

Crop Pest Losses and Impact Assessment Work Group (2007 – 2009)
Final Report to the Western IPM Center
September 4, 2009

A. Grant Data

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Title: Crop Pest Losses and Impact Assessment Work Group (2007 – 2009)

Progress Report to the Western IPM Center, September 4, 2009

Type: IWG

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States Involved: Arizona, California, Texas

Funding Year: 2007-2009

Funding Amount: \$10,000 per year for 2 years

B. Nontechnical Summary

Through this project, focused in the low deserts of Arizona and Imperial Valley California, we develop accurate “real world” data on crop pest losses, control costs, target pests and pesticide use, through face-to-face workshops in an interactive survey process that encourages (and rewards) stakeholder input. Growers, pest control advisors (PCAs), Extension personnel and industry professionals attend workshops to complete the survey, and are offered incentives to offset the costs of participation. This face-to-face approach results in improved response rates, a more representative and better quality set of data, education of all those involved, and collaborative partnership with key stakeholder groups. As necessary, we conduct follow-up mail surveys with key PCAs to ensure good representation of region-wide acres in the final datasets. We currently collect data for cotton, cantaloupes, watermelons and head lettuce. The data generated are useful for responding to pesticide information requests generated by EPA & USDA, and can provide a basis for regulatory processes such as Section 18 or 24c requests, as well as for evaluating the impact of our extension programs on risk reduction to growers.

C. Objectives

- 1. In collaboration with scientists and stakeholders throughout the low desert areas of AZ and southern CA, we will serve as the forum for discussion and development of crop pest loss and impact assessment in key economic crops of this region, including cotton, lettuce, melons and alfalfa.**

This objective was achieved. We held seven meetings in the 2007-08 season and five in the 2008-09 season, discussing and developing crop pest losses data for cotton, head lettuce, watermelons, cantaloupes and, to a lesser extent, alfalfa, and interacting with about 85 stakeholders (PCAs, growers, industry representatives and Extension personnel) in year one and 90 in year two from Arizona and California.

- 2. We will expand our data collection efforts to include weeds, plant pathogens and nematodes as appropriate and relevant to each specific crop.**

This objective was achieved. In the recent project renewal, we have added weed science and plant pathology expertise to our ranks, and have begun to expand data collection for the first time beyond crop insect losses. Starting with the 2008 Melon Pest Losses, we incorporated questions on melon diseases and related data on fungicide use; in 2009 we similarly expanded the Lettuce Pest Losses and also collected information on weed losses and herbicide use in melons. The Cotton Pest Losses survey was revised in 2008 to include a section on weeds and herbicide use. The new data on non-insect pests and their control will provide baseline information for understanding changes in weed and disease distribution and management practices in these crops, including adoption of IPM and reduced-risk pesticides. In 2008, we also piloted a new Alfalfa Pest Losses survey with PCAs at three Cotton / Alfalfa losses meetings.

- 3. We will serve as a clearinghouse for developed information and metrics on crop pest losses and impact assessments.**
 - a. We will address all Federal, state and local requests for information on the impacts of pests or pesticides and other pest management practices in our key crops.**
 - b. We will assist others in the extension of this process as a model for development of additional stakeholder-derived data as requested.**
 - c. We will summarize data on crop pest losses on a dedicated webpage, making these data available worldwide.**

3a. This objective was achieved. Through the Arid Southwest IPM Network, we have continued to coordinate responses to federal pesticide information requests for Arizona and neighboring states in the arid southwest. As appropriate and when available, we have incorporated into these responses data collected through the Crop Pest Losses working group, for example, in data requests related to endosulfan, methomyl and oxamyl in the past two years. These reports are

available by clicking “Information Requests” on our website at http://ag.arizona.edu/apmc/Arid_SW_IPM.html. These data have also served more local needs, such as an analysis of the economic impact of Lygus in Arizona cotton (Fournier, Ellsworth & Barkley 2007). We have also routinely responded to local requests for information by growers, grower groups, and other local agencies. This includes: information on market penetration of flonicamid (Carbine) for assessing cotton IPM program adoption and to various manufacturers; Lygus, whitefly, and other cotton insect control trends for assessment of efficacy of grant activities; cotton and vegetable pesticide use trends as an impact assessment of department of entomology and IPM programmatic activities (Academic Program Review, Entomology, 2008; Extension IPM Competitive Grants program, 2008); Arizona Cotton Growers Association requests for comparative information on pest management trends in Bt and non-Bt cotton; Arizona Cotton Research & Protection Council requests for SLN support of Bt cotton refuge requirements exemptions in support of pink bollworm eradication

