

# **The Agricultural Extension Team: Enhancing Stakeholder Input and Coordinated Program Planning and Delivery to Agricultural Clientele Statewide (an SPT project)**

## **2011 Grant Report**

### **Goals/Objectives**

- (1) Through a variety of **stakeholder engagement** mechanisms, we will continue to identify research and information needs of agriculture clientele statewide.
- (2) We will further **improve communication** between specialists and agents within Cooperative Extension to enhance program planning and delivery to meet clientele needs.
- (3) We will provide quality up-to-date research-based **education and outreach** to stakeholders via Extension meetings and workshops, e-mail communications and publications.

### **Outputs, Outcomes and Impacts**

#### **1. Stakeholder Engagement**

##### **1a. Needs Assessment**

Identification of agricultural stakeholder research and education needs is a critical and ongoing part of extension program planning. In 2009-2010, the team developed an Agronomic Crops IPM Needs Assessment survey to determine priority research and education needs for field crops. Preliminary results pointed to the need for more information on alfalfa and wheat management for insect pests and weeds. In addition, Shawna Loper and Ayman Mostafa, two new county agents in central Arizona who started in spring 2011, have been conducting their own clientele needs assessments to help direct their future efforts and program planning. In addition, Ayman has continued to collect additional data for the Agronomic Crops IPM Needs Assessment at face-to-face meetings and online, via Survey Monkey. This input will help direct our future efforts in field crops IPM.

##### **1b. Crop Pest Losses Workshops**

Another form of stakeholder engagement occurs via the Crop Pest Losses and Impact Assessment Working Group. Through this activity, funded by the Western IPM Center, we annually engage pest control advisors working in cotton, lettuce and melons, through a series of face to face workshops designed to develop data on crop yield losses due to pests and other factors, and the economic impact of pests and pest management practices. In 2010 – 2011, we held 6 workshops (4 for cotton and one each for lettuce and melons). Survey data are used to identify pest management research and education needs for our cotton and vegetable IPM programs. (See <http://cals.arizona.edu/apmc/croplosswg.html> for more information on this project and links to related ACIS pages, including survey data). These workshops also serve as a venue for two-way dialog with PCAs on important pest management issues. For example, in 2010 – 2011, John Palumbo engaged PCAs to learn about their experiences with the

invasive bagrada bug. This baseline data on bagrada bug populations and management practices will be useful for measuring changes in vegetable management as the growers adjust to this new invasive pest.

### **1c. Advisory Committees**

Another important source for stakeholder input for program planning is advisory committees. These exist at the state and county level, and some are project-specific. In addition to county advisory groups, we convene the IPM Coordinating Committee, a 21-member multidisciplinary stakeholder committee that guides our IPM programs statewide. This past year, the committee was expanded to include new faculty (Ayman Mostafa) and external stakeholders (Tom Montoya, a PCA). We held an exciting meeting on April 13, 2011 that included reviews of program accomplishments by each of our new Leadership Teams (see <http://cals.arizona.edu/apmc/coordinating.html#notes>).

The 1080 database advisory group is made up of PCAs, growers, commercial applicators and ag-chemical industry representatives that are providing input into the development of the Arizona Pest Management Center Pesticide Database, which includes 20 years of Arizona agricultural pesticide use data. These data have been useful for identification of pest management research and education needs and extension program planning. For example, we queried the database to determine the most effective locations and target audience for a series of soil fumigation trainings held in Spring 2011. The data have already been used to provide input on federal pesticide information requests that have informed registration issues (see [http://ag.arizona.edu/apmc/Arid\\_SWPMC\\_Info\\_Requests.html](http://ag.arizona.edu/apmc/Arid_SWPMC_Info_Requests.html)).

## **2. Improve Communication within Cooperative Extension**

### **2a. Formation of IPM Leadership Teams**

With the hiring this past year of 3 new Assistants in Extension (Lydia Brown, Agronomic Crops IPM; Bryan Stevens, Community IPM; and Wayne Dixon, IPM Assessment), we have now organized Leadership Teams, small committees, which guide the program development and the activities of each Assistant in Extension. Leadership Teams include multidisciplinary faculty and, in some cases, external stakeholders. In addition to the 3 Leadership Teams mentioned above, Marco Peña works under the guidance of the Vegetable IPM Leadership Team. This re-structuring has proven to be a very effective model for keeping these new resources focused on the most important activities and outputs.

