings.

Beneficiaries

School children and their teachers are the beneficiaries. In 2013 during Arizona Agricultural Literacy Days, twenty-five volunteers read the book in 104 classrooms. It was reported that approximately 3,000 students participated. In 2014, during Arizona Agricultural Literacy Days, thirty-one volunteers read the book in 101 classrooms. It was reported that approximately 2,626 students participated. These audiences now have access to accurate information with appropriate photos about Arizona's agriculture industry.

More than half of the book discusses specialty crops. The main character, Pee Wee Bee, represents the bee industry and is featured throughout the book. The book narrative encompasses thirty-two pages. Specialty crops are either mentioned or used in photos on pages 7, 21, and 28. Specialty crops are discussed in detail, including facts and photos, on pages 10 – 15, 20 – 23, and 30 – 32. The listed specialty crops are bees/honey, lettuce, pistachios, pecans, melons, chile peppers, citrus, nursery plants and eggs.

Individuals who read the book are able to expand and enhance their knowledge about the specialty crop industry in Arizona with the hope that they would increase their consumption of these products that are locally grown in our state. This would therefore help increase the sales of commodities of those individuals in the industry.

Lessons Learned

Coordinating approval of narrative changes, photos, and layout from the authors and the initial funders caused unanticipated delays in the publishing timeline. Writing a children's book is also

a challenging task. It necessitates the explanation of a complex industry in very few words that are understandable to elementary grade readers while displaying informative, accurate photos that encompass Arizona's dynamic agriculture industry.

The projection to reach 200 classrooms each of the two years was very optimistic. It was surmised that the volunteers were not comfortable using the electronic version of the book in 2013. Only 104 classrooms were reached in 2013. Volunteers are still being solicited for the 2014 AZ Ag Literacy Days so classroom numbers are not yet available.

Contact Persons

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Additional Information

A copy of *Arizona Agriculture: Bee's Amazing Adventure* and a media kit were sent by the Publisher, per the contract, to the following: Publishers Weekly, Green Teacher, Scottsdale Public Library System, Scholastic, Kid Lit Reviews, Independent Pub magazine, Reader Views Kids, KidStop toys, Yikes! Toys, The Bookworm store, Children's Museum of Phoenix, Phoenix Zoo, Readerlink Distribution Services, LLC, Social Studies School Service, Booklist - American Library Association, Raising Arizona Kids Magazine, Foreword Magazine, School of Arts & Sciences, Gardner's Book Service, Treasure Chest Books, American West Books, Inc., Barnes & Noble, National Geographic KIDS, Arizona State Library, Holly Henley, Arizona State Library, Irene Garnett, Tamera Thornton, Arizona Republic, School Library Journal, Portland Book Review, Grade Reading, and Southwest Books of the Year.

Arizona Grown Marketing Efforts Phase 3

Activities Performed

First Quarter (Oct. 2013 – Dec. 2013) Activities:

- R&R Partners has begun work on Phase III of the continuing AZ Grown efforts to increase visibility and awareness of the importance of buying local produce and plants in Arizona.
- The following items were accomplished by Dec 31, 2013:
 - Digital billboard placement, cost and contracts were finalized in December. The campaign will run for 10 weeks starting on January 27th. The boards are in the Canyon network and they will provide two additional to-be-determined spaces as bonus locations per week.
 - Facebook content calendars were created for December and January and sent to Cory Lunde who takes care of the posting.

Second Quarter (Jan. 2014 – Mar. 2014) Activities:

- R&R Partners is continuing work on Phase III of the AZ Grown efforts to increase visibility and awareness of the AZ Grown product label.
- The following items were accomplished by the end of March 2014:

- Digital billboards began running across the Valley on January 27, 2014 and ended on April 6, 2014, completing a 10 week run. Facebook content calendars were created for February, March and April and were sent to Cory Lunde who takes care of the posting.
- R&R Partners will continue to provide Facebook content and posts through the remainder of the year per Phase III scope.

Third Quarter (Apr. 2014 – June 2014) Activities:

- 72 Arizona Grown fruit and veggie stress balls were distributed to teachers and presenters at the Summer Agricultural Institute (SAI). SAI is a five-day tour designed to teach K-12 teachers about Arizona's agricultural production and help them incorporate that knowledge in the classroom curriculum. SAI combines hands-on learning about agriculture with practical curriculum development. Teachers receive Arizona Specialty Crop Lessons which includes 30 lessons written by 16 Arizona teachers. All lessons teach about Arizona's specialty crop industry and have been aligned to Arizona's Academic Standards. Each lesson encompasses more than one subject area. This is a great opportunity for teachers to learn about Arizona's fruit and vegetable production and to pass on that knowledge to the children in their classrooms.
- The Arizona Nursery Association held their Strategic Planning meeting in June and 20 AZ Grown fruit and vegetable stress balls were distributed to the attendees.
- The AZ Grown Phase III campaign consisted of digital billboard placement throughout Maricopa County and daily Facebook content and posts. The billboard campaign not only continued to raise awareness of the AZ Grown brand but also drove increased visitation to the AZ Grown website. March 2014 saw the highest amount of monthly visits with 432 sessions. July 2014 brought in 87 visits which means the billboard campaign pulled an 80% increase of traffic to the website.

From the start of the campaign through the post-campaign summer months (January 2014 – July 2014), we have seen over 4,000 page views with 1,411 unique users viewing the page. The majority of this traffic was during the run of the billboards this spring.

These numbers are impressive because we did not have digital online banners or advertising to initiate click-throughs to the site. We had to rely on mental recall of the website URL and the action of users typing it in manually following their commute. Each session (actively engaged viewers) averaged 2.42 page views and viewers average session time was 1:32. In addition, nearly 84% of visitors during the billboard campaign were new with only 16% being returning visitors. This means the increase of brand awareness was significant.

In addition to the website performance, Facebook also continues to perform well with very high engagement numbers. Since the turn of the New Year, Facebook likes have increased by 108 followers (fans). We are nearing 2,000 total fans since our effort began two years ago.

Audience Overview

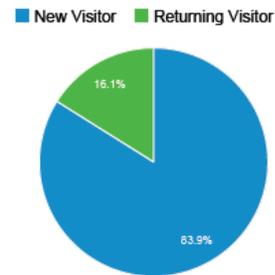
Jan 1, 2014 - Jul 17, 2014

All Sessions 100.00%
 + Add Segment

Overview



Sessions 1,672	Users 1,411	Pageviews 4,052
Pages / Session 2.42	Avg. Session Duration 00:01:32	Bounce Rate 52.15%
% New Sessions 83.91%		



Total Page Likes as of Today: 1,865



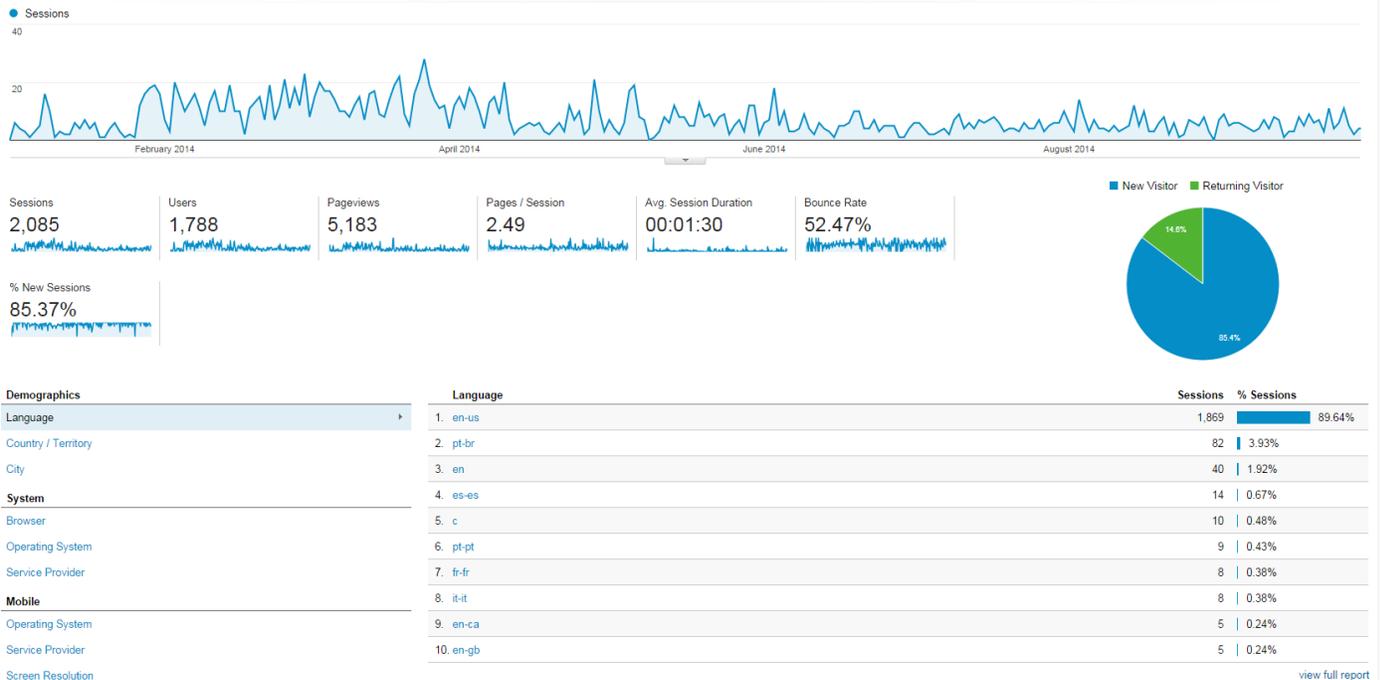
BENCHMARK
Compare your average performance over time.
Total Page Likes

Fourth Quarter (July 2014 – Sept. 2014) Activities:

To date, we had 5,183 page views with 1,788 unique users viewing the page. The majority of this traffic was during the run of the billboards this spring which shows how well the billboards worked to drive interest to the site.

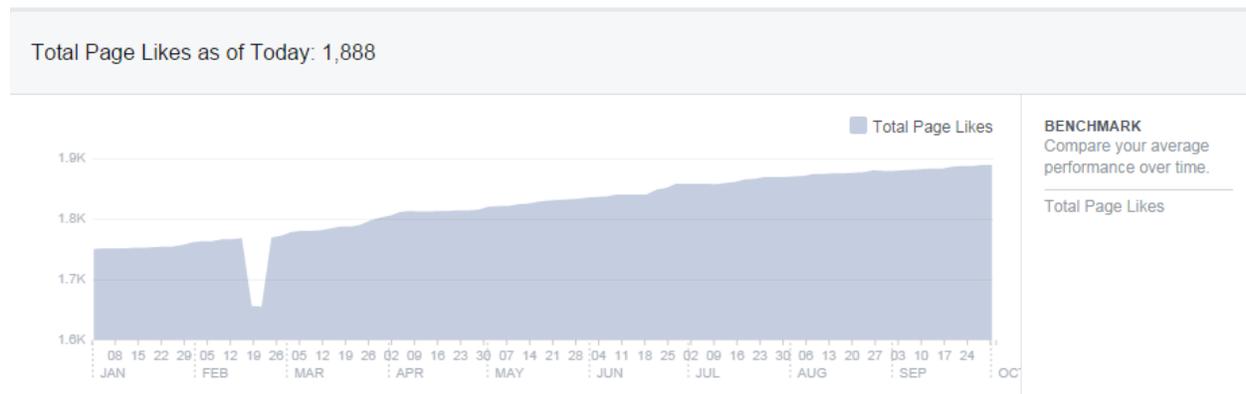
The website numbers remained consistent as we moved into Q4 of the campaign against our Q3 report, due to a lack of additional advertising. Below are the numbers throughout the last 9 months campaign:

- Each session (actively engaged viewers) averaged 2.49 page views
- Average session time was 1:30
- 84% of visitors during the billboard campaign were new with only 16% being returning visitors. This means the increase of brand awareness was significant.