3b. This objective was achieved. As reported previously, in June 2007, we coordinated with colleagues in the Texas Cooperative Extension system to organize a Cotton Insect Losses workshop in Lubbock, Texas, attended by 15 local stakeholders. There is interest in initiating cotton losses data collection in West Texas as part of a USDA RAMP grant (Ellsworth et al., 2006) on areawide management of Lygus, a polyphagous insect pest of many western crops. These data may be used to measure changes in pest management practices and their impact over the four-year project term. This information was extended and presented to pesticide educators at NAPACSEW (Charleston, 2009) as a model for assessing the impact of pesticide education programs.

3c. This objective was achieved. In 2008, we updated the Cotton Insect Losses website which now features detailed Cotton Insect Losses data and analysis from 1979 through 2007 (<http://ag.arizona.edu/crops/cotton/insects/cil/cil.html>) (2008 data are being compiled and will be added in September 2009.) In 2008, we created a new home on the Arizona Crop Information Site for data and information related to Vegetable / Melon Pest Losses. This site provides easy access to stakeholders to the pest losses survey form, presentations, data and publications. <http://ag.arizona.edu/crops/vegetables/insects/vegiloss.html>. In 2009, both websites were updated and language was revised to reflect the inclusion of weeds and plant pathogens in the data.

D. Working Group Membership

In addition to Team Members listed above, many Arizona and California PCAs, growers, and other industry participants have become regulars at our annual meetings, look forward to sharing information among colleagues, and complete crop losses surveys on a regular basis.

E. Progress

Project Highlights 2007-2009

- We held 12 face-to-face interactive stakeholder workshops in Arizona and California centered on the topic of pest losses in major crops: cotton, alfalfa, head lettuce, cantaloupes, and watermelons (table 1).
- We collected, analyzed and in some cases published data on pest losses in these same crops.
- Work group members implemented a pilot Alfalfa Pest Losses survey in a series of 3 joint cotton-alfalfa workshops in 2008. Interest in extending this process to alfalfa was met with less stakeholder enthusiasm than we had hoped, and attempts to stimulate interest among alfalfa stakeholders have not gone far. If sufficient stakeholder interest warrants continuing this process for alfalfa in the future, we will do so, though our immediate plans are to discontinue this effort.
- In formulating the proposal for this project, we reached out to weed management and plant pathology colleagues with the goal of expanding future data collection efforts beyond insect losses to incorporate weeds, plant pathogens, nematodes, and their control tools. In 2008, we expanded the melon losses survey to collect data on plant pathogens and fungicide use that will serve as baseline data for ongoing data collection in watermelons and cantaloupes. We also began collecting weed management information in cotton. In 2009, we expanded data collection for the lettuce pest losses workshops to include plant diseases and added weeds and weed management questions to the melon pest losses surveys.
- Data collected through this process were also incorporated into responses to Federal pesticide information requests, including information requests for endosulfan, imidacloprid and methomyl, available on the Arid Southwest IPM Network website at http://ag.arizona.edu/apmc/Arid_SWPMC_Info_Requests.html.
- We updated the Cotton Insect Losses website which now features detailed Cotton Insect Losses data and analysis from 1979 through 2007 (<http://ag.arizona.edu/crops/cotton/insects/cil/cil.html>). 2008 data is in the process of being compiled and formatted as of early September 2009. (There is a delay in posting data until final average cotton prices are available, which happens in late summer each year for the previous year.)
- We created a new home on ACIS for information related to all Vegetable / Melon pest losses information. This site provides easy access to stakeholders to the pest losses survey form, presentations, data and publications. <http://ag.arizona.edu/crops/vegetables/insects/vegiloss.html>.
- We published more than a dozen publications incorporating Crop Pest Losses data, including 6 University of Arizona Crop Report articles based on crop pest losses data with 2 more submitted for the next published report (see Appendices, below).
- John Palumbo (with S. Castle) has submitted an article, now in press, in the peer reviewed journal, Pest Management Science.

