

Welcome, everyone. I'm Al Fournier. I hold the faculty position of IPM Program Manager, based at the Maricopa Ag Center. I am also Assistant Specialist in IPM with an adjunct appointment in the Entomology Department.

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While at Purdue I worked to promote adoption of IPM by schools and childcare centers. Today I'll talk about the changing paradigm for success in the world of Integrated Pest Management **applied research and outreach**, and the way this affects all of us. I will talk a bit about my PhD work, and how what I learned turns out to have great practical value to us as scientists when it comes to being successful under this new paradigm of competitive grants for IPM.

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Read any good RFP's lately? I'd like to talk about a few major trends in funding requirements for federal grants, particularly those related to IPM. Three major trends are (1) citing stakeholder needs in the proposal & involving end-users in the research; (2) integrated collaboration among disciplines and institutions; and (3) evaluating outcomes and impact.

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Without citing genuine, documented needs of stakeholders (that is, end-users of the research), many grant proposals stand little chance of being funded.

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Pest Management Strategic Plans or PMSPS provide one important form of stakeholder input.

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“Pest Management Strategic Plans” are documents that have been developed by a group of stakeholders to identify priority needs for research, education and regulation in a particular crop or commodity. These plans are commodity or issue based, and often span more than one state. Funds are available from the Western IPM Center to develop PMSPs. Out of about 30 PMSPs completed in the West, only one to date has involved Arizona. John Palumbo was involved in PMSP for head lettuce production in AZ and CA, and has told me the PMSP was “like gold” for securing additional funding. Why? Because it provides ammunition: stakeholder documentation that there is a real need that is not being met. One of things I’ve focused on in my position is coordinating the development of more PMSPs for Arizona commodities.

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A slide with a blue and white background. The title is "Trends in Competitive Federal Funding". Below the title is a bulleted list of three items: "Stakeholder needs &amp; involvement", "Multidisciplinary &amp; Regional collaboration", and "Evaluating outcomes and impact". The second item is highlighted in orange. At the bottom right of the slide, there is a small number "8".

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### Multidisciplinary & Regional Collaboration:

- “Projects are **multidisciplinary**, involve **multiple pests**, are typically **multi-state** or **regional in scale**”
- “**Extensive collaboration between individuals and institutions is expected**”

USDA Risk Avoidance and Mitigation Program (RAMP) RFP

Another trend in federal funding for IPM is the requirement for what I call “integrated collaboration.” Projects should be multi-disciplinary, multi-state, and involve many partner organizations. Some of these funding programs expect PIs to address not only research, but education and implementation goals as well.

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### Trends in Competitive Federal Funding

- Stakeholder needs & involvement
- Multidisciplinary & regional collaboration
- **Evaluating outcomes and impact**

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**Plan for Evaluation**

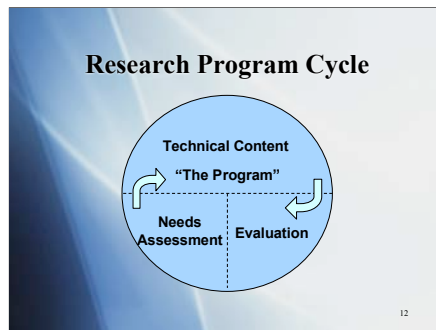
“Measures and outcomes:

- What will be different as a result of this project?
- How will you evaluate the success of the project in terms of measurable environmental results?
- Quantifiable risk reduction measures should be described.”

(EPA Pesticide Environmental Stewardship Program RFP)

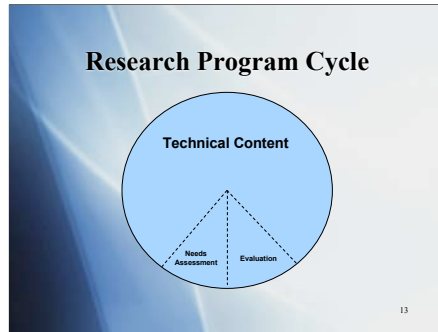
A plan for evaluation is now required in most federal grant proposals. There is a very strong effort nationally to develop indicator measures for successful programs and adoption of IPM. This phenomenon is not unique to EPA and USDA. It is a general trend across all federal grants programs. These agencies have to be increasingly accountable for continually shrinking resources. Documenting long-term program impacts, or even short-term ones, requires resources.