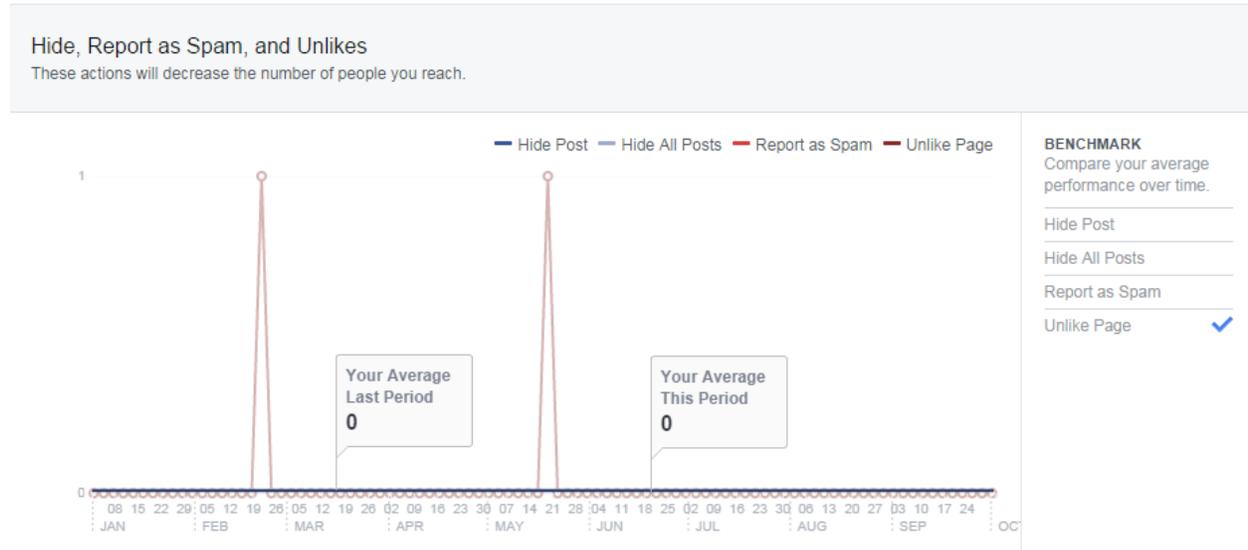


Facebook performed well with high engagement numbers.

Since the turn of the New Year, Facebook likes have increased by 108 followers (fans). We are nearing 2,000 total fans since our effort began two years ago. These fans are ultimately our brand ambassadors and we should only continue to target and grow these numbers in the future.



Our level of opt-outs (unlikes) is extremely low. Only two people unliked us during this campaign. This statistic is simply unheard of and speaks to the high quality of our content that is connecting with our group of fans we have engaged with. It is one thing to gain a fan, but it is harder to keep them and our effort to maintain our audience is exceeding our expectations.



Concerning content, quotes about plants and produce seem to perform the best overall though season-specific events or callouts can really spike interest. Note that the event and seasonal posts usually receive a bump because of the tag that is included which is gaining a new audience from the event host, distributor or whole-seller which is why the quote posts take the cake as having the most engagement amongst our followers. We should continue to build more on these types of posts moving forward. Our most engaged posts were on August 8th (Peaches in season) which reached 658 people and April 30th (Inspirational quote) which reached 649 organically.

Post Details Reported data may be delayed up to 30 minutes. X

Arizona Grown
 August 8 · Edited (9) · 🌐

This weekend, experience Peach Mania 2014 at Apple Annie's Orchard! Before picking your own, start tomorrow with an "All-You-Can-Eat Peaches and Pancakes Breakfast" from 7:30 a.m.-10:30 a.m. Event details here: <http://www.appleannies.com/weekend-events/>

658 People Reached

74 Likes, Comments & Shares

55 Likes	17 On Post	38 On Shares
9 Comments	4 On Post	5 On Shares
10 Shares	3 On Post	7 On Shares

27 Post Clicks

2 Photo Views	6 Link Clicks	19 Other Clicks @
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NEGATIVE FEEDBACK

0 Hide Post	1 Hide All Posts
0 Report as Spam	0 Unlike Page

658 people reached Boost Post

Like · Comment · Share 👍 17 🗨️ 4 🔗 3

Arizona Department of Agriculture
Specialty Crop Block Grant Program
Agreement No. 12-25-B-1655

Post Details Reported data may be delayed up to 30 minutes. X

Arizona Grown
April 30 · Edited [?] · [?]

"Remember that children, marriages, and flower gardens reflect the kind of care they get." - H. Jackson Brown, Jr.



649 people reached **Boost Post**

Like · Comment · Share · 29 1 3

649 People Reached

48 Likes, Comments & Shares

40 Likes	29 On Post	11 On Shares
1 Comments	1 On Post	0 On Shares
7 Shares	3 On Post	4 On Shares

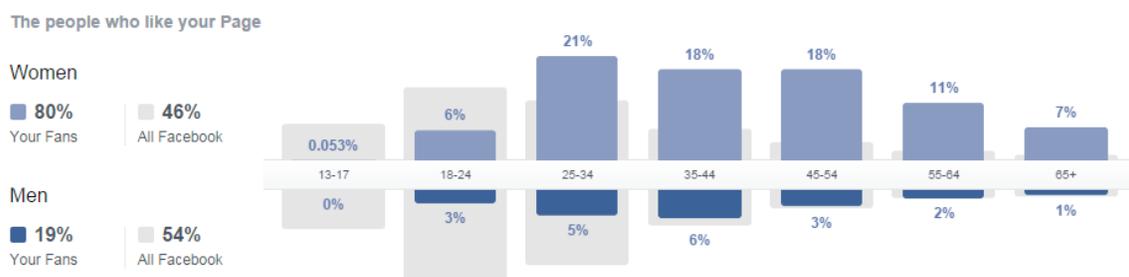
12 Post Clicks

10 Photo Views	0 Link Clicks	2 Other Clicks
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NEGATIVE FEEDBACK

0 Hide Post	0 Hide All Posts
0 Report as Spam	0 Unlike Page

Additionally, 80% of our fans are women so our content should continue to appeal to our highly female audience. Additionally, 25% are located in Phoenix which means downtown event content and information would be favorable with a high number of fans.



Country	Your Fans	City	Your Fans	Language	Your Fans
United States of America	1,843	Phoenix, AZ	578	English (US)	1,808
Mexico	6	Mesa, AZ	133	English (UK)	50
Morocco	3	Tucson, AZ	80	Spanish	9
Peru	3	Gilbert, AZ	75	Spanish (Spain)	4
Philippines	3	Scottsdale, AZ	74	French (France)	3
Canada	3	Tempe, AZ	69	Portuguese (Portugal)	2
Germany	2	Chandler, AZ	69	Romanian	2
France	2	Yuma, AZ	66	Indonesian	1
Pakistan	2	Glendale, AZ	53	Korean	1
Australia	1	Buckeye, AZ	46	Italian	1

Facebook continues to be the key to our success as numbers continue to grow, engagement remains high and our fans stay with us. What we are seeing is a slowdown in acquisition of new fans. This is due to the lack of Facebook advertising and promoted/boosted posts. Facebook promoted posts are an inexpensive way to boost our engagement and fans. As we eye our start date for Phase 4, we would recommend using some of the advertising budget for Facebook to continue to increase these numbers through 2015.

Problems and Delays

There have been no delays with this project.

Future Project Plans

Continue to develop Facebook posts, track and monitor Facebook and website traffic through the end of the year. Submit final report.

Funding Expended To Date

A total of \$104,633.10 has been expended as of September 30, 2014. This project went over budget by \$236.10. Because this is an internal ADA project, funds were transferred from our administrative budget.

Plant Something Campaign – Public Outreach III

Activities Performed

First Quarter (Oct. 2013 – Dec. 2013) Activities:

- Activities for this grant were delayed. See revised timeline below which was included in the sub-award agreement.

Project Activity	Who’s Responsible	Timeline
Development of Social Media Plan and Facebook Postings	ANA Promotion Committee working with R & R Partners	January – December 2015
Selection and Purchase of Paid Media Advertising	ANA Promotion Committee working with R & R Partners	March 2014– December 2014
Attending Public Events promoting the campaign	ANA Staff	May 2014 – December 2015 (as they occur)
Website Enhancements due to addition of state partners	ANA Staff working with State staff and Park & Co	January– December 2015 (as states sign on)
State Partner Promotional Activities	ANA Staff	January – December 2015
Survey member retail nurseries	ANA Staff	March 2014 and March 2015
Track television, radio and billboard information	ANA Staff working with R & R Partners	January – December 2015

Second Quarter (Jan. 2014 – Mar. 2014) Activities:

- Plant Something Marketing committee met to determine a marketing plan for the digital billboards which will run in the spring to encourage consumers to purchase plants and trees by sending them to the Plant Something website to locate their nearest retail nursery.
- Working with the advertising agency, selected artwork and place the advertising order for the digital billboards.
- Received many proofs and distributed them to committee members and received final approval for the billboards.

Third Quarter (Apr. 2014– June 2014) Activities:

- No specific work on this grant was done in these months as they are leading into the summer months. Spring advertising was completed last quarter and fall decisions have not been made yet for radio and billboards. Travel for state partners will also occur in August and October of this year, the fall quarter.

Fourth Quarter (July 2014 – Sept. 2014) Activities:

- Media prices were submitted however no advertising was run this quarter. Some ads will appear in November and then in Spring 2015.
- Conversations were held with many states trying to convince them to join Plant Something. It looks like California and Maine will join next quarter.
- Progress toward the goal of increasing state partners is happening with the current number of partners being 18, up from 12. Progress toward the goal of increasing the sales of plants and trees in the state has not been measured yet, however interest in the program is increasing and advertising is being placed therefore increasing the chances of meeting this portion of the grant's goal.

Problems and Delays

First Quarter (Oct. 2013 – Dec. 2013) Activities:

- No activity, will begin activity in March 2014 due to a previous grant taking more time to finish than expected. See revised timeline in Activities Performed.

Second Quarter (Jan. 2014 – Mar. 2014) Activities:

- Goals so far are attainable and we are on schedule with this grant.

Third Quarter (Apr. 2014 – June 2014) Activities:

- No specific delays have occurred, just waiting for the fall season to promote to consumers in Arizona. Also waiting for fall conferences to promote to other states for potential new partners.

Fourth Quarter (July 2014 – Sept. 2014) Activities:

- The committee decided to save funds for November and Spring 2015 purchases in order to use them in the most effective way.

Future Project Plans

- Media buy purchases
- Development of Social Media Plan and Facebook Postings
- Attend Public Events promoting the campaign
- Website Enhancements due to addition of state partners
- Survey member retail nurseries
- Track television, radio and billboard information

Funding Expended To Date

A total of \$51,484.90 has been expended as of September 30, 2014.

- Program income for Plant Something so far this year is from state partners paying their yearly renewal fee and totaled \$12,000. All program income will be spent on Plant Something programs for the state partners.

Breeding for Improved Nutrient Use Efficiency

Activities Performed

First Quarter (Oct. 2013 – Dec. 2013)

During this first period we initiated two greenhouse studies and one field study related to the objectives of this study. One greenhouse study was sampled and harvested during this period.

Second Quarter (Jan. 2014 to Mar. 2014)

A second field experiment was initiated this quarter. The other greenhouse study and the two field studies were sampled and harvested this period.