- Peter Ellsworth (with S. Naranjo) has published two refereed journal papers in 2009 (1 in Pest Management Science and 1 in Biological Control) that reference these data.
- We have presented Crop Pest Losses data and information about the survey process at numerous Extension meetings and professional conferences, in addition to the crop pest losses workshops. This includes presenting the survey and process at the High Plains Cotton Insect Losses workshop in Lubbock, Texas in June 2007, and presenting to the Western IPM Center Advisory Committee in March 2009. Many of these presentations are available online, and are cited in the references below.

Meeting Participation

A summary of meeting participation is presented in table 1. About 175 stakeholders, including pest control advisors, growers, Extension personnel and agro-industry representatives, participated in 12 meetings in 2 states. Many participants completed crop losses questionnaires and engaged in dialog to help us improve the process.

Table 1: Crop Insect Losses meeting participation summary, 2007-2009.

Date	Crops	Location	Participants
9/12/07	Cotton	Yuma, AZ	10
11/8/07	Cotton & Alfalfa	Parker, AZ	5
11/27/07	Cotton & Alfalfa	Holtville, CA	8
11/29/07	Cotton & Alfalfa	Maricopa, AZ	14
4/15/08	Head Lettuce	Yuma, AZ	30
7/9/08	Cantaloupe & Watermelons	Yuma, AZ	11
7/16/08	Cantaloupe & Watermelons	Phoenix, AZ	7
12/2/08	Cotton	Maricopa, AZ	13
12/3/08	Cotton	Parker, AZ	7
12/4/08	Cotton	Yuma, AZ	16
4/14/09	Head Lettuce	Yuma, AZ	26
7/23/09	Cantaloupe & Watermelons	Yuma, AZ	28
Totals:	5 crops	2 states	175 participants

Table 2: Cotton Insect Losses Responses, Arizona, 2007 - 2008.

Survey use statistics	2007	2008
No. of PCA respondents	22	21
Arizona Acreage reported	82,079	69,552
% of total AZ acreage	46.5%	49.6%

Table 3: Head Lettuce Insect Losses Responses, Yuma Valley, 2007-2009.

Survey use statistics	Fall 2007	Spring 2008	Fall 2008	Spring 2009
No. of PCA respondents	11	11	12	11
Acreage reported	17,750	11,300	17,750	11,300
% of total acreage	76%	51%	72%	63%

Table 4: Spring Melon Insect Losses Responses, Yuma Valley, 2008-2009

Survey use statistics	Cantaloupes 2008	Cantaloupes 2009	Watermelons 2008	Watermelons 2009
No. of PCA respondents	6	5	5	3
Acreage reported	2,733	1650	1,280	765
% of total acreage	85%	50%	80%	60%

Table 5: Spring Melon Insect Losses Responses, Central AZ, 2008 -2009.

Survey use statistics	Cantaloupes 2008	Cantaloupes 2009	Watermelons 2008	Watermelons 2009
No. of PCA respondents	2	2	2	2
Acreage reported	4200	2600	400	1000
% of total acreage	55%	45%	27%	35%

Alfalfa Pest Losses Update

- In 2006-2007, we developed a draft survey instrument for alfalfa insect losses with former project collaborator Mike Rethwisch (University of California, Riverside) and presented it to PCAs for input at one of our cotton insect losses meetings.
- Based on input from PCAs and Extension personnel, we further modified the questionnaire adding sections on weed and plant disease losses. The instrument was piloted at 3 Cotton / Alfalfa Pest Losses workshops in late 2007, two in Arizona and one in California.
- Interest and participation in the Alfalfa Pest Losses survey was lower than anticipated. In all, 7 completed surveys were submitted. We do not plan to repeat this survey in the future unless we determine that there is enough stakeholder interest in the data to sustain continuation of the survey.