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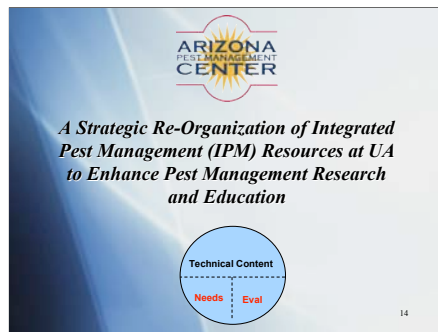
Another way to look at this is to think about your research program as a pie. Your work, from the most basic exploration of the problem to developing solutions, to writing publications or outreach materials to deliver solutions to end-users, is your “program.” But under this new paradigm, there are at least 2 other important components to this diagram. These are, first, determining that there is a need for a specific research program (“needs assessment”) and, on the other end, evaluating what you have delivered to clientele. As I’ve represented in the diagram, a good amount of attention should be given to each of these 3 program aspects. The paradox is that most scientists who have the expertise to develop and deliver good research-based information often have little training, knowledge, or frankly, interest in these other two components.

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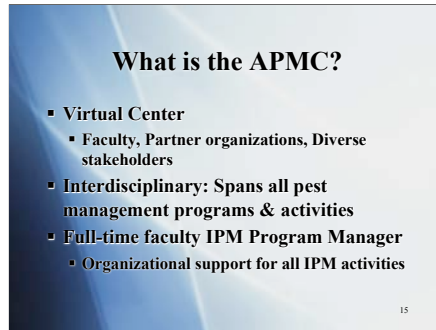
Most Extension programs, at any university, probably look more like this, with the largest focus of time and resources given to the program, and a squeezing out of these other important activities. This is a very natural tendency, for several reasons. For one thing, this is where the skills and interests of the faculty lie. Another reason we see this pattern has to do with limited resources. Our faculty here are stretched pretty thin. When one program is over, there are other immediate pressing needs, and this evaluation may not get done, or more likely will be done in cursory fashion. This is not a criticism of our faculty, but more a function of circumstances and reality. The problem is, in today's world, this approach is not competitive.

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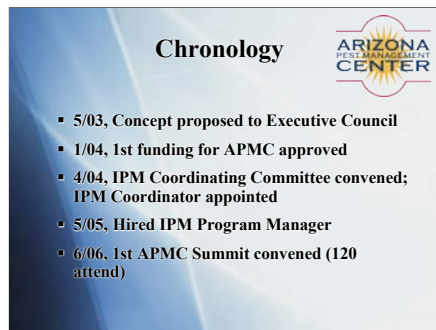
At UA, we are in a better position to compete than most, because of the way we have re-organized our limited IPM resources under the umbrella of the Arizona Pest Management Center. It is a goal and function of the APMC to help maintain balance to this program cycle. By providing organizational support to some of these “non-disciplinary” functions of all the IPM programs, we hope to increase all of our opportunities, benefits to clientele throughout the state, and our relevance. Doing so will greatly increase the potential for future external funding of Arizona’s IPM programs. The Arizona Pest Management Center represents a reorganization of UA IPM resources to help Arizona to more effectively respond to pest management challenges in urban, agricultural and natural areas.

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The APMC is a **virtual center**, a (loose) collection of people: UA faculty, partner organizations, clientele, basically anyone with an interest in “pest management” in Arizona, including the people in this room. This is an open, transparent organization and we invite your membership. **The APMC is Diverse and interdisciplinary.** It spans all disciplines and programs related to pest management: Weeds, insects, diseases, nematodes, vertebrate pests in urban areas, agriculture, and natural environments. The idea of the APMC was to **create a position** to serve in a much-needed organizational role for the UA integrated pest management research and outreach programs, an “IPM Program Manager.”

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The concept for the Arizona Pest Management Center was conceived by John Palumbo, Paul Baker, and Peter Ellsworth in response to various changes in the federal climate, new opportunities that resulted, and a need to develop transparency with respect to our federal 3(d) obligation in IPM.