### **2b. Team Meetings**

The Extension Ag Team met twice this past year, in August 2010 to plan late season Extension meetings last year, and in April 2011 to plan early and midseason meetings this year. We delayed our spring meeting later than usual this year to ensure the involvement of new county agents, Shawna Loper and Ayman Mostafa. Their arrival has greatly energized the team to a new level of activity and outputs. In addition, a conference call is scheduled for July 21. Meeting notes are available on the APMC Integrated Crop Management Team webpage at [http://cals.arizona.edu/apmc/cotton\\_team/index.html#notes](http://cals.arizona.edu/apmc/cotton_team/index.html#notes) and on the Agronomic IPM Team webpage at [http://cals.arizona.edu/apmc/agronomic\\_ipm.html](http://cals.arizona.edu/apmc/agronomic_ipm.html).

## **2c. Team Email List**

Between meetings, the Ag Team maintains an email list to ensure ongoing communication and planning among team members.

## **2e. Team Websites**

The Arizona Pest Management Center websites hosts working group web pages (cited above) for the Integrated Crop Management Team, the Agronomic IPM Team and the Crop Pest Losses working group, all subsets of our Agricultural Extension Team. These web pages provide a point of contact for Team members to post meeting notes and share current information and resources.

## **2f. Mentoring**

The existence and regular meetings of this group have facilitated mentoring of new and junior faculty members by tenured and senior faculty. This mentoring aspect has increased with the hiring of new county agents and assistants in extension. For example, new faculty have had one on one sessions with senior faculty on topics such as needs assessment, survey development and grant writing.

## **3. Education and Outreach: Outputs, Outcomes and Impacts**

The Ag Team's educational outputs this past year have exceeded those of the past several years, in part because of the contributions of new faculty and in part because of an increase in leveraged resources to deliver Extension outputs.

### **3a. Leverage**

The activities described in this section were leveraged by a number of grants and other external resources, including the following:

- Ellsworth, P.C. & A. Fournier. 2010-2012. The Arizona Pest Management Center: Enhancing Capacity for IPM Practice in Diverse Environments. Extension IPM Coordination Program. \$525,000 (3 years).
- Ellsworth, P.C. 2010. Pesticide Safety Education Program (PSEP). \$23,276.
- Ellsworth, P.C. & A. Fournier. 2010. State Funds to Augment Extension IPM Programs. University of Arizona College of Agriculture and Life Sciences. \$55,000.
- Ellsworth, P.C., A. Fournier & Norton, R. Development and Implementation of a Statewide Training and Education Program for the Use of Soil Fumigants in Arizona Crop Production Systems. Environmental Protection Agency. \$15,000.
- Fournier, A., P. Ellsworth, J. Palumbo, M. Olsen, W. McCloskey. 2010-2011. Crop Pest Losses and Impact Assessment Working Group. Western IPM Center. \$20,000 (2 years).
- Ellsworth, P. Commodity Reference and Survey Guidelines for Cotton Pests. 2010. USDA-APHIS-PPQ-CPHST. \$47,999.
- Fournier, A., P.C. Ellsworth & J. Peterson. 2010-2013. Pesticide Information Empowers Progressive Vegetable Industry. Arizona Department of Agriculture, Specialty Crops Block Grant Program. \$142,426. (3 years).

- Palumbo, J. 2010. Enhancing Arizona Vegetable Extension IPM Programs. Arizona Department of Agriculture, Specialty Crops Block Grant Program. \$37,125.
- Palumbo, J. 2011-2013. Enhancing Arizona Vegetable IPM in Arizona. Arizona Department of Agriculture, Specialty Crops Block Grant Program. \$87,709. (3 years)
- Brown, L., P.C. Ellsworth, A. Fournier, S. Naranjo & A. Mostafa. 2011. Reduced Risk Pesticide Use in Arizona Cotton. Field Demonstrations-reduced risk pesticide use-FY 2011. Arizona Department of Agriculture. \$16,304.

Without these external resources secured by faculty, our Extension program outputs would be severely limited.