We talked about this project in conjunction with another at the Southwest Ag Summit in Yuma, AZ.

Third Quarter (April 2014 to June 2014)

Analysis of all soil samples collected in the 1st greenhouse study and 1st field study were completed this quarter. The soil samples from the second greenhouse study and 2nd field are in progress

All the tissue samples from the first greenhouse experiment and the 1 field experiment have been digested and are being analyzed now.

We talked about this project in conjunction with another at the Desert Ag Conference in Chandler, AZ.

Fourth Quarter (July 2014 to September 2014)

These field and greenhouse experiments generated thousands of tissue and soil analysis. We spent the entire summer completing these analysis.

Problems and Delays

First Quarter (Oct. 2013 – Dec. 2013)

There have been no delays in activities of this project.

Second Quarter (Jan. 2014 to Mar. 2014).

Due to winter rainfall we were delayed in planting the second field experiment. It was finally planted but a month later than expected when the field was sufficiently dry to re-work. We are now on schedule again.

Third Quarter (April 2014 to June 2014)

We have no delays in the soil analysis. We had some issues with the instrumentation for P tissue analysis. We will get this issue resolved and get back on track the 4th quarter.

Fourth Quarter (July 2014 to September 2014)

We had some laboratory instrumentation issues late in the third quarter and through the early part of the fourth quarter. These issues were resolved and much of the fourth quarter was spent on laboratory analysis. We also conducted rhizosphere pH reduction experiments during this quarter.

Future Project Plans

Chemical analysis are nearly complete. We are compiling the data for QTL analysis. We have no preliminary results ready to report as of this writing. We anticipate completing ATL analysis during fifth quarter and will have preliminary results.

We have outlined project activities in three workshop and field day activities to date. Total contacts have exceeded 70 individuals. However, as these QTL analysis are completed we will throttle up outreach activities. We anticipate interaction with over 85% of the lettuce industry when this study is completed.

Funding Expended To Date

A total of \$34,698.45 has been expended as of September 30, 2014.

Enhancing IPM in Arizona Vegetable Crops

Activities Performed

First Quarter (Oct 1, 2013 – Dec 31, 2013) Activities:

The objective of this project is to synergize the Universities outreach efforts in vegetable IPM by delivering and demonstrating IPM in high value, vegetable production systems. The Vegetable IPM Team continues to deliver new information to growers and PCAs throughout Arizona with the assistance of the extension educator who continues to organize and assist in a number of extension activities. Since October, we have prepared and delivered a total of 6 “Vegetable IPM Updates”. These updates are brief email messages that contain information on insect, weeds, diseases and market activities that are presently occurring in Arizona. These updates have been sent to PCAs, growers and other agribusinesses every two weeks since early January 2010 with

the support of SCBGP funding. The updates can be found at <http://ag.arizona.edu/crops/vegetables/advisories/advisories.html>. When we initiated our updates, our listserv had ~175 email addresses, and since that our list serve has increased to over 500 recipients. Other team activities during this quarter include several extension talks (6 CEUs), and involved participation in the Desert Crops Workshop held in El Centro on Dec 5, 2013. Our extension educator (Marco Pena) has also produced two new video demonstrations on various IPM topics. These videos can be seen at our new IPM Video Archive, <http://cals.arizona.edu/crops/vegetables/videos.html>. He continues to engage with numerous stakeholders soliciting input for identifying their IPM needs/priorities as well as feedback on the relevance of our deliverables.

Second Quarter (Jan 1, 2014 – Mar 30, 2014) Activities:

During this quarter, we have prepared and delivered a total of 9 “Vegetable IPM Updates” that contained timely information on insect, weeds, diseases and market activities that occurred in Arizona vegetable crops. The updates can be found at <http://ag.arizona.edu/crops/vegetables/advisories/advisories.html>. We added 15 new subscribers to our email listserv this quarter; now well over 500 recipients. Other team activities during this quarter include several extension talks (3 CEUs), and involved participation in the field day and seminars at the Southwest Ag Summit held in Yuma on Feb 26-27, 2014. Our extension educator (Marco Pena) has also produced one new video demonstration. These videos can be seen at our new IPM Video Archive, <http://cals.arizona.edu/crops/vegetables/videos.html>. He continues to engage with numerous stakeholders soliciting input for identifying their IPM needs/priorities as well as feedback on the relevance of our deliverables.

Third Quarter (Apr 1, 2014 – Jun 30, 2014) Activities:

During this quarter, we have prepared and delivered a total of 8 “Vegetable IPM Updates” that contained timely information on insect, weeds, diseases and market activities that occurred in Arizona vegetable crops. The updates can be found at <http://ag.arizona.edu/crops/vegetables/advisories/advisories.html>. We added 6 new subscribers to our email listserv this quarter; now well over 500 recipients. Other team activities during this quarter include several extension talks (10 CEUs) that included: 1) our annual UA Lettuce Insect, Disease and Weeds Losses Workshop in Yuma, 2) UA IPM Assessment Meeting at Maricopa AZ, and 3) AZCPA Desert Ag Conference, at Chandler AZ. Our extension educator (Marco Pena) has also produced one new video demonstration. These videos can be seen at our new IPM Video Archive, <http://cals.arizona.edu/crops/vegetables/videos.html>. He continues to engage with numerous stakeholders soliciting input for identifying their IPM needs/priorities as well as feedback on the relevance of our deliverables.

Fourth Quarter (July 1, 2014 – Sep 30, 2014) Activities:

During this quarter, we have prepared and delivered a total of 7 “Vegetable IPM Updates” that contained timely information on insect, weeds, diseases and market activities that occurred in Arizona vegetable crops. The updates can be found at <http://ag.arizona.edu/crops/vegetables/advisories/advisories.html>. Among the topics presented in these updates included: Management Guidelines for Whiteflies and CYSDV on Fall Melons, Bagrada Bug Management

on Desert Cole Crops, Plant Derived Chemicals as Disease Control Tools, Soil Solarization, Distinguishing Characteristics of Similar Summer Annual Grasses and Band Application of Herbicides. We added a number of new subscribers to our email listserv this quarter; now approaching 600 recipients. Other team activities during this quarter include several extension talks that included: a New Invasive Species Workshop in Yuma on July 24 (3 CEUs), 2. Our annual [Preseason Vegetable Workshop](#) in Yuma on Sep 4 (4 CEUs), 3. The DCOY Vegetable meeting on Sep 6 in Yuma (3 CEUs), 4. Syngenta Field Tour and Seminar in Yuma on Sep 29. Our extension educator (Marco Pena) has also produced one new video demonstration. These videos can be seen at our new IPM Video Archive, <http://cals.arizona.edu/crops/vegetables/videos.html>.

Problems and Delays

None.

Future Project Plans

We plan to continue the production of the Veg IPM Updates and associated pdf files. We will conclude several demonstration projects on fall melons (CYSDV) and leafy vegetables. We are currently scheduled to present at two Vegetable IPM Seminars in Yuma in November. We will develop and disseminate IPM technical publications.

Funding Expended To Date

A total of \$29,397.41 has been expended as of September 30, 2014.

Managing Weeds in Nursery Containers

Activities Performed

First Quarter (Oct. 2013 – Dec. 2013) Activities:

- The first quarter of the grant year was spent preparing for the project to begin. Since the project involves the transportation of herbicides and other agricultural chemicals, we decided that the to-be-hired Research Specialist should drive a University truck, rather than a personal vehicle. A work truck was identified and basic repairs were made to make it reliable and safe.
- Recruitment for a 0.50 FTE Research Specialist was completed in the first quarter with Worku Burayu beginning on January 06, 2014.

Second Quarter (Jan. 2014 – Mar. 2014) Activities:

- The Research Specialist, Dr. Worku Burayu (hereafter referred to as RS) began work January 6, 2014.
- RS attended ADA Arizona Pesticide Safety TTT Workshop and passed with a 94%, qualifying him to provide “Worker Protection Standard Pesticide Safety Training to agricultural workers and pesticide handlers in Arizona.”
- RS attended Arizona Nursery Association networking event and distributed surveys to nursery professionals assessing their weed management needs.

- Visits were made to 10 nurseries to gather stakeholder input and make arrangements for future trainings. Laminated posters addressing the best practices to manage spurge in nurseries was distributed to these sites.
- Assessments of weed pressure and management strategies was conducted at these 10 sites.
- Herbicide calibration training was conducted at two grower sites.

Third Quarter (Apr. 2014 – Jun 2014) Activities:

- Dr. Burayu began field studies of best management practices at two grower sites and conducts weekly data collection visits.
- Statistical analysis and results summary were started.
- A handout and presentation was developed to teach calibration math.
- Continued needs assessments were conducted.

Fourth Quarter (Jul 2014 – Sep 2014) Activities:

- Herbicide trials were completed at grower sites.
- Data analysis and results summary were continued.
- A plant phytotoxicity study was initiated at a grower site.
- Five informal application workshops were conducted and were attended by 20 nursery workers.

Problems and Delays

First Quarter (Oct. 2013 – Dec. 2013)

- Because it takes some time for new positions at the University of Arizona to be approved, the new research specialist, Worku Burayu did not begin on the project until January 6, 2014. We will now begin to make earnest progress toward producing outcomes.

Fourth Quarter (Jul 2014 – Sep 2014)

- Due to the delay in hiring the research specialist, an extension of time was granted by the ADA on September 26, 2014. The new expiration date of the sub-award agreement is December 31, 2014.

Future Project Plans

- Herbicide efficacy studies conclude and phytotoxicity studies initiated. Data analysis and preparation for presentation. Results will be shared with nursery growers through presentations at local industry conferences, on-site consultations at nurseries, through a fact-sheet and at national weed science meetings.

Funding Expended To Date

A total of \$23,305.32 has been expended as of September 30, 2014.

Mechanism for Improving Seed Placement Uniformity

Activities Performed

First Quarter (Oct. 2013 – Dec. 2013) Activities:

- A two bed shaper/planter was designed using SolidWorks. Fabrication of the unit will commence next quarter.
- Investigations into the optimal design for the first prototype drum seeder were made. Decisions about the design were made and components will be procured and fabricated next quarter.
- Numerous studies were conducted on the performance of current planter designs. Based on our observations, we have found that seed drop height, i.e. distance above the soil surface that the seed is released from the metering unit, is a significant factor for seed placement precision. As such, we have been working on designs for modifying existing planters that will minimize seed drop height. Fabrication of these components will begin next quarter.

Second Quarter (Jan. 2014 – Mar. 2014) Activities:

- A two bed shaper/planter was fabricated.
- A modified opener for belt type planters that opens the furrow more smoothly was acquired and installed.
- A seed guide insert was developed.
- An opener that reduces air planter seed drop height by 1 inch was fabricated.
- An air planter seed metering unit was modified and a new opener was fabricated so that seed drop height was reduced by 2 inches.
- Components for a drum planter were acquired and are being adapted to function for the intended purpose.
- A trip to the World Ag Expo in California was taken to learn more about the latest technologies for precision vegetable planters as several new pieces of equipment have been developed. In the same trip, a visit to Tucson was made to pick up components for a novel precision planter that will be investigated as part of this project.

Third Quarter (Apr. 2014– June 2014) Activities:

- A grease track for evaluating planter design performance in the lab was refurbished and made operational.
- Conventional air and belt type planters were evaluated on the grease track and expected performance was obtained.
- A prototype drum type cell wheel metering device was evaluated, but performance was found to be unsatisfactory. A second generation design will need to be developed.

Fourth Quarter (July 2014 – Sept. 2014) Activities:

- Configured grease track so that the performance of various planter designs can be evaluated on the same test stand.
- Design of a second generation prototype drum type cell wheel metering device was initiated.