The concept was proposed to the Executive Council four years ago. Our first formal funding through the Western IPM Center was approved shortly thereafter. Our IPM Coordinating Committee was first convened later that year and plans were undertaken for recruitment of an IPM Program Manager. In June 2006, we held the first APMC Summit, bringing together over 100 diverse stakeholders to identify pest management priorities.

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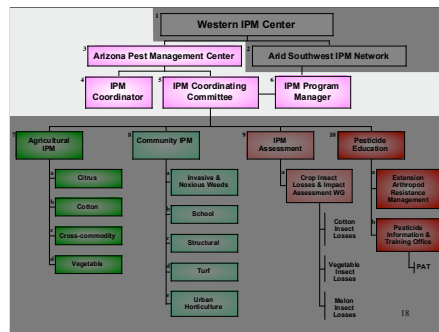
## Funding for the APMC

- IPM Program Manager (100% Extension)
  - 40% Federal IPM 3(d) funds
  - 10% State funds
  - 50% Extramural Grants (USDA, WIPMC)
- Program support through internal IPM grants (IPM 3(d) funds)
- Project-based state partner support (e.g., ACPA project)



Funds for my position come partly from federal IPM formula funds and partly from competitive grants and 10% state Extension funds. The APMC manages a competitive mini-grants program for faculty, to support IPM projects.

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All IPM programs at UA are now organized within the APMC. This umbrella organization is managed by the IPM Coordinating Committee, a steering committee made up of UA faculty & stakeholders from across the state with expertise in entomology, plant pathology and weed science. The committee is convened by Dr. Peter Ellsworth, who serves as Arizona’s IPM Coordinator. Every state land grant college has an IPM Coordinator that is responsible for managing federal resources related to IPM and reporting to back on outcomes. Day to day management of the APMC is my responsibility, as the IPM Program Manager. I also serve in an advising role to the committee. One of my jobs is to talk to faculty and clientele in the state and help to identify pest management needs.

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## IPM Coordinating Committee

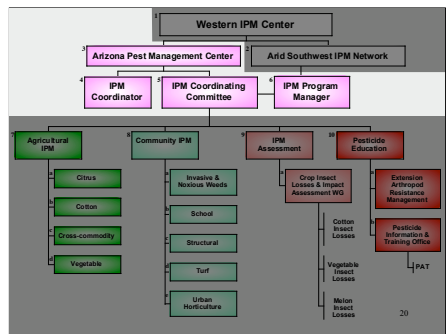
<p>Paul Baker          Peter Ellsworth          Rick Gibson          Kim McReynolds          John Palumbo          Bob Roth          Lin Evans</p>	<p>Jim Christenson          Al Fournier          Dawn Gouge          Mary Olsen          Jeff Silvertooth          Pat Clay          Rick Melnicoe</p>
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Current membership

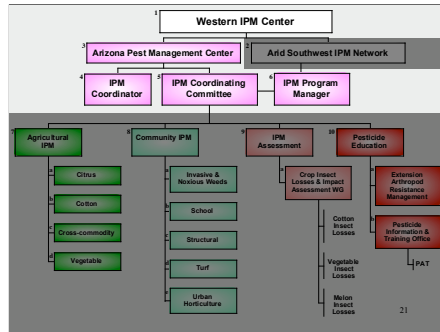
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This is the current membership of the IPM Coordinating Committee.

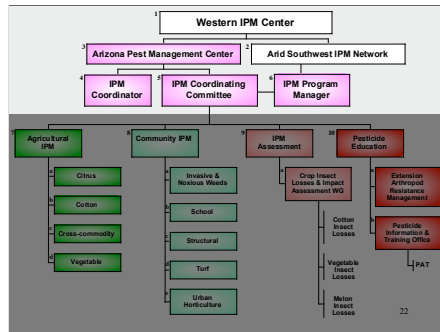
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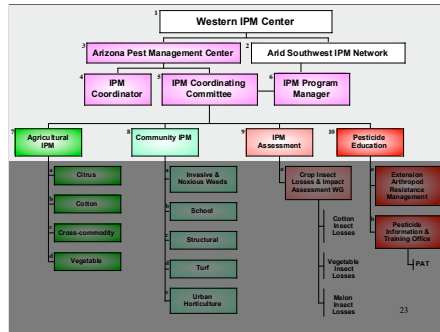
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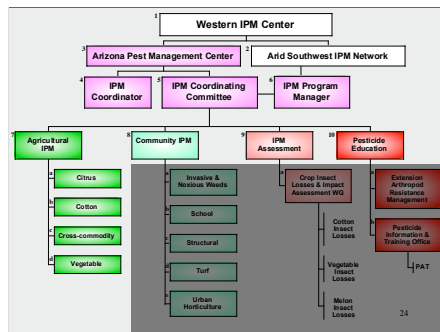
Another function of the APMC is to link our pest management programs and Arizona clientele to the Western IPM Center. The WIPMC currently provides some of the funding for the APMC through competitive grants related to some of our projects. This communication link is important because the WIPMC is plugged directly into USDA's national programs, and also communicates with EPA on pesticide issues in the state.