### **3b. Extension Meetings, Workshops and Field Days**

The Ag Team organized and delivered 28 extension meetings between 7/13/10 and 7/14/11, including 6 Crop Pest Losses workshops, indoor meetings, “tent talks” and other field-based meetings. In addition, several faculty (including Ellsworth, Palumbo, Tickes and Matheron) delivered presentations at state and regional conferences including the Desert Agriculture Conference and the Southwest Agriculture Summit. As summarized in the table presented at the end of this report, at least 94 Arizona Dept. of Agriculture CEUs, 56.5 California Dept. of Pesticide Regulation CEUs and 19 Certified Crop Advisor CEUs were delivered. Attendees are very conservatively estimated at over 1,600 people. (For some meetings I lack data on number of attendees.) The idea to arrange “Tent Talks”, short field-based meetings on focused topics, arose out of the needs assessments conducted by Shawna and Ayman. This meeting format has been well received, and we have delivered 6 Tent Talk meetings to date.

The Soil Fumigation Education Team was formed this year to develop and deliver a series of Extension workshops to educate growers and applicators about new label requirements for soil fumigants. The Team, led by Randy Norton, included colleagues from the Arizona Department of Agriculture and industry fumigant trainer Jerome Otto. They developed a series of presentations based on EPA modules on soil fumigant topics, and delivered very well received trainings that included fit testing for personal protective equipment. In all, 5 agricultural fumigation workshops were presented in key areas of the state, and a sixth one for turfgrass fumigation. The team set up a website with links up-to-date information and resources, including EPA’s Soil Fumigant Toolbox [http://cals.arizona.edu/apmc/soil\\_fumigant\\_education\\_team.html](http://cals.arizona.edu/apmc/soil_fumigant_education_team.html).

The Southwest Ag Summit held in Yuma in March attracted 760 participants including 131 students, and delivered 12 AZ, 12 CA and 12 CCA CEUs in the breakout sessions alone. Presenters for the Ag Team included John Palumbo, Randy Norton and Al Fournier.

In addition to specific trainings mentioned above, and independent from the CEU tally given, a number of pesticide safety trainings were held throughout the state to support initial licensing of new applicators and continuing education of license holders. Meetings were held in remote parts of the state and also in Utah, reaching diverse audiences including many tribal members. From March 2010 through

March 2011, 79 private applicators and 50 commercial applicators received initial pesticide applicator certifications and over 1,100 individuals received CEUs, including agricultural and urban pest management CEUs.

### **3c. Advisories**

**Agent Advisories.** With the coming of the new county agents in central Arizona, we have resumed delivery of timely weekly crop and pest management advisories to over 450 email subscribers in central AZ (Pinal, Pima and Maricopa Counties). This is in addition to ongoing advisories sent out in Yuma, LaPaz, Graham and Cochise counties. Now these timely updates are reaching all agricultural areas of the state once again. All of these advisories draw upon the important work of specialists, including Paul Brown's weather advisory data and specific outputs of specialists such as described below in this section.

**Vegetable IPM Updates.** In January 2010, with the coordination of Marco Peña, the Vegetable Crops IPM Leadership Team (Palumbo, Tickes, Matheron and Nolte) began putting out the Veg IPM Updates on a biweekly basis. These updates deliver timely information to end-users via web, email and smart phone. Delivered 36 biweekly updates since January 2010 on insect, disease and weed management topics. These reached over 450 Arizona and California stakeholders by email list, and at least 300 stakeholders via the Arizona Crop Information Site (<http://ag.arizona.edu/crops/vegetables/advisories/advisories.html>). In addition, the same team has produced and posted 21 vegetable IPM videos to date (8 on insects, 10 on weed control and 3 on diseases) and created video archive webpage at <http://ag.arizona.edu/crops/vegetables/videos.html>. Stakeholders have responded with enthusiasm about the quality and timeliness of these updates. We have seen a steady increase in attendance at educational meetings and a 2-fold increase in listserve membership for Veg IPM updates. Two regional agricultural publications, Western Farm Press, and Western Agri-Radio Network have requested to use and further distribute our "updates" to larger audiences.