Problems and Delays

- The prototype drum type cell wheel metering device developed performed unsatisfactorily. A completely new approach is needed. Developing a new prototype drum planter is time consuming and may delay being able to test the device in October as per the project plan. Prototype design will be made a top priority next quarter in order to try and adhere to the project's timeline.

Future Project Plans

- We plan to continue evaluating conventional and modified air and belt planter designs and make modifications as necessary.
- Complete design and fabrication of a second generation prototype planter.
- Evaluate second generation prototype planter performance and make modifications as necessary.
- Prepare for presentations.

Funding Expended To Date

A total of \$21,928.16 has been expended as of September 30, 2014.

Pathogen Transmission to Crops from Animals

Activities Performed

First Quarter (October 1, 2013 – December 31, 2013) Activities:

Outcome 1: *To update the current database of pathogen risk from animal intrusion into agricultural fields by screening a vast range of scat samples for presence of pathogens, both traditional and emerging;*

- The project team is currently working with local stakeholders and Dr. Kurt Nolte to identify current protocols for identification and discovering scat found in agricultural fields commonly used by the industry.
- We have disseminated "Scat Collection Kits" to food safety managers for two large growers in Yuma, AZ. These stakeholders will collect scat samples when found in fields and send them to the University of Arizona for pathogen analysis.
- Over the next quarter we hope do provide these "kits" to additional growers in the community.

Outcome 2: *To incorporate data from the updated database into environmental pathogen survival models to develop animal intrusion risk assessment scenarios;*

- Initiation of scat sample collection for Outcome 2 will begin during the next quarter.

Outcome 3: *To incorporate risk information in developed user-friendly tools to guide growers and field workers in recognizing relative risks arising from field fecal deposition from different sources.*

- In anticipation for scat sample collection and information dissemination, the project team held a stakeholder meeting on December 1-3rd. During this meeting grower needs regarding scat sample collection were discussed.
- The graduate student recently hired to this project has begun conducting extensive literature reviews on methods commonly used for analysis of pathogens in animal scat. Additionally, a copy of the University of Arizona *Scat and Track Guidebook* has been given to Elissa Malott and she will work to incorporate and update pathogen risk data in the guidebook with the intent that it will be provided to growers at the completion of this project.

Second Quarter (January 1, 2014 – March 31, 2014) Activities:

Outcome 1: *To update the current database of pathogen risk from animal intrusion into agricultural fields by screening a vast range of scat samples for presence of pathogens, both traditional and emerging;*

- The project team has provided additional “Scat Collection Kits” to a new project partner in Yuma, AZ that works closely with Arizona Game and Fish. This stakeholder is of particular interest to our group because of the close relationship that they have with AZ Game and Fish as well as are licensed to trap and removal animals in Arizona and California. As part of their duties they use both micro and macro animal management practices to reduce animal over population as well as modify animal intrusion pathways through agricultural fields.
- This stakeholders has agreed to collect fecal samples from Bobcat, deer, skunk, coyote, wild dogs, etc. which adds tremendous value to this project.

Outcome 2: *To incorporate data from the updated database into environmental pathogen survival models to develop animal intrusion risk assessment scenarios;*

- Scat sample collection in Yuma, AZ for Outcome 2 has begun during this quarter.
- The project PIs have also reached out to the Arizona Desert Museum in Tucson, AZ to collect fecal samples from local animals that may be of risk to leafy greens growers in Yuma, AZ.

- Additionally, MS graduate student Elissa Malott has begun developing Polymerase Chain Reaction (PCR) assays in the laboratory to screen animal scat for the following pathogens; *E.coli*, Salmonella, Listeria, and Campylobacter.

Outcome 3: *To incorporate risk information in developed user-friendly tools to guide growers and field workers in recognizing relative risks arising from field fecal deposition from different sources.*

- Graduate student Elissa Malott presented, “*Pathogen Transmission to Crops from Animals*,” a poster of research results to date at the University of Arizona Water Resources Research Center Annual Conference (see Photo below). This conference was attended by 350 water professionals from across the Southwestern U.S.

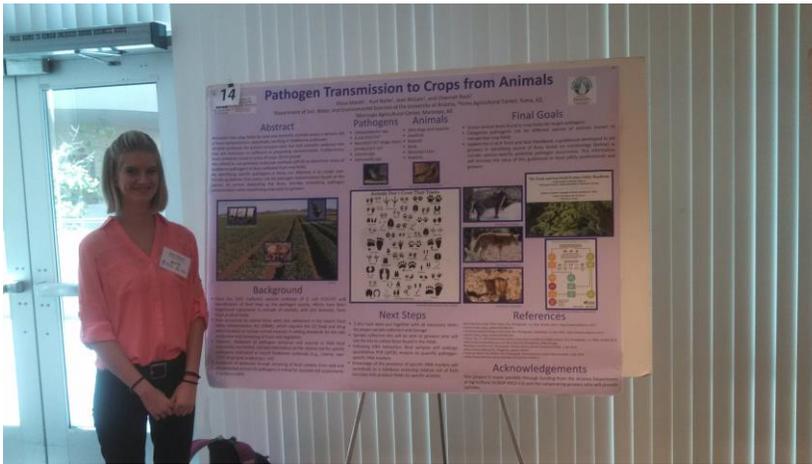


Figure 1.
Graduate Student
Elissa Malott
and her
poster
“*Pathogen
Transmission
to Crops
from
Animals*” at
the WRRC

- Elissa Malott submitted an abstract to present research results at the SWESx Graduate Student Poster Exhibition, held at the University of Arizona to commemorate Earth Day. It is also important to note that she won “honorable mention” for her poster presentation at SWESx and had tremendous support for this project and her research.
- PI Channah Rock and Elissa Malott had expected to present results at a Yuma Fresh Produce Safety Meeting originally scheduled for March 12, 2014, but this meeting did not occur in March and instead was postponed to a later date.

Third Quarter (April 1, 2014– June 30, 2014) Activities:

Outcome 1: *To update the current database of pathogen risk from animal intrusion into agricultural fields by screening a vast range of scat samples for presence of pathogens, both traditional and emerging;*

- Since the dissemination of “Scat Collection Kits” to food safety managers in Yuma, AZ approximately 25 fecal samples have been shipped to the University of Arizona for further testing.
- Over the next quarter we plan to provide additional “kits” to growers and food safety managers in the community consistent with the proposed scope of the project.

Outcome 2: *To incorporate data from the updated database into environmental pathogen survival models to develop animal intrusion risk assessment scenarios;*

- As stated above, scat sample collection for Outcome 2 has continued during this quarter. Samples were collected by project participants and then shipped to the University of Arizona, where graduate student Elissa Malott began to characterize the fecal matter using developed molecular techniques for the following pathogens; *E.coli*, Salmonella, Listeria, and Campylobacter.
- qPCR assays for both Salmonella and Listeria have been tested and validated in Dr. Jean McLain’s laboratory at the University of Arizona. The molecular qPCR assay for Campylobacter is currently being tested and it is anticipated that it will be validated by the next quarter.
- As characterization continues into the next reporting period, information on pathogen presence will be incorporated into mock animal intrusion scenarios in order to better determine risk. During this quarter initial information gathering has begun related development of “real world” animal intrusion scenarios applicable to the local industry.

Outcome 3: *To incorporate risk information in developed user-friendly tools to guide growers and field workers in recognizing relative risks arising from field fecal deposition from different sources.*

- From May 7-9th, the project PI, Dr. Channah Rock, traveled to Salinas, CA and learned about other animal intrusion issues faced by the fresh produce industry at the Western Food Safety Summit held by Hartnell College.
- Additionally, the project PI and graduate student, Elissa Malott, traveled to New Port Beach, CA to attend the annual Center for Produce Safety Research Symposium from June 23-26th. There Elissa learned about and interacted with industry members on animal intrusion impacts to leafy green production agriculture and discussed potential solutions to these problems that would be acceptable by the industry in the form of a user friendly tool.

Fourth Quarter (July 1, 2014– Sept 30, 2014) Activities:

Outcome 1: *To update the current database of pathogen risk from animal intrusion into agricultural fields by screening a vast range of scat samples for presence of pathogens, both traditional and emerging;*

- Project PIs worked with Yuma food safety professionals to develop a list of target animals for scat collection. The target list, comprised of approximately 25 animal species, is based on three criteria: 1) known intrusion into agricultural fields; 2) inclusion in the University of Arizona *Scat and Track Guidebook*; and 3) scat had not previously been assessed for pathogen presence in related studies. This list will be circulated among growers and Yuma extension personnel involved in the scat collection procedures.
- Development of the target animals list was performed under the guidance of Dr. Paula Kahn-Rivadeneira, the newly hired Extension Food Safety Specialist in Yuma. Dr. Kahn-Rivadeneira, who has extensive experience in trapping and analysis of scat from birds and rodents, has agreed to cooperate on this project.
- Collection of wild animal feces (wild cats, javelina, deer) will be done with the assistance of personnel from Arizona Game and Fish. Distribution of “fecal collection kits” will be expanded over the next reporting period to include Game and Fish professionals.
- Over the next reporting period we plan to provide additional “kits” to growers and food safety managers in the community consistent with the proposed scope of the project.

Outcome 2: *To incorporate data from the updated database into environmental pathogen survival models to develop animal intrusion risk assessment scenarios;*

- Scat sample collection for Outcome 2 has continued during this quarter. Samples were collected by project participants and then shipped to the University of Arizona, where graduate student Elissa Malott began to extract DNA in preparation for characterization of the fecal matter using developed molecular techniques for the following pathogens; *E.coli*, Salmonella, Listeria, and Campylobacter.
- qPCR assays for both Salmonella and Listeria were tested and validated in Dr. Jean McLain’s laboratory at the University of Arizona during the previous quarter. During this quarter, qPCR assays for two toxin genes specific to Shiga-toxin producing *E. coli* were developed and validated, and work continued on development of the molecular qPCR assay for Campylobacter.

- As characterization of fecal samples begins in the next reporting period, information on the presence of the four target pathogens in each fecal sample will be incorporated into mock animal intrusion scenarios in order to better determine risk. In order to account for variability in range or animal diets (which could skew fecal pathogen density), we anticipate the analysis of a minimum of three separate fecal samples from each target animal. Ultimately, we anticipate the development of “real world” animal intrusion scenarios applicable to the local industry.

Outcome 3: *To incorporate risk information in developed user-friendly tools to guide growers and field workers in recognizing relative risks arising from field fecal deposition from different sources.*

- On Thursday, August 21st, project PI Channah Rock presented the objective and initial results of this project at an Executive Food Safety Session hosted by the Yuma Safe Produce Council in Yuma, Arizona. In attendance at the meeting were members of the Arizona Leafy Green Marketing Agreement, as well as food safety experts who are members of the Safe Produce Council, Irrigation District Managers, University faculty, and specialists from the University of Arizona. Approximately 30 stakeholders were present at this meeting.
- Additionally, graduate student Elissa Malott submitted an abstract to present her research results at the 5th Annual University of Arizona Food Safety Consortium Meeting, to be held at the Westward Look Resort in Tucson, Arizona on October 10.

Problems and Delays

In early July, the graduate student working on this project (Elissa Malott) fell ill and was unable to work in the laboratory for nearly four weeks. Fortunately, Elissa has now returned to the laboratory and is working to address the backlog of samples. We do not anticipate that this will cause any delays in completion of the project.

Future Project Plans

- We anticipate that all assays for fecal analyses for pathogens will be completed and validated. Though this work is 90% completed to date, the assay for *Campylobacter* has proven to be challenging and has yet to be completely validated. Once this assay is validated, analysis of all fecal DNA currently archived can be completed.
- We anticipate continued fecal/scat sample collection by project participants, including new project partners, as outlined in previous sections of this report.
- We will continue data analysis, work with project partners to complete grant reporting requirements and disseminate findings to stakeholders.