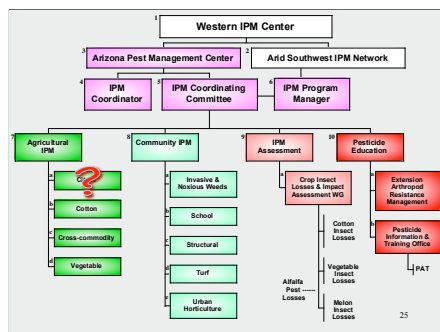
The Arid Southwest IPM Network is one of the projects currently funded by the WIPMC. This is a communication network of pest management colleagues in AZ, CA, NM and NV. This network handles pesticide information requests that come from EPA. I communicate these requests to specialists, researchers, and end-users and report their input back to the WIPMC, who reports it to EPA for all the western states.



The APMC currently maintains five focal areas, in agricultural IPM, Community IPM, IPM Assessment, Pesticide Education, and Pest Diagnostics (which we'll come to later). Within each focus, there are one to four program teams that actively develop, manage, and implement IPM programs.



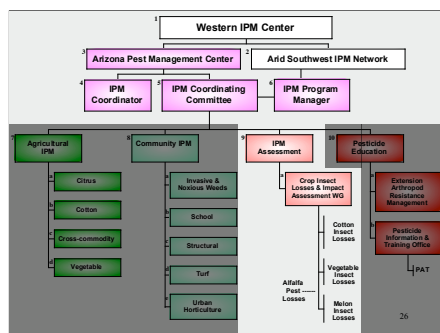
For example, in the agricultural focus we have IPM programs in the areas of cotton, vegetables, and cross-commodity IPM. While most faculty maintain a program-oriented focus, the APMC serves the dual role of supporting program activities and interfacing with regional and federal agencies, including the Western IPM Center. In general, a small team of faculty (sometimes only one) is responsible for each of these program areas. We probably have more boxes here than we have people addressing these areas!



I should emphasize a few points about the structure of the APMC:

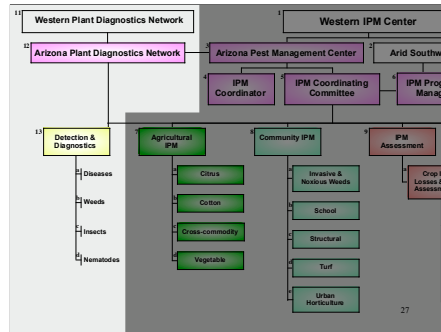
- (1) Each of these boxes are meant to represent not only an Extension effort in this area, but the specialists and campus-based researchers that are working in these areas.
- (2) None of this is carved in stone. The original organizational chart was developed by the IPM Coordinating Committee with considerable input from faculty.
- (3) It is ever-changing. For example, the program area of citrus IPM is now in question with the departure of David Kerns to Texas. A function of the IPM Coordinating Committee is strategic planning for IPM, and we welcome all input into this process.

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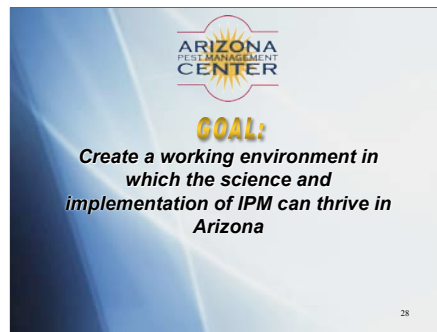
Another important role of the APMC is IPM Assessment. Does the pest management education we deliver provide benefits to end-users? Even before the APMC, we have maintained a dialog with end-users of the cotton IPM program to measure insect losses, and this is now being expanded into other crops and broadened beyond insects to include weeds, plant pathogens and nematodes.