**Field Crops IPM Shorts.** The Field Crops IPM Leadership Team (Ellsworth, Ottman, Norton, McCloskey, Mostafa and Fournier), working with Assistant in Extension Lydia Brown, have followed the tradition of the Vegetable IPM Leadership Team in producing short, timely advisory pieces on field crops pest management and getting these out to the broadest audience possible. Starting in June 2011, they began producing "Field Crops IPM Shorts" on a weekly basis. Each "short" is a one-page article on a timely topic of interest that includes photos, data and/or graphics. Topics so far have included natural enemies of cotton pests, selective insecticides, cotton pest thresholds, and a guide to glyphosate products for weed control. The pieces go out weekly to at least 360 stakeholders via agent email lists, and have also been picked up each week and redistributed by Western Farm Press while some pieces have been distributed by the National Cotton Council and Southwestern Farm Press, reaching many tens of thousands of readers. The pieces are archived on the ACIS site at [http://ag.arizona.edu/crops/cotton/agronomic\\_ipm.html](http://ag.arizona.edu/crops/cotton/agronomic_ipm.html).

### 3d. Websites

**Arizona Crop Information Website.** The ACIS website (<http://ag.arizona.edu/crops/>) hosts current information and publications for clientele on crop production and pest management and is a primary outlet for Extension outputs. The site also provides clientele with information about upcoming meetings and pesticide regulatory updates. Our ACIS email list includes about 300 participants, and is used to send updates to clientele on new extension publications, emerging pest or pesticide issues and upcoming events.

**Arizona Pest Management Center Website.** The APMC website hosts Team and Working Group pages that facilitate communication among Ag Team Members.

The Ag Team site: [http://cals.arizona.edu/apmc/cotton\\_team/index.html](http://cals.arizona.edu/apmc/cotton_team/index.html)

Agronomic IPM Leadership Team: [http://cals.arizona.edu/apmc/agronomic\\_ipm.html](http://cals.arizona.edu/apmc/agronomic_ipm.html)

Soil Fumigant Education Team: [http://cals.arizona.edu/apmc/soil\\_fumigant\\_education\\_team.html](http://cals.arizona.edu/apmc/soil_fumigant_education_team.html)

Crop Pest Losses Working Group: <http://cals.arizona.edu/apmc/croplosswg.html>

Cross-Commodity Research and Outreach Program (CROP): <http://cals.arizona.edu/apmc/cross-commodity.html>

### 3e. Publications

A summary of new or revised articles and publications that represent outputs of this group:

#### Extension Publications: Field Crops IPM Shorts

Ellsworth, P., L. Brown, A. Fournier, X. Li, J. Palumbo & S. Naranjo. 2011. Field Crops IPM Short: Keeping Cotton Green. University of Arizona Cooperative Extension.

<http://ag.arizona.edu/crops/cotton/files/SelectiveChemicalControlsvF.pdf>. July 2011

Ellsworth, P., A. Mostafa, L. Brown & S. Naranjo. 2011. Field Crops IPM Short: Soft Bodied *Collops* Like Soft Bodies. University of Arizona Cooperative Extension.

<http://ag.arizona.edu/crops/cotton/files/CollopsVFlo.pdf>. July 2011

Ellsworth, P. & L. Brown. 2011. Field Crops IPM Short: Drapetis Fly: Natural Whitefly Enemy in Cotton. University of Arizona Cooperative Extension. <http://ag.arizona.edu/crops/cotton/files/DrapetisvF.pdf>. June 2011

Ellsworth, P., L. Brown, A. Fournier & S. Naranjo. 2011. Field Crops IPM Short: \$1-plus Cotton: New Insect Thresholds? University of Arizona Cooperative Extension.

<http://ag.arizona.edu/crops/cotton/files/NewThresholdsvF.pdf>. June 2011

McCloskey, W. & L. Brown. 2011. Field Crops IPM Short: Increasing Glyphosate Activity. University of Arizona Cooperative Extension. <http://ag.arizona.edu/crops/cotton/files/GlyphosatevF.pdf>. July 2011.

#### Extension Publications: Vegetable IPM Updates

Palumbo, J.C., B. Tickes, M. Matheron, M. Peña. 2010-2011. Vegetable IPM Updates. University of Arizona Cooperative Extension. (These updates are published bi-weekly, sent out by smart phone and email and posted the ACIS website. Each update contains one short timely paragraph each on insect management, weed management and disease management in vegetables. Sometimes other topics are featured. 13 Updates were posted between July 2010 and July 2011). Archived on the ACIS website. <http://ag.arizona.edu/crops/vegetables/advisories/archive.html>

Palumbo, J. C. 2011. Assessment of Insect Losses and Insecticide Use on Arizona Head Lettuce, 2004-2010. UA Veg IPM Update, Vol 2, No. 8. April 20, 2011.