Funding Expended To Date

A total of \$11,523.13 has been expended as of September 30, 2014. The ADA is monitoring this project's budget closely. It is anticipated that spending will get back on track in the next reporting period.

Pesticide Diagnostic Laboratory for Arizona Vegetables

Activities Performed

First Quarter (Oct.1, 2013- Dec.31, 2013) Activities

Preliminary work on this project began during the 2012 vegetable-growing season in the low desert and the organized efforts were initiated after funding was approved from the Specialty Crop Block Grant Program. Both gas and liquid chromatograph machines were already in place in our laboratory at the University of Arizona Yuma Agriculture Center. A part time student was hired to work with us to identify the techniques needed to best analyze soil and plant tissue for the presence of the three principle herbicides used in the production of lettuce, Pronamide, Benefin and Bensulide. The project has focused on finding the best methods to extract these compounds from soil and plant tissue and to detect them in the extraction.

Lettuce tissue and soil was treated with variable levels of Pronamide, Bensulide and Benefin in the laboratory, greenhouse and in the field to produce samples for analysis. Hundreds of samples were processed to evaluate various extraction and detection methods. Many people and organizations assisted in this effort. These included Frank Jaime (Gown Co.), Sean Kurokawa (Primus Labs), Larry Evanicky (Shimadzu Corp.), Paul Martin (USDA Desert Research Center), Danielle Martin (Gowan Co.), Jaime Archuleta (Shimadzu Corp.) Steve Castle (USDA Desert Research Center), and Kurt Knolte (U of Az. Cooperative Extension),

What is detected depends on the sampling and the extraction procedures that have been used. Several techniques were tested for extracting Pronamide, Benefin and Bensulide from soil and plant tissue. We found that soil analysis is far more accurate and consistent than is tissue analysis for these three herbicides. All three are applied to soil where they are picked up by the weeds and the crop. Only Pronamide moves in the plant. Benefin and Bensulide move very little. What we detected in the plant tissue had been filtered through the soil and plant and was between 0.1 ppm and 3.0 ppm. Seedling plants are hard to sample and the amount we found in them was extremely variable. In contrast, we found between three and 150 ppm of these three herbicides in the top inch of the soil and it was more consistent than what we found in the plant. The soil is easier to sample and more consistent. The sampling guidelines that we currently give to people wanting us to analyze lettuce fields for Pronamide, Benefin or Bensulide is to collect a composite sample of 200 g taken from the top inch of soil. We ask also that they collect separate samples from affected and unaffected areas of the field if possible, for comparison. We have determined that a modified QUECHERS solid phase extraction procedure works well for these three herbicides.

The detection process was more straightforward and we had good assistance from both the hardware and software people at Shimadzu Corporation the manufacturers of the liquid and gas chromatographs machines and from the chemists at Gowan Company. After much experimentation and repair, we decided that the high-pressure/UV liquid chromatograph worked well for the three lettuce herbicides. Samples were spiked by the chemists at Gowan Company

and provided to us as unknowns to verify our results. Our detections were within accepted Industry standards and we know have good confidence that our extraction and detection procedures are accurate. We began informing the industry that we could process samples by the end of October, 2013. We have informed people through the vegetable IPM advisories and presentations at some vegetable production meetings. We hope to build a database of results and gain experience with our procedures this season. A summary of our activity to date follows.

Number of samples processed	Compounds analyzed for	Location of samples collected	Number of growers assisted	Number of pest control advisors assisted
148	Pronamide Bensulide DCPA EPTC Oxyfluorfen Benefin Carfentrazone Triflulfuron	Yuma Valley 85 Gila Valley 19 Wellton Mohawk 13 Yuma Mesa 3 Yuma Ag. Center 18	19	14

The target for the number of samples processed this year was 200 to 400. The actual number of samples processed to date is 148. It is likely that we will reach this target this year. The target number of fieldmen, growers, research and extension personnel submitting samples was 20 to 50. The actual number was 33. We have already reached this target.

Second Quarter (Jan.1, 2014 - March 30, 2014) Activities:

The Pesticide Diagnostic Laboratory became further established and recognized this quarter. 82 samples were run this quarter and these included 8 new active ingredients that we had not analyzed for previously. These active ingredients were: Glyphosate, Thifensulfuron, Imazethypyr, Imazamox, dimethioate, diuron, Flumioxazin and Lamba-cyhalothrin. New software was installed in our HPLC by Shimatzu Corp. that allows us to do an improved job of organizing or data and to generate repots for clientele. The ability to run glyphosate soil samples that we developed this quarter will enhance the value of the laboratory. We have received more requests for glyphosate analysis than for any other pesticide. Recognition of the laboratory and the analysis we can perform has steadily increased mostly by word of mouth but also through presentations at meetings like the Southwest Ag Summit and articles in the Vegetable IPM Updates.

Third Quarter (Apr.1, 2014 - June 30, 2014) Activities:

Four pesticides were added to the list of active ingredients that can be detected in the pesticide diagnostic laboratory. These included Pendimethalin, EPTC, Halosulfuron, and Nicosulfuron. This was a slower quarter in terms of the total number of samples run. 57 samples were submitted to the lab for analysis from Arizona growers and Pest Control Advisors. We continued to refine our techniques and reports. The majority of the agricultural community in southwestern Arizona is now aware of the laboratory, and an increasing number in central Arizona have become aware of it.

Fourth Quarter (July, 1 2014 – Sept. 30, 2014) Activities:

One hundred and twenty three samples were submitted this quarter for the analysis of 12 herbicide active ingredients. These included Benefin, Bensulide, Pronamide, DCPA, EPTC, Oxyfluorfen, Flumioxazin, Linuron, Halosulfuron, Glyphosate, Prometryn and Trifluralin. Calibration curves were developed for Benefin, Bensulide, Pronamide Flumuioxazin and Oxyfluorfen. A new lab technician was hired this quarter that is doing an excellent job refining and documenting the procedures that are being used. An Amendment was requested to extend the period of this grant because there was a three month period that we were without a Lab Technician and a significant amount of the budget was unused. The extension was approved by the ADA on August 5, 2014 and extends the project until September 30, 2015 and will allow us to expand on the number of active ingredients that we can analyze to further refine our techniques.

Problems and Delays

First Quarter (Oct.1, 2013-Dec. 31, 2013)

We initially focused on the three principle herbicides used on lettuce, Pronamide, Bensulide and Benefin although we found that there is demand to analyze for several other pesticides that we were able to extract and detect. We processed samples for five other compounds that are listed above. There were some that we could not process. Most notable among these is Glyphosate. There is good demand to analyze for Glyphosate year round and we are still working it. Processing those samples has been delayed.

Second Quarter (Jan.1, 2014-Mar. 30, 2014)

The primary goal of this project is help Arizona growers and pest control advisors to most effectively and safely use pesticides in the production of specialty crops. It is not to support litigation between producers and chemical companies when crop injury or poor performance occurs. Lawsuits involving these issues have become increasingly common in the specialty crop industry in Arizona. We have sought to avoid being involved in these matters by pointing out that if we find the possibility of crop injury with our analysis, that our results need to be confirmed by a certified commercial laboratory. This is likely, however to be an ongoing problem.

Third Quarter (Apr.1, 2014 - June 30, 2014)

The laboratory technician on this project is responsible for processing the samples and generating the reports. The person in this position became unreliable and had to be replaced this quarter. This caused delays in processing many of the samples that were submitted. The research specialist working with us on this project still managed to process the samples that were submitted, but they were delayed. It took much of this quarter to find an adequate replacement, and an amendment was submitted to extend the length of the project.

Fourth Quarter (July 1, 2014 – Sept. 30, 2014)

A new Laboratory Technician was hired and has done an excellent job of expanding the number of pesticides that we can process and refined our techniques.

Future Project Plans

We plan to continue to improve our reports and document our results. The research results from this project will be publicized to the public through presentations at industry meetings and articles in the popular press. A poster has been created that is set up at public meetings to familiarize the public with the lab.

Funding Expended To Date

A total of \$6,836.83 has been expended as of September 30, 2014. The ADA is monitoring this project's budget closely. Slow spending is due to lack of technician for a period of time and funds should be expended with approved extension for the project activities.

Reducing Pesticide Risks in Arizona Lettuce

Activities Performed

First Quarter (Oct. 2013 – Dec. 2013) Activities:

- Held teleconference with all project personnel (Fournier, Ellsworth, Dixon, Palumbo, Guzy, Jepson) on October 3. Reviewed project objectives and outlined plan and roles for accomplishment of goals. Discussed technical issues related to data structuring and analysis (objective 1) and began initial plans for PRiME workshop at Southwest Ag Summit 2014 (objectives 2 and 3).
- Dixon developed a dataset of all 2012 lettuce pesticide use data from APMC database and examined and corrected data errors in rates, acres and total chemical applied. Working with Fournier, he began examining location information (township, range, section) to identify errors that need to be resolved prior to incorporation of 2012 data for PRiME analysis (objective 1).
- Dixon developed a list of all products used on 2012 lettuces and provided to Guzy. This was cross-checked with the PRiME database to identify new products for which ecotoxicological profiles will need to be added to PRiME to facilitate extended risk analyses of data (objective 1).
- Arizona Department of Agriculture Environmental Services Division (ADA-ESD) is responsible for ongoing 1080 data entry in part funded through this project. As of this report, our APMC pesticide use database is up to date through the 12/31/13, except for a small number of records. Gary Christian, who previously supervised data entry retired as of 12/31/13. We continue to work with Robert Tolton and Jack Peterson as program contacts, and David Hall continues in his technical support role for the ADA-ESD 1080 database.
- Expected Measurable Outcome #1: We made progress in reviewing and correcting data but have not finalized data for processing and analysis by market sector. This is consistent with timeline.

- Expected Measurable Outcome #2: Fournier, with input from project partners, developed pre-and-post questionnaire to be implemented at Southwest Ag Summit (Feb 27) and future meetings to measure participant awareness and knowledge of eco-toxicological risks associated with their pesticide programs and awareness of ipmPRiME as a tool to help identify and mitigate risks. Baseline data were collected as part of a prior SCBGP grant and are available for comparison.
- Expected Measurable Outcome #3: We will attempt to make contact with key stakeholders at Southwest Ag Summit (Feb 27) to begin dialog and create more awareness of our risk analyses to date (outcomes of prior SCBGP), and also to get input to better understand drivers of pesticide risks in AZ lettuce production.