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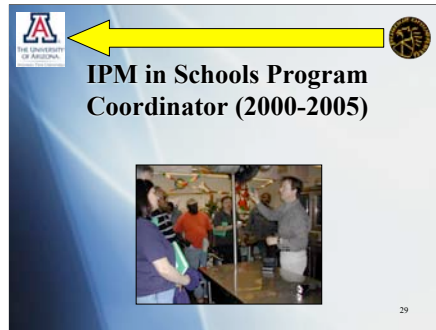
I also want to mention another important organization related to pest management, which is the Arizona Plant Diagnostics Network. This is a parallel organization that focuses on pest detection and diagnostics, including plant diseases, weeds, insects and nematodes. Pest diagnostics is critical to IPM, and detection of new invasive pests is critical to forming a rapid response. Like the APMC, the APDN is connected to a Western center for plant diagnostics, the WPDN, which in turn connects to a national network.

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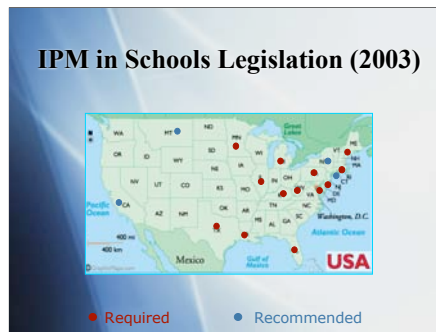
The goal of the APMC is to create a working environment in which the science and implementation of IPM can thrive in AZ, by making the best possible use of these limited resources and by enhancing our ability to compete for regional and national resources.

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I want to take a little bit of a personal detour to tell you more about my own research background, how I came to be in this position at UA, and what I hopefully bring to the table in all this. During my PhD program at Purdue, I coordinated an Extension program on “IPM in Schools.” I worked on developing this program while taking graduate classes and developing my research topic.

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Since the early 1990’s there has been an increasing political push for IPM programs in schools, aimed at reducing risks to children’s health from both pests and pesticides. This has led to adoption of laws in many states requiring or recommending schools to use an IPM approach to control pest problems in buildings and on grounds. In 2003, 13 states (shown with red dots) required IPM by law while another 4 states (with blue dots) have laws recommending IPM use in schools. Despite these legal requirements, the actual implementation of these IPM programs in schools is largely unmeasured.

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IPM in schools seeks to reduce the need for pesticide treatments through improved sanitation, exclusion and non-chemical controls. Inspections and pest monitoring replace routine pesticide treatments. When needed, low-risk pesticides (such as insect baits) are preferred. IPM programs also include management of turf and landscape around the schools.

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### IPM in Schools at Purdue

- Funded by EPA & IDEM
- Pilot IPM programs, trainings, manual & website
- Model Pest Management Policy, OISC (voluntary)
- Questions: Why did school districts adopt IPM? What did those programs look like?

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I coordinated pilot IPM programs in schools and childcare settings, developed education materials and a website, and frequently presented workshops and trainings to school administrators, custodians, directors of building and grounds. In 2000 the state passed a “model policy” for school pest management that espoused the principles of IPM. We promoted adoption of IPM as a way for schools to meet the requirements of the voluntary policy. I became interested in understanding what made some school districts and not others adopt an IPM approach to managing pests. And also, what I saw in the schools led me to believe that the “IPM programs” as implemented in the schools didn’t quite match the scientific or academic ideal of IPM. I developed my topic