#### Other Extension Publications

Ellsworth, P.C. When is “Done is done?” Making late season insect control decisions. 2010. Presented at Late Season Production Meeting, Parker, AZ. 8/13/10. (Published, annotated presentation.) [http://ag.arizona.edu/crops/presentations/10Parker\\_LT\\_decisionsvF2lo.pdf](http://ag.arizona.edu/crops/presentations/10Parker_LT_decisionsvF2lo.pdf)

Ellsworth, P.C. 2010. Lygus in Cotton No. 4: Chemical Control Termination Guidelines (Draft). University of Arizona Cooperative Extension Circular (peer reviewed), 2 pp. [http://ag.arizona.edu/crops/presentations/DRAFT\\_LT\\_guide2-pg.pdf](http://ag.arizona.edu/crops/presentations/DRAFT_LT_guide2-pg.pdf)

Ellsworth, P.C., A. Fournier, P. Goodell, D. Kerns, M. Parajulee, Y. Carrière. 2010. The influence of landscape on Lygus Management: What can growers do about it? P-IE Symposium, “Transcending Geography with Regional Cotton IPM Projects”, Entomological Society of America, San Diego, CA. 12/14/10 (invited). (Published, annotated presentation.)

Ellsworth, P.C., S. Li, B. Tabashnik, J. Holloway, R. Humphries. 2011. Pink bollworm efficacy dynamics in Twinlink™ cotton. Beltwide Cotton Conference Proceedings, National Cotton Council, in press.

Ellsworth, P.C., J. Palumbo, A. Fournier, X. Li, S. Naranjo. 2010. Whitefly Management: Multi-Crop Systems. IRAC Symposium, “Understanding and Capitalizing on Agricultural Biodiversity in IPM/IRM”, Entomological Society of America, San Diego, CA. 12/14/10 (invited). (Published, annotated presentation.) [http://ag.arizona.edu/crops/presentations/10ESA\\_IRAC\\_Bemisia7Flo.pdf](http://ag.arizona.edu/crops/presentations/10ESA_IRAC_Bemisia7Flo.pdf)

Olsen, M.W. 2011. True Mistletoes. University of Arizona Cooperative Extension, Publication AZ1308 (revised). <http://cals.arizona.edu/pubs/diseases/az1308.pdf>

Olsen, M.W. 2011. Verticillium Wilt. University of Arizona Cooperative Extension, Publication AZ1034 (revised). <http://cals.arizona.edu/pubs/crops/az1034.pdf>

Richardson, J.M., B.A. Castro, J.D. Thomas, P.C. Ellsworth, L.D. Godfrey, D.L. Kerns, 2010. Control of Western Tarnished Plant Bug, *Lygus hesperus*, with Dow AgroSciences Sulfoxaflor Insecticide in Cotton. Beltwide Cotton Conference Proceedings, National Cotton Council. p. 1205.

Richardson, J.M., B.A. Castro, J.D. Thomas, P.C. Ellsworth, L.D. Godfrey & D.L. Kerns. 2011. Transform™: field performance against *Lygus hesperus* in cotton. Beltwide Cotton Conference Proceedings, National Cotton Council, in press.

Schuch, U.K. and J. J. Kelly. 2011. Selecting, Planting, and Staking Trees. University of Arizona Cooperative Extension Publication AZ1402 (CD of 36 slides with notes, revised)  
<http://cals.arizona.edu/pubs/summary/az1402ndx.html>

### Reports

Brown, P.W., P.C. Ellsworth, M. Olsen, J. Silvertooth, R. Tronstad. 2010. Stub Cotton Production in Arizona. A Review and Feasibility Study. An invited analysis by the Arizona Cotton Growers Association. 29 pp.

Ellsworth, P.C. 2010. Pink Bollworm Control Costs & Value of Bt Technologies to AZ Cotton Growers. Report to AZ Cotton Growers Association & reprinted in ACGA newsletter, and submitted to Monsanto Company, 4 pp.