Second Quarter (Jan. 2014 – Mar. 2014) Activities:

- Held teleconference with all project personnel (Fournier, Ellsworth, Dixon, Palumbo, Guzy, Jepson) on Jan 23. Discussed logistics and presentation plans for ipmPRiME workshop at Southwest Ag Summit (SWAS) 2014 (objectives 2 and 3). Discussed development of journal article to publish results from historical risk analysis of AZ lettuce pesticide use (objective 1). Also finalized work plan and assigned roles for development of outreach articles (objective 2). Discussed development of ipmPRiME tool for benchmarking of current pesticide practices in lettuce.
- Jepson, Guzy and co-authors published an article in a scientific journal that reviews the science behind the risk indices that make up ipmPRiME. While this was not directly related to the Arizona Lettuce analysis, publication of these data are important because they explain the scientific underpinnings of the ipmPRiME tool that support the risk analyses generated. This article will be cited in our future publications:
 - Jepson PC, Guzy M, Blaustein K, Sow M, Sarr M, Mineau P, Kegley S. 2014. Measuring pesticide ecological and health risks in West African agriculture to establish an enabling environment for sustainable intensification. *Phil. Trans. R. Soc. B* 369: 20130491.
- With input collected by Fournier from lettuce pest management Extension specialists (Palumbo, Tickes, Matheron), Guzy developed typical pesticide use scenarios for lettuce that could be selected by ipmPRiME tool users during the SWAS workshop, then modified as needed to reflect their use practices for spring or fall production. The idea is that the tool then will calculate and output risk scores associated with their actual pesticide practices, to inform future decision-making.
- Guzy conducted tests of the ipmPRiME server on 3 dates in February, in preparation for Southwest Ag Summit workshop. This was to ensure functionality and to test speed of ipmPRiME online database at high capacity.
- Using leveraged funds, Dixon, Fournier and team developed and printed small notebooks to be used as a handout / give-away at Southwest Ag Summit and future events, to enhance outreach (objective 2). The notebooks feature the ipmPRiME URL and a brief definition of each of the risk indices in ipmPRiME. This was not a stated objective of the grant but an extra activity to increase awareness of ipmPRiME as a risk mitigation and decision-making tool.
- The team presented a workshop at the Southwest Ag Summit in Yuma on Feb 27. Guzy presented a hands-on session held in a computer lab, wherein users could access ipmPRiME, choose to load the lettuce pesticide use scenarios or enter their own practices

and output pesticide risk scores to inform future decision making. Jepson briefly presented data from our historical risk analysis of lettuce pesticide use and Fournier conducted pre and posttest of risk mitigation knowledge of participants.

- All team members met on Feb 28 to debrief from the SWAS session and discuss next steps in the project and related technical issues.
- Arizona Department of Agriculture Environmental Services Division (ADA-ESD) continued ongoing 1080 data entry. As of this report, our APMC pesticide use database is complete for 1080s through Feb 2013, with March about halfway completed. ADA personnel also invested time this quarter on completion of scanning of physical 1080 forms from 2013. We have just received from ADA (in late April) complete scans of the 2013 1080s. We expect these will be integrated into our database over the next quarter.
- Dixon continued work on that APMC Pesticide Use Database. One new feature is an automatic updating of ADA 1080 data to our database nightly. He also continued importation of 1080 PDF scans provided by ADA into our database, a feature which greatly improves our efficiency in data verification and correction. PDFs are now complete for all years from 2008 – 2012; 2007 PDFs are currently being processed.
- Expected Measurable Outcome #1: We made slow progress in completing the review and correction of 2012 pesticide use data for ipmPRiME analysis, due mainly to the focus on so many other activities conducted this quarter. Publication of Royal Society journal article by Jepson et al. lays a scientific foundation for future publication of AZ lettuce pesticide risk analysis with ipmPRiME.
- Expected Measurable Outcome #2: Fournier, implemented pre-and-post questionnaire at Southwest Ag Summit (Feb 27) to measure participant awareness and knowledge of ecotoxicological risks associated with their pesticide programs and awareness of ipmPRiME as a tool to help identify and mitigate risks. Response rates were low, due to light attendance in the session. (See Problems and Delays.)
- Expected Measurable Outcome #3: Our team had discussed planning of preliminary outreach to key stakeholders (beyond growers and PCAs) at the Southwest Ag Summit, to create awareness of the historical pesticide risk analyses for AZ lettuce and to facilitate future dialog among all stakeholders on the potential marketing value of these data (objective 3). Fournier made contact with key individuals in anticipation of SWAS. However, two members of the APMC Pesticide Use Database Advisory Committee contacted Fournier and Ellsworth prior to SWAS and expressed concerns about our approach of reaching out directly to these stakeholders. It was decided that discussion is needed among our Advisory Committee members to determine next steps with respect to objective 3 of this project. (Meetings planned in May.)

Third Quarter (Apr. 2014– June 2014) Activities:

- Arizona Department of Agriculture Environmental Services Division (ADA-ESD) continued ongoing 1080 data entry. As of this report, our APMC pesticide use database is nearly complete for 1080s through late May 2014.
- Using leveraged resources, Fournier hired a part-time temporary employee to work with Dixon on the APMC Pesticide Use Database. (No SCBG funding used to support this.) The primary function of this position is to assist Dixon in integration of PDF scans of L-1080 forms into our database and verification and correction of data. This person invested

about 100 hours between Feb 1 and May 30. We estimate about 30 hours were related to lettuce records.

- Dixon and temp personnel have now integrated PDF scans for all available 1080 forms from 2007 through 2013. This includes about 55,000 1080s for lettuce crops, inclusive of at least 72,694 applications. Lettuce records for these years have been carefully scrutinized for potential errors and corrections made.
- We delivered Arizona pesticide use data for 2012 formatted to OSU-IPPC for ipmPRiME analysis. This will extend the broad analysis (previously completed through 2011 in a prior SCBG). Data are formatted to facilitate market sector analysis (Fall versus Spring crops).
- Fournier and Guzy both presented research results in a “Big Data” symposium at the Entomological Society of America Pacific Branch meeting in Tucson on April 8. Our presentations covered the APMC pesticide use database (structure, function and capacity) and the risk analysis of historical pesticide use in Arizona lettuce.
 - 04/08/2014 Fournier A.J., P.C. Ellsworth, W.A. Dixon II, M. Guzy, P. Jepson, J.C. Palumbo. IPM trends: two decades of Arizona pesticide use data. Entomological Society of America Pacific Branch Meeting, Tucson, AZ. 50 participants.
 - 4/08/2014 Guzy M., A.J. Fournier, P.C. Ellsworth, W.A. Dixon II, P. Jepson. Historical pesticide use and risk in Arizona lettuce. Entomological Society of America Pacific Branch Meeting, Tucson, AZ. 50 participants.
- Michael Guzy traveled to Arizona April 7 – 11 and interacted with Wayne Dixon on technical issues related to integration of Arizona pesticide data with ipmPRiME. They set up the software and permissions so UA and OSU could share the ipmPRiME programming source code and also setup a program for downloading EPA data tables and inserting new records into the database. Guzy met with Fournier and Ellsworth as well, primarily to discuss potential sources of leveraged funding to support further risk assessment collaborations between our organizations. In June, we submitted a USDA-NIFA Crop Protection and Pest Management Applied Research and Development Program proposal with Guzy as lead investigator.
- The APMC Pesticide Use Database advisory committee met on May 28 (Yuma) and May 29 (Maricopa). Agendas were the same for both meetings and included the topic of “assessing and promoting safety in the Arizona lettuce industry”. This continued earlier discussions about the publication of a technical report, which would include aggregated data on pesticide use reductions and (potentially) a summary of the ipmPRiME analysis of Arizona lettuce pesticide use. Some members expressed concerns about pursuing and especially publishing any results from pesticide risk analyses with ipmPRiME. Others recognized the potential value in these data, to arm the industry with scientific information on pesticide practices to counter anti-industry campaigns such as poorly informed “dirty dozen” list. We could use these data to tell a great story about the Arizona lettuce industry. While discussion on this topic was divided, it was concluded that we should move forward and produce the report, if only to have it available for defense of the industry if needed. The Maricopa meeting included participation our ADA partners, Jack Peterson, Robert Tolton and David Hall.
- Expected Measurable Outcome #1: 2012 pesticide use data have been delivered for ipmPRiME analysis, which is in progress. A conference call is planned for August to discuss the next steps in the analysis including various market sector breakdowns.

- Expected Measurable Outcome #2: As no outreach to growers and PCAs, beyond our Pesticide Use Database Advisory Committee, occurred in this quarter, Fournier did not collect further data on awareness and knowledge of pesticide risk and its mitigation. Fournier will present a risk assessment survey at a series of Fall Extension meetings, which will be planned during a Sept 3 meeting of UA Cooperative Extension personnel.
- Expected Measurable Outcome #3: As reported last quarter, plans for a stakeholder discussion session at 2014 Southwest Ag Summit fell through because such as session was not viewed favorably by some members of our Advisory Committee. This was discussed in our May meetings with the Pesticide Use Database Advisory Committee. The general consensus (though at least one member disagreed) was that we should proceed to produce a technical report that can be kept “on the shelf” and available to respond to any future criticisms of lettuce industry pesticide practices. This approach was preferred rather than initiation of any direct discussion about pesticide risk assessment data with growers / shippers at this juncture.

Fourth Quarter (July 2014 – Sept. 2014) Activities:

- Arizona Department of Agriculture Environmental Services Division (ADA-ESD) continued ongoing 1080 data entry. A temporary contracted employee assisted during the first part of the quarter and was let go mid-quarter. Around the same time, two permanent staff members retired. The personnel shortage has created a 3-month backlog of 1080 data to be entered. A new contract employee will be brought on board once Year 2 funds for this project have been transferred from UA to ADA-ESD. (This is in process now.) A permanent ADA employee is currently entering data to try to keep pace. Our APMC pesticide use database is nearly complete for 1080s through late June or July 2014. (We have some more recent data, but later months are incomplete.)
- Using leveraged resources, we continued to employ a part-time temporary employee to work with Dixon on the APMC Pesticide Use Database and brought in a second part-time person at a higher level when the first person’s hours were reduced to return to school. (No SCBG funding used to support any of this.) These personnel continued to assist Dixon in verification and correction of lettuce data and other specialty and non-specialty crop data.
- This quarter, with the help of some new tools, we identified additional errors in 2013 Lettuce records, including rate errors and location errors. While we did not commit to including 2013 pesticide use data in our expanded pesticide risk analysis of lettuces as part of this project, it was decided by the team to invest this additional time to make the lettuce market sector datasets as up-to-date as possible. Evaluation and correction of 2013 data was a major activity this quarter and is nearly complete.
- The team held a conference call on Aug 11. We had important technical discussions about how to develop the market-sector specific datasets and what market sectors to focus on. It was decided that 6 market sectors will be analyzed separately using ipmPRiME (2006 – 2013): all head lettuces as a group (spring and fall separately), all leaf lettuces as a group (spring and fall separately), and romaine (spring and fall separately). The decision to include 2013 data means more investment in data verification and correction by Wayne Dixon and Al Fournier. John Palumbo will review preliminary datasets, which will then be finalized and sent to Michael Guzy for ipmPRiME analyses.

- We also discussed development of Extension publications and the technical report on lettuce pesticide use. Based on the advice of the APMC Pesticide Use Database Advisory committee, the technical report will be subject to that committee's review and will be made available to the industry once completed. This quarter, Fournier developed and circulated among team members a detailed outline for the technical report. We are in the process of further developing this draft. Fournier and Jepson will lead Extension publication #1 tentatively called "Fundamentals of Risk" and Guzy and Jepson will lead authorship for publication #2 tentatively called "Risk Indicators Primer". Unfortunately, we are behind schedule on both of these publications.
- On the Aug 11 conference call, the team also discussed plans for the Year 2 PCA / Grower workshop. We discussed several options but determined the best choice would be in June or July 2015, either in San Diego or at the Yuma Ag Center. Many PCAs spend time in San Diego in the summer months and it is a common venue for industry meeting this time of the year. A dedicated afternoon session at Yuma Ag Center in July, right before the start of the fall planting season, might also work well. We will further explore both options.
- Fournier and Guzy were invited to present project results in a symposium at the national Entomological Society of America 2015 Annual Meeting in Portland, OR in November. After discussion, it was decided that Guzy would present for the team. This quarter he registered for the meeting and made travel plans. Fournier and Jepson are collaborating with Guzy in developing the presentation.
- Expected Measurable Outcome #1: Decisions were made on how to structure the market sector data for analyses, and to make all ipmPRiME data analyses inclusive of 2013 data. This will take more time, but result in a more up-to-date analysis that will maximize the information's utility to the Arizona lettuce industry. Results from our prior grant (broad analysis of 1991-2011 lettuce pesticide data) continue to be of interest to the academic community, as evidenced by invited presentations at regional and national professional meetings.
- Expected Measurable Outcome #2: As no outreach to growers and PCAs occurred in this quarter, Fournier did not collect further data on awareness and knowledge of pesticide risk and its mitigation. Fournier is coordinating with County Agents to present at future Extension meetings early in 2015.
- Expected Measurable Outcome #3: As previously reported, our offers to facilitate stakeholder dialog related to the marketing value of our data analyses have not been well met. This outcome remains dependent upon the interest of this industry in the information we can provide. This will remain a topic of discussion among our stakeholder advisory group.