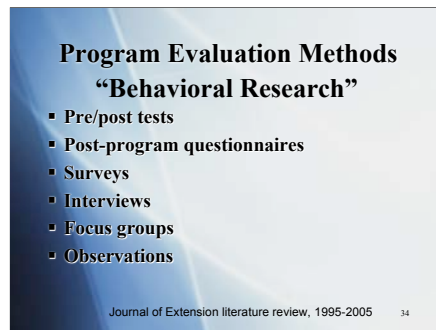
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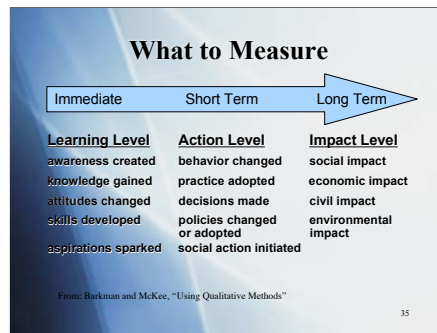
Answering these questions required that I develop a whole new set of research skills focused on documenting and understanding human behavior and motivations. I suddenly realized that nothing in my B.S. or M.S. work in the area of IPM had really prepared me to answer this question. I had to enter...“The Qualitative Zone.” To accomplish this, I took two semesters of qualitative research methods and worked closely with a national program evaluation expert in the School of Education on my thesis committee.

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Although quite different area of research that what we are used to in the “hard sciences,” there is a both a NEED for this kind of “behavioral research” and a thriving theoretical and academic discipline behind this. One of the major areas of academic activity is in “Program Evaluation.” My research questions essentially required an evaluation of school IPM programs—their adoption and implementation. So I want to talk about program evaluation methods, what actually gets measured, and the types of data and data analysis techniques that are used.

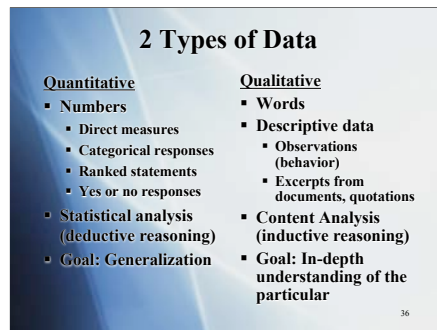
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An “outcome” is defined as the “change” you would expect to see as a result of participation in a program (Barkman).

- Immediate outcomes correspond with the level of learning: What has the participant learned or how has their thinking changed?
- Short term outcomes correspond with the level of action: What behavior, practice, or policy has changed as a result of involvement in the program?
- Long term outcomes correspond with the level of impact: These outcomes affect society as a whole. How has society or some subset of society changed as a result of program involvement?

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Regardless of the outcomes measured, instruments can collect two fundamentally different types of data: quantitative or qualitative.

- Strengths of quantitative data: It provides a broad understanding of program outcomes/impact and is generalizable.
- Strengths of qualitative data: It can provide an in-depth understanding of personal program impacts; insight into the *meaning* of a program to participants; **insight into participant’s motivations and decisions; it can** elucidate program process and can enhance quantitative data in program evaluations.
- Weaknesses of qualitative data: more difficult and time-consuming to gather and analyze data; it is less generalizable and may not “stand alone.”

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### **Research Questions**

- 1. What factors most influenced school administrator's decision to adopt IPM policies?**
- 2. How was IPM practiced in the schools? --Contrast with "ideal" IPM based on the literature.**

These were my two primary research questions, focused on adoption and implementation of IPM in Indiana k-12 schools.

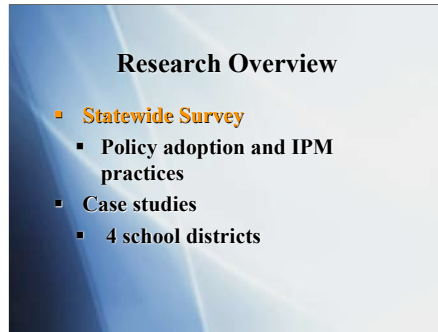
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### **Research Questions**

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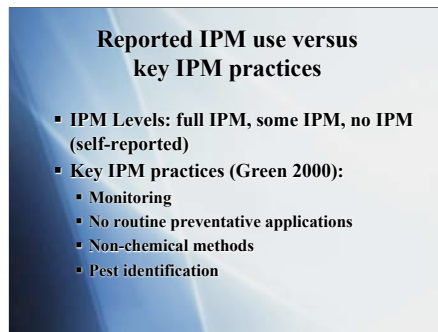
Today, I will focus on a small subset of data relating to this second question.

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The overall design for my Ph.D. project included 2 components: a statewide survey and 4 detailed case studies of Indiana school district's pest management programs. The survey was intended to provide a broad picture of statewide policy adoption and the use of IPM practices in schools. The goal of the case studies was to allow a more detailed examination of potential adopter's perspectives