Ellsworth, P.C. 2011. Cotton IPM: A Quiet Revolution Reduces Costs, Losses and Risks for Arizona's Cotton Growers. University of Arizona College of Agriculture and Life Sciences Impact Report.  
[http://ag.arizona.edu/apmc/docs/CottonIPM2011\\_Impacts.pdf](http://ag.arizona.edu/apmc/docs/CottonIPM2011_Impacts.pdf)

Nolte, K.D., M. Ottman, T. Teegerstrom and G. Wang. 2010. Minimum Tillage for Wheat Following Winter Vegetables. Extension Research Report. A College of Agriculture Report Series, University of Arizona, College of Agriculture and Life Sciences, Tucson, Arizona  
<http://ag.arizona.edu/pubs/crops/az1523.pdf>

Subramani, J. & E.C. Martin. 2011. Effects of yearly laser leveling on yield and irrigation: a large scale demonstration. Cotton Research & Outreach 2009 – 2010. University of Arizona, College of Agriculture and Life Sciences.

Subramani, J. & E.C. Martin. 2011. Effects of every row versus every other row irrigation: a large scale demonstration. Cotton Research & Outreach 2009 – 2010. University of Arizona, College of Agriculture and Life Sciences.

Wang, G. & R. Asiiimwe. 2010. Effects of 1-MCP and Quadris on Cotton Growth and Yield. Cotton Research & Outreach 2009 – 2010. University of Arizona, College of Agriculture and Life Sciences.

Wang, G. R. Asiiimwe, P. Andrade & M. Sheedy. 2010. Simulated Hail Damage in Cotton. Cotton Research & Outreach 2009 – 2010. University of Arizona, College of Agriculture and Life Sciences.

### Journal & Peer-Reviewed

Naranjo, S.E. and P. C. Ellsworth. 2010. Fourteen years of Bt cotton advances IPM in Arizona. *Southwest. Entomol.* 35: 437-444.

Palumbo, J. C. 2011. Influence of adjuvants and spray timing of Movento on aphid contamination and crop injury in baby spinach. Online. *Plant Health Progress* doi:10.1094/PHP-2011-0630-01-RS. <http://www.plantmanagementnetwork.org/sub/php/research/2011/spinach/>

Richards, T. J., P. C. Ellsworth, R. Tronstad and S. E. Naranjo. 2010. Market-based instruments for the optimal control of invasive species: *Bemisia tabaci* in Arizona. *J. Agric. Resource Econ.* 35: 349-367.

Tabashnik, B. E., M. S. Sisterson, P. C. Ellsworth, T. J. Dennehy, L. Antilla, L. Liesner, M. Whitlow, R. T. Staten, J. A. Fabrick, G. C. Unnithan, A. J. Yelich, C. Ellers-Kirk, V. S. Harpold, X. Li and Y. Carrière. 2010. Suppressing resistance to Bt cotton with sterile insect releases. *Nature Biotechnology*: 28(12): 1304-1307 (+ online methods & supplementary information, 10 pp.).

### Western Farm Press Articles, July 2010 – July 2011

Ag Team members have had extension work spotlighted nearly every week over the past year. Articles presented by author, most recent first.

Blake, C. 2011. (Fournier, A., contributor). IPM Delivers Monumental Gains in Arizona Agriculture. Western Farm Press. <http://westernfarmpress.com/cotton/ipm-delivers-monumental-gains-arizona-agriculture>. July 21, 2011.

Blake, C. 2011. (Norton, R., contributor). Cover crop trials to improve Arizona cotton production. Western Farm Press. <http://westernfarmpress.com/cotton/cover-crop-trials-improve-arizona-cotton-production>. June 10, 2011.

Blake, C. & R. Norton. Cover crops bring improved soil for cotton growers. Western Farm Press. (Video interview with R. Norton.) <http://westernfarmpress.com/cotton/cover-crops-bring-improved-soil-cotton-growers>. June 9, 2011.

Blake, C. 2011. (Ellsworth, p., contributor). Gaming simulation to improve lygus control in cotton. Western Farm Press. <http://westernfarmpress.com/cotton/gaming-simulation-improve-lygus-control-cotton>. June 9, 2011.

Blake, C. 2010. (Ellsworth, p., contributor). Desert cotton – insect sweeping, identification. Western Farm Press. <http://westernfarmpress.com/cotton/desert-cotton-insect-sweeping-identification>. August 4, 2010.