Problems and Delays

First Quarter (Oct. 2013 – Dec. 2013)

- Although we are still on track with the proposed timeline, we have invested more time than anticipated into verification and correction of 2012 lettuce pesticide use data, which could put us behind in the next quarter. This means we will be getting data to Guzy for PRiME analysis a bit later than originally planned. We are progressing through the data evaluation as quickly as possible, and have recently employed a part time data support person (through other resources) to assist with tasks related to data verification.

Second Quarter (Jan. 2014 – Mar. 2014)

- As anticipated in the prior quarter, we did not deliver 2012 AZ lettuce data to IPPC for ipmPRiME analysis this quarter. This is nearly complete and will be provided to IPPC during the third quarter.
- As noted above, we were disappointed with low participation levels at Southwest Ag Summit workshop in Feb. We discussed this as a team and discussed strategies to increase participation in future events. One set back is that we were anticipating more pre and post data on the risk mitigation survey we implemented at the workshop. We need baseline data to measure changes in awareness of, and intention to use, pesticide risk mitigation tools (e.g., ipmPRiME). Fournier plans to present at upcoming agricultural Extension meetings statewide to ensure collection of adequate “year 1” baseline data to support evaluation of outcome 2.

Third Quarter (Apr. 2014 – June 2014)

- Because of later delivery of 2012 AZ lettuce data to IPPC for ipmPRiME analysis, we have not yet completed market sector data analyses.
- Outreach articles are in progress but are behind our projected timeline.

Fourth Quarter (July 2014 – Sept. 2014)

- The decision to include 2013 data into all of our market sector analyses has delayed ipmPRiME analyses, but should enhance the value of our research for industry stakeholders because the data will be more timely and relevant.
- Outreach articles are in progress but are behind our projected timeline. Please see revised timeline below.

Project Activity	Who	Timeline
Maintain 1080 data entry to support project goals	Christian, Peterson (ESD)	Ongoing
Prepare 2012 1080 lettuce data for PRiME analysis, including data verification and correction for Yuma County	APMC, with input from Guzy	Dec 2013 – July 2014
Prepare 2013 1080 lettuce data for PRiME analysis, including data verification and correction for Yuma County	APMC, with input from Guzy	July 2014 – Oct 2014
Prepare 1991-2013 1080 lettuce data from all other AZ Counties for PRiME analysis including data verification and correction	APMC, with input from Guzy	Sept 2014 – Jan 2015
Subset data by market sector, review of data by UA PIs, finalize for IPPC analysis	APMC, with input from Guzy	Jan 2015 – Feb 2015
Complete analyses by market sector on previous AZ lettuce PRiME data to identify drivers of pesticide risk & available mitigating practices	Guzy & Jepson (IPPC) with input from APMC	Feb 2015 – May 2015

Project Activity	Who	Timeline
Adapt PRiME online teaching tool to support grower decision-making; involves updating PRiME tool based on previous work.	IPPC w/ stakeholder input APMC partners gather to prioritize pesticide choices	Mar 2014 – Apr 2015
Publish outreach article #1 (Fundamentals of Risk)	APMC & IPPC	Apr 2015
Publish outreach article #2 (Risk Indicators Primer)	APMC & IPPC	May 2015
Engage stakeholders in dialog on drivers of pesticide risks (various venues)	APMC & IPPC	May 2015 – Sep 2015
Finalize teaching tools with grower & PCA input; pilot test	IPPC w/ stakeholder input APMC partners gather	Apr 2015– July 2015
Deliver 2 workshops: one each for growers & PCAs	APMC & IPPC	Aug 2015
Submission of quarterly grant reports	Fournier	Quarterly
Submission of final grant report	Fournier	Nov 2015

Future Project Plans

- Guzy will present information from our previous ipmPRiME analyses of 1991 – 2011 lettuce pesticide use at Entomological Society of America Annual meeting in Nov.
- We will finalize market sector datasets for 2006 – 2013 and deliver to John Palumbo for review and verification prior to ipmPRiME analyses. This includes completion of 2013 data corrections.
- Fournier will coordinate with County Agents to continue to seek opportunities to conduct risk assessment survey.
- Guzy and Jepson expect to deliver a draft of Extension Publication #2 in the next quarter for review by other team members.
- We will adapt and finalize teaching tools for pilot test.
- We will deliver workshops and submit final reports.

Funding Expended To Date

A total of \$59,068.28 has been expended as of September 30, 2014.

Survey of Arizona Wine Grape Production

Activities Performed

First Quarter (Oct. 2013 – Dec. 2013) Activities:

- Assembled committee to provide coordination of growers with National Agricultural Statistics Service (NASS)
- Met with NASS State Statistician to review project.
- Worked with NASS to prepare survey based on Oregon Wine Growers survey.
- Provided NASS with a list of known growers and wineries in Arizona.
- Received, reviewed and provided feedback on survey forms prepared by NASS.

- NASS created and distributed the Arizona Wine Growers Association Vineyard Survey.
- All goals for this period were achieved.

Second Quarter (Jan. 2014 – Mar. 2014) Activities:

- USDA-NASS collected several list sources to gather names of potential vineyard operators. These sources consisted of names gathered by USDA agencies, State Department of Agriculture sources and a vineyard list from the Arizona Wine Growers Association. USDA-NASS prepared them into one electronic file and removed duplication. The final list consisted of the sample for the Arizona Vineyard Survey.
- USDA-NASS also spent considerable time designing a survey questionnaire to collect basic acreage and production data. The specifications included acreage for the entire state, acreage by county, region and variety. The survey questionnaire also includes questions on sales, practices and losses. The resulting questionnaire was approved by the U.S. Office of Management and Budget (OMB) which allows NASS to use its legal authority to protect all individual responses from disclosure. Due to this authority, only state, regional and county data will be published or made available to others outside USDA-NASS.
 - The survey is designed as a census, meaning all known vineyard operations are included and the goal is to get 100 percent response. The survey design makes allowance for nonresponse but to minimize survey error, a high response rate must be achieved.
- USDA-NASS completed the initial mail out of the vineyard survey questionnaire in early February 2014 followed by a postcard reminder seven days later. 96 potential vineyards were included in the sample.
- In early March, a second request mailing was completed consisting of those who had not returned a questionnaire.
- On April 1, USDA-NASS began a telephone nonresponse data collection phase consisting that ended April 21, 2014.
- As of April 18, USDA-NASS had an 81 percent response rate.
 - USDA-NASS anticipates still having samples to gather after the telephone phase ends. They will be meeting with the survey sponsor to determine the best strategy to get the remaining samples completed.
- While these data collection phases were on-going, USDA-NASS also coded an analysis program to catch data inconsistencies and to get the data ready to summarize. USDA-NASS is current on this analysis and all of the samples collected so far have been run through the computer program.
- In general, the survey is progressing well and is on schedule and within the budget outlined in our reimbursable agreement.

Third Quarter (Apr. 2014– June 2014) Activities:

- NASS worked to assemble data and to complete analysis.
 - i. In April, NASS began a telephone data collection phase of all survey respondents who did not mail back a survey questionnaire. By month's end, NASS had gone through the list of non-respondents several times and had an 81 percent response rate.

- ii. In May, NASS continued to manually review the reported data to make sure there were few inconsistencies and that the data looked reasonable. The data was run through a computer edit and analysis program that also flagged data inconsistencies that were not caught during the manual review. While this analysis took place, telephone interviewers also continued to call respondents to try and boost response rates. By month's end, response was up to 89 percent.
- iii. In June, analysis slowed due to an extremely large project that took almost all of the available NASS resources. That project ended around June 16 and work on the vineyard survey continued. NASS designed publication tables and provided summary specifications to the IT staff responsible for summarization. NASS telephone enumerators continued to call non-respondents and a limited amount of face-to-face contacts took place. By month's end, response was up to 94 percent.
- iv. A report should be available by September 1.

Fourth Quarter (July 2014 – Sept. 2014) Activities:

- NASS completed the Survey and presented it to the AWGA for review
- NASS made corrections to the data and submitted a final survey to AWGA
- NASS provided data to AWGA and government agencies.
- AWGA distributed information to the wine growers.
- AWGA staff has publish articles in AZ magazines, AWGA website, Verde Valley Consortium web site, Wilcox Wine Country web site, along with other media outlets.
- AWGA staff and committee members provided press releases in the hopes of having articles published regarding the results of the survey by Arizona media outlets.

Problems and Delays

None.

Future Project Plans

- Publish additional articles
- Conduct survey of new vineyards and increased acreage
- Determine continued growth of wine grape crops

Funding Expended To Date

A total of \$19,000.00 has been expended as of September 30, 2014.

Sustainable Management Practices for Bagrada Bugs

Activities Performed

First Quarter (Oct 1, 2013– Dec 31, 2013) Activities:

The primary objectives of this project are to determine the relative attractiveness of various species of plants within the Brassicaceae plant family to identify candidate species to be used in trap crops for Bagrada bug. During this first quarter, funding did not arrive in time to initiate

field studies to evaluate the relative attractiveness of Brassicaceous cultivars. However, a laboratory study conducted at the Yuma Ag Center was initiated that used choice and no-choice tests to measure the host selection behavior of *Bagrada* bugs. In these trials, we measured host attractiveness, host acceptance and host susceptibility of 12 Brassicaceous cultivars to *Bagrada* adults. Results to date suggest that Radish and green cabbage appear to be preferred hosts. We will be repeating these studies. Additionally, we initiated a study to investigate the flight capability of *Bagrada* adults under various temperatures. A preliminary trial to tests the flight distance capability of *Bagrada* bug using tethered flight mills was conducted at the USDA-ARS, ALARC lab in Maricopa.

Second Quarter (Jan 1, 2014 – Mar 30, 2014) Activities:

During this first quarter, no field activities were conducted. However, a laboratory study conducted at the Yuma Ag Center was finished that used choice and no-choice tests to measure the host selection behavior of *Bagrada* bugs. Measurements of host attractiveness, host acceptance and host susceptibility of several Brassicaceous cultivars to *Bagrada* adults were completed. A manuscript has been prepared for publication. Preliminary studies designed to investigate the flight capability of *Bagrada* adults under various temperatures suggests that a temperature threshold exists for adult *Bagrada* bug flight.

Third Quarter (Apr 1, 2014 – Jun 30, 2014) Activities:

During this 3rd quarter, a field nursery was established at the Yuma Ag Center to collect *bagrada* bug adults for field studies to be conducted in August/September. A manuscript describing and reporting results from a laboratory study that measured the host selection behavior of *Bagrada* bugs on several Brassicaceous cultivars was completed. Studies investigating the flight capability of *Bagrada* adults under various temperatures and with different host plants were continued. Broccoli and cabbage transplants were grown in a nursery for fall trap crop studies.