F. Results

This working group continues to expand its efforts and the value of the data generated through this stakeholder-driven process. In the past two years, we have expanded data collection for melons to include insects, plant pathogens and weeds and their management tools. The lettuce survey now includes insects and plant pathogens and the cotton survey includes insects and weeds. Pest Control Advisors have responded favorably to this approach. Since the same individuals are responsible for all aspects of pest control, it makes sense to collect information on all pests at these meetings. The newly expanded data will serve as a baseline to help us measure changes in non-insect crop pests and their management that occur over time. This is especially important moving forward, because USDA NASS has discontinued their crop surveys that provided the only reliable source of similar, but not as complete, information in the past.

The data developed through these efforts are publicly available on the Arizona Crop Information Site (ACIS) and through numerous websites and publications listed in the

Appendix. Data identify the leading pest threats in these crops and provide information on control costs and pesticide use preferences and patterns. We have had several information requests in the past year that these data have helped to satisfy. This includes Federal pesticide information requests (see below) and more local / regional requests from researchers who have used the data in grant proposals and reports.

Impact of the Data

These data and this Work Group serve to address any Federal, regional, state, and local requests for information on the impact of insects or insecticides on our key crops. As coordinator of the Arid Southwest IPM Network (another Western IPM Center – funded project) during this project term, Al Fournier has used these data to respond to federal pesticide information requests for the crops involved (e.g., endosulfan and methomyl). We had numerous informal requests for information in 2007 and 2008. Formal responses are posted on the Arid Southwest IPM Network website at http://ag.arizona.edu/apmc/Arid_SWPMC_Info_Requests.html.

What makes these data unique with respect to pesticide (and IPM) policy is that we are directly measuring the “intent” of each insecticide input. That is, stakeholders are asked to identify the specific intent or intended target or targets of their management decisions and inputs. So in addition to the rich quantitative data collected in this exercise, we also have unique qualitative insights into the decision-making experience of the pest manager. These insights will help guide our existing and new programs of research, implementation and IPM outreach.

The data provided through this process are also useful in evaluating aspects of our IPM programs over time (e.g., changes in insecticide use or changes in pest status for these crops) and quickly responding to the changing needs of grower communities. Not only do we hope to sustain these activities to continue to maintain current pest loss data for cotton, lettuce and melons, we hope to continue to expand these efforts over time to include more crops and more types of pests.

Through this data source alone have we been able to document: 2006 and 2007 as the two years with the lowest foliar insecticide use in cotton on record in Arizona (records begin in 1979); 2007 as the lowest grower costs for foliar insecticides in cotton; 2008 as the first year since 1965 that cotton growers have not deployed insecticides to control pink bollworm statewide.

G. Appendix: Publications, Presentations and Websites

Websites:

Cotton Insect Losses data, survey instruments, and links to national cotton insect losses data, is available on the Arizona Crop Information Site (ACIS) at <http://ag.arizona.edu/crops/cotton/insects/cil/cil.html>.

Lettuce and Melon Insect Losses data, survey instruments, presentations and publications are available on ACIS) at <http://ag.arizona.edu/crops/vegetables/insects/vegloss.html>.

Publications:

Ellsworth, P.C., A. Fournier and T.D. Smith. 2007 (revised 09/08). Based on Ellsworth, P.C. and J.S. Jones. 2000. Arizona Cotton Insect Losses. Publ. No. AZ1183. University of Arizona, College of Agriculture and Life Sciences, Cooperative Extension, Tucson, Arizona. URL: <http://cals.arizona.edu/crops/cotton/insects/cil/cil.html>.

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Palumbo, J., K. Nolte, A. Fournier & P. Ellsworth. 2009. Insect Crop Losses and Insecticide Usage for Head Lettuce in Arizona 2007/2008. 2009 Vegetable Report. College of Agriculture & Life Sciences, University of Arizona. (submitted)

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Presentations:

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http://ag.arizona.edu/crops/presentations/LIL%20wksp%202006%20Final_4.pdf

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