Ellsworth, P., L. Brown, A. Fournier, X. Li, J. Palumbo & S. Naranjo. 2011. Keeping Cotton a Green Crop. Western Farm Press. <http://westernfarmpress.com/cotton/keeping-cotton-green-crop>. July 19, 2011

Ellsworth, P. & L. Brown. 2011. Drapetis Fly: Natural Whitefly Enemy in Cotton. Western Farm Press. <http://westernfarmpress.com/cotton/drapetis-fly-natural-whitefly-enemy-cotton>. July 5, 2011

Ellsworth, P., L. Brown, A. Fournier & S. Naranjo. 2011. \$1-plus Cotton: New Insect Thresholds? Western Farm Press. <http://westernfarmpress.com/cotton/1-plus-cotton-new-insect-thresholds>. July 5, 2011

Farm Press Staff. 2011. (Palumbo, J., B. Tickes, M. Matheron & M. M. Peña contributors). Arizona Veg IPM: CYSDV, sclerotinia lettuce drop, and sprangletop. Western Farm Press. <http://westernfarmpress.com/vegetables/arizona-veg-ipm-cysdv-sclerotinia-lettuce-drop-and-sprangletop>. July 13, 2011.

Farm Press Staff. 2011. (Palumbo, J., B. Tickes, M. Matheron & M. M. Peña contributors). Arizona Veg IPM: CYSDV, sclerotinia lettuce drop, and sprangletop. Western Farm Press. <http://westernfarmpress.com/vegetables/arizona-veg-ipm-cysdv-sclerotinia-lettuce-drop-and-sprangletop>. June 29, 2011.

Farm Press Staff. 2011. (Palumbo, J., B. Tickes, M. Matheron & M. M. Peña contributors). Arizona Veg IPM: whitefly-CYSDV management, pythium link, weed seeds and fire. Western Farm Press. <http://westernfarmpress.com/vegetables/arizona-veg-ipm-whitefly-cysdv-management-pythium-link-weed-seeds-and-fire>. June 15, 2011.

Farm Press Staff. 2011. (Palumbo, J., B. Tickes, M. Matheron & M. M. Peña contributors). Arizona Veg IPM: spring melons, plant resistance-tolerance, backpack sprayer calibration. Western Farm Press. <http://westernfarmpress.com/vegetables/arizona-veg-ipm-spring-melons-plant-resistance-tolerance-backpack-sprayer-calibration>. June 3, 2011.

Farm Press Staff. 2011. (Palumbo, J., B. Tickes, M. Matheron & M. M. Peña contributors). Arizona Veg IPM: insecticide use, lettuce drop, pigweed and the lysimeter. Western Farm Press. <http://westernfarmpress.com/vegetables/arizona-veg-ipm-insecticide-use-lettuce-drop-pigweed-and-lysimeter>. May 19, 2011.

Farm Press Staff. 2011. (Palumbo, J., B. Tickes, M. Matheron & M. M. Peña contributors). Arizona Veg IPM: whitefly, powdery mildew management on melons. Western Farm Press. <http://westernfarmpress.com/vegetables/arizona-veg-ipm-whitefly-powdery-mildew-management-melons>. May 4, 2011.

Farm Press Staff. 2011. (Palumbo, J., B. Tickes, M. Matheron & M. M. Peña contributors). Arizona Veg IPM: insect losses, melon powdery mildew, nutsedge. Western Farm Press. <http://westernfarmpress.com/vegetables/arizona-veg-ipm-insect-losses-melon-powdery-mildew-nutsedge>. April 22, 2011.

Farm Press Staff. 2011. (Palumbo, J., B. Tickes, M. Matheron & M. M. Peña contributors). Arizona Veg IPM: produce pests, lettuce powdery mildew, shepardspurse. Western Farm Press. <http://westernfarmpress.com/vegetables/arizona-veg-ipm-produce-pests-lettuce-powdery-mildew-shepardspurse>. March 24, 2011.

Farm Press Staff. 2011. (Palumbo, J., B. Tickes, M. Matheron & M. M. Peña contributors). Arizona Veg IPM: Bagrada bug, gray mold, weed laws. Western Farm Press.  
<http://westernfarmpress.com/vegetables/arizona-veg-ipm-update-bagrada-bug-gray-mold-weed-laws>. March 10, 2011.

Farm Press Staff. 2011. (Palumbo, J., B. Tickes, M. Matheron & M. M. Peña contributors). Arizona Veg IPM: thrips, downy mildew, ditch herbicides. Western Farm Press.  
<http://westernfarmpress.com/vegetables/arizona-veg-ipm-thrips-downy-mildew-ditch-herbicides>. Feb 24, 2011.