Fourth Quarter (July 1, 2014 – Sep 30, 2014) Activities:

During this 4th quarter, we continued to maintain our *Bagrada* bug lab colony and field nursery at the Yuma Ag Center. In July, we initiated a study using broccoli (cotyledon stage) transplant trays to lure over-summering adults from alternative plant hosts. We were successful in trapping adults and observed a distinct pattern of movement of adults from alternate hosts (grasses, cotton, urban plants) onto brassica plants. We conducted 4 trials, where the last observations in mid-August trapped the highest numbers. In August we initiated a mark/release/recapture study where we marked 1000 adults with one of two protein markers and released them at distances of 500 and 100m downwind from broccoli plants. Results were mixed, and additional studies were initiated in the laboratory to refine the protein markers for greenhouse studies this spring and summer. In September we initiated a trap crop study in the field using insecticide –treated canola seed as a trap crop. Results were not positive and we are re-evaluating our experimental approach for future studies. We will continue our flight duration studies and responses of *bagrada* bugs to plant volatiles in wind tunnel experiments.

Problems and Delays

Third Quarter (Apr 1, 2014 – Jun 30, 2014) Activities:

- We've had a delay in transferring funds via a subaward to our USDA collaborators. Paperwork has been submitted and funding should be available by the 4th quarter.

Fourth Quarter (July 1, 2014 – Sep 30, 2014) Activities:

- Because of the delays in establishing a sub-award for our USDA collaborators, we have not spent any of the funding yet. They have essentially been working on their funding to this point. We plan to get a lab assistant hired this spring to complete the lab and greenhouse work. Additionally, we plan to purchase the lab supplies to complete both lab and field studies for summer 2015. USDA colleagues will expend travel funds in 2015 as well. Finally, we have used 2 acres of plot space to date (\$4,000) but have not been invoiced yet from YAC.

Future Project Plans

We plan to continue to maintain our Bagrađa bug lab colony and field nursery at the Yuma Ag Center during the winter (off season). Additional studies will continue in the laboratory to refine the protein markers for greenhouse studies this spring and summer. We will prepare and deliver our final research findings. We will prepare scientific journal articles.

Funding Expended To Date

No funding expended to date. The ADA is monitoring this project's budget closely. Slow spending is due to delayed contract with USDA. It is anticipated that spending will get back on track in the next reporting period.

2013 Arizona Agricultural Literacy Days Survey Analysis

A digital version of the recently published book, *Arizona Agriculture: Bee's Amazing Adventure*, was read by volunteers to elementary-school-aged children during the fall of 2013 as part of Arizona Agricultural Literacy Days, an event organized by the Agricultural Literacy Program through The University of Arizona College of Agriculture and Life Sciences Cooperative Extension. This is the first children's book that focuses entirely on Arizona's unique agriculture and specifically identified specialty crops. Immediately before the book was read, students were asked 14 questions regarding their knowledge of specialty crops grown in Arizona and their consumption of certain specialty crops. These questions were asked of the classroom as a whole and responses were given by a raise of hands which was recorded. The 14 questions were asked again approximately one week later.

In addition to reading the book, volunteers were responsible for asking the pre-questions and recording the responses. Teachers were responsible for asking the post-questions and providing demographic data.

Demographics:

All data was obtained through the 2013 Arizona Agricultural Literacy Days which is held annually in the fall with emphasis on the three days before Thanksgiving. The opportunity to volunteer as a reader was announced through various emails and Listservs. A total of 25 people volunteered and registered to visit 90 classrooms. Of the 25 volunteers, 22 provided pre-question data for 75 classrooms (an 88.0% response rate for 83.3% of the classrooms). Much of the data had errors, namely missing data or calculation errors; therefore, data for 45 classrooms were discarded and 30 were retained (40.0% retention rate). Of the 90 classrooms, 53 teachers provided post question and demographic data (58.9% response rate). Of these 53 classrooms, data from 44 classrooms were retained (83.0% retention rate), 9 of which were discarded for missing data and calculation errors.

From the 44 classrooms, there were a total of 1,124 students who participated, averaging 26 students per classroom. Four kindergarten classes totaled 117 students. Seven first-grade classes totaled 162 students. Nine second-grade classes totaled 205 students. Nine third-grade classes totaled 218 students. Thirteen fourth-grade classes totaled 354 students. Two sixth-grade classes totaled 68 students. Assuming all 90 classrooms were visited, the 2013 AZ Ag Lit Days reached approximately 2,340 students. Race/Ethnicity and gender are broken down in the following table.

GRADE	n	GENDER	ETHNICITY					TOTAL
			White	Hispanic	Black	Asian American	Native American	
K	4	Male	31	18	1	1	1	52
		Female	44	19	1	1	0	65
1 st	7	Male	63	14	0	2	3	82
		Female	58	15	1	5	1	80
2 nd	9	Male	75	40	3	1	0	119
		Female	57	23	4	2	0	86
3 rd	9	Male	53	55	6	3	4	121
		Female	41	45	7	1	3	97
4 th	13	Male	120	34	9	4	5	172
		Female	126	38	6	7	5	182
6 th	2	Male	24	6	1	1	0	32
		Female	23	9	2	2	0	36
TOTAL	44		715	316	41	30	22	1124

Survey Questions and Administration:

Volunteers were instructed to ask students 14 questions prior to reading the book *Arizona Agriculture: Bee's Amazing Adventure*. Respondents raised their hands to the affirmation, volunteers recorded this number, and volunteers submitted this data online. Teachers were instructed to ask these same 14 questions to their students 1 week after the reading. Questions were asked and recorded in the same manner as before. Teachers submitted this data online in addition to their classroom's demographic data.

Seven of the fourteen questions were intended to measure students' pre- and post-reading knowledge of specialty crops grown in Arizona. The other seven questions were intended to measure students' recent consumption of specialty crops. The fourteen questions are as follows:

1. Raise your hand if you think that the **lettuce** sold in the local grocery stores is grown in Arizona.
2. Raise your hand if you have eaten any **lettuce** in the past 24 hours.
3. Raise your hand if you think that the **melons** sold in the local grocery stores are grown in Arizona. Examples of melons are watermelons, cantaloupes, & honeydews.
4. Raise your hand if you have eaten any **melons** in the past 24 hours.
5. Raise your hand if you think that the **pistachio** and **pecan** nuts sold in the local grocery stores are grown in Arizona.
6. Raise your hand if you have eaten any **pistachio** or **pecan** nuts in the past 24 hours.
7. Raise your hand if you think that the **chile peppers** sold in the local grocery stores are grown in Arizona.
8. Raise your hand if you have eaten any **chile peppers** in the past 24 hours.
9. Raise your hand if you think that the **citrus** sold in the local grocery stores are grown in Arizona. Examples of citrus are oranges, lemons, grapefruit, & tangerines.
10. Raise your hand if you have eaten any **citrus** in the past 24 hours.

11. Raise your hand if you think that the **eggs** sold in the local grocery stores are grown in Arizona.
12. Raise your hand if you have eaten any **eggs** in the past 24 hours.
13. Raise your hand if you think that the **honey** sold in the local grocery stores is made by Arizona bees.
14. Raise your hand if you have eaten any **honey** in the past 24 hours.

Results:

The following questions related to knowledge are **statistically significant** ($p \leq .010$ at the $\alpha=.05$ level). This is to say that there is a 1% or less chance that the change in students' mean scores is attributed to something other than the book. The converse of this is that there is a 99.0% or greater chance that the change in students' mean scores is attributed to the book.

#	QUESTION	<i>p</i> value	Pre-survey Mean	Post-Survey Mean	% Change
1	Raise your hand if you think that the lettuce sold in the local grocery stores is grown in Arizona.	.000	0.406	0.748	+84.3%
3	Raise your hand if you think that the melons sold in the local grocery stores are grown in Arizona. Examples of melons are watermelons, cantaloupes, & honeydews.	.003	0.549	0.703	+28.0%
5	Raise your hand if you think that the pistachio and pecan nuts sold in the local grocery stores are grown in Arizona.	.000	0.336	0.610	+81.6%
9	Raise your hand if you think that the citrus sold in the local grocery stores are grown in Arizona. Examples of citrus are oranges, lemons, grapefruit, & tangerines.	.001	0.710	0.840	+18.3%
11	Raise your hand if you think that the eggs sold in the local grocery stores are grown in Arizona.	.006	0.624	0.756	+21.2%

The following questions related to knowledge are **not statistically significant** ($p > .010$ at the $\alpha=.05$ level). This is to say that any change in students' mean scores is attributed to something other than the book.

#	QUESTION	<i>p</i> value	Pre-survey Mean	Post-Survey Mean	% Change
7	Raise your hand if you think that the chile peppers sold in the local grocery stores are grown in Arizona.	.202	0.695	0.747	+7.6%
13	Raise your hand if you think that the honey sold in the local grocery stores is made by Arizona bees.	.019	0.776	0.730	-6.0%

The following questions related to consumption is **statistically significant** ($p \leq .010$ at the $\alpha=.05$ level). This is to say that there is a 1% or less chance that the change in students' mean scores is attributed to something other than the book. The converse of this is that there is a 99.0% or greater chance that the change in students' mean scores is attributed to the book.

#	QUESTION	<i>p</i> value	Pre-survey Mean	Post-Survey Mean	% Change
14	Raise your hand if you have eaten any honey in the past 24 hours.	.002	0.367	0.241	-34.4%

The following questions related to consumption is **not statistically significant** ($p > .010$ at the $\alpha=.05$ level). This is to say that any change in students' mean scores is attributed to something other than the book.

#	QUESTION	<i>p</i> value	Pre-survey Mean	Post-Survey Mean	% Change
2	Raise your hand if you have eaten any lettuce in the past 24 hours.	.137	0.395	0.402	+12.1%
4	Raise your hand if you have eaten any melons in the past 24 hours.	.376	0.259	0.271	+4.6%
6	Raise your hand if you have eaten any pistachio or pecan nuts in the past 24 hours.	.207	0.250	0.221	-11.9%
8	Raise your hand if you have eaten any chile peppers in the past 24 hours.	.183	0.335	0.292	-12.8%
10	Raise your hand if you have eaten any citrus in the past 24 hours.	.464	0.562	0.558	-0.7%
12	Raise your hand if you have eaten any eggs in the past 24 hours.	.296	0.494	0.472	-4.5%

Conclusion:

Five of the seven questions related to knowledge regarding specialty crops (1, 3, 5, 9, & 11) were statistically significant. This means that 1) the students as a whole were better able to answer these five questions more correctly, that 2) this increased ability was substantial, and that 3) their ability to do so is due to what they learned from the book.

With regards to questions 7 & 13 related to knowledge about chile peppers and honey, a high percentage of students correctly answered these questions on the pre-survey indicating a high initial knowledge. Statistically speaking, the difference between the pre- and post-means scores are non-existent. Since the mean scores were so high, it is reasonable to conclude that there was little room for knowledge increase among the students as a whole.

Questions 2, 4, 6, 8, 10, 12, and 14 all attempted to measure students' consumption of specialty crops. A limiting factor in this measurement is that students have very little decision making in what food is brought into the home. This is more of a function of the eating habits of the adults in their lives. It is conceivable that students' desire to eat specialty crop foods did increase, but that these foods were not made available to the students.

With regards to question 14 related to honey consumption, it was not expected that students' report would be significantly less. This result may give more credence to the limitations of the study's design. Answering questions in a group has a high tendency for social conformity. Meaning, if individuals are aware that their answer is different than a large enough number of peers, then that person may be influenced to change his/her answer to be more similar to the group at large. Furthermore, there is also a tendency in youth to provide answers similar to their friends. These factors may have been highly present for question 14.

Further research is needed to accurately measure a change in students' consumption of specialty crops and food in general. Additionally, the limitations of this study's design indicates the need for further research to ascertain how influential the book is at increasing students' knowledge about Arizona's specialty crops. Results from this study indicate that there may be a positive influence and can be beneficial to students' education.