Farm Press Staff. 2011. (Palumbo, J., B. Tickes, M. Matheron & M. M. Peña contributors). Arizona Veg IPM: aphid management, freeze-chill injury, wheat. Western Farm Press.  
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**Appendix A (next page): Table of Extension Meetings, July 2010 – July 2011.**

Date	Meeting	AZ CEUs	CA CEUs	CCA CEUs	Participants
7/13/10	Melon Pest Losses Workshop, Yuma AZ	2	2		15
8/13/10	Late Season Crop, Pest and Weed Management Workshop, Parker AZ	5	5		
8/31/10	Preseason Vegetable Workshop, Yuma, AZ	3	3	3	57
11/23/10	THE 21st ANNUAL FALL DESERT CROPS WORKSHOP, El Centro, CA	3.5	4	4	
11/2/11	Cotton Pest Losses, Maricopa	2.5			12
11/12/11	Cotton Pest Losses, Yuma	2.5			3
11/12/11	Cotton Pest Losses, Blythe, CA	2.5			13
12/2/10	Cotton Pest Losses, Yuma	2.5			2
2/15/11	Early Season Crop and Pest Management Workshop, Poston, AZ: Included presentation on insect management in alfalfa and cotton by Vonny Barlow	4	4		
2/22/11	Soil Fumigation Training, Yuma	4.5	4.5		45
2/23/11	Soil Fumigation Training, Buckeye	4.5	4.5		27
2/24/11	Soil Fumigation Training, Willcox	4.5	4.5		16
2/24/11	Bin Fumigation Training, Willcox	2	2		10
2/25/11	Soil Fumigation Training, Maricopa	4.5	4.5		16
3/9 - 3/10	Southwest Ag Summit, Yuma. 1080 Presentation	12	12	12	760
4/7/11	Ellsworth: Invited presentations to Mexican cotton growers, Obregon, Mexico. Whitefly was focus, but also covered Lygus, selective technologies, etc. Included 2 hour presentation and 1.5 hour field workshop.				100
4/12/11	Extension Meeting, Marana, 20 attending (Shawna)	1.5			20
4/13/11	Extension Meeting, Casa Grande, 20 attending (Shawna)	1.5			20
4/21/11	Lettuce Insect, Disease and Weed Losses Workshop, Yuma Ag Center,	2	2		48
5/4/11	Desert Agriculture Conference, Presentations by Palumbo, Ellsworth, Tickes, Matheron, Paul Jepson (OSU), Pete Goodell (UC) and others	5			110

5/13/11	Stakeholder Focus Group: Refining the Lygus Reduced Risk Simulation. Marana.	3			13
6/16/11	Extension "Tent Talk" (short, field-based meeting) highlighting cotton variety trails. Coolidge, AZ. 8:30 am – 12:00 pm. , 15 attending (Shawna)	2			15
6/20/11	Ellsworth. Mexicali, Mexico. 8 hours training (6 indoors; 2 in field). Focus on Lygus IPM, chemical control, and related				30
6/21/11	Yuma County Mid-Season Cotton Workshop. 10:00 am – 3:00 pm. Yuma Ag Center, Yuma, AZ. CEUs requested.	3.5			55
6/22/11	Mid-Season Crop and Weed Management Workshop. 8:00 am – 2:00 pm. La Paz County, AZ. CEUs requested.	5	4.5		15?
6/23/11	Extension "Tent Talk" (short, field-based meeting) highlighting cotton management issues. 8:30 am – 12:00 pm. Ak Chin Indian Reservation, AZ., 15 attending (Shawna)	2			15
6/24/11	Extension "Tent Talk" (short, field-based meeting) on cotton management with cotton double cropping demonstration. Morning meeting. Goodyear, AZ. 21 attending (Ayman)	3			21
7/11/11	Extension "Tent Talk" (short, field-based meeting) highlighting cotton management issues. Marana, 15 attending (Shawna)	2			15
7/13/11	Mid & Late Season Cotton Management. 9 am – 11:30 am. Layton Farms and Ranches (UA Variety Trial Location), Thatcher, AZ.	2			25
7/14/11	Mid & Late Season Management for Corn & Cotton. 9 am – 11:30 am. Curry Farms, Cochise County, AZ	2			22
	<b>Totals</b>	<b>94</b>	<b>56.5</b>	<b>19</b>	<b>1485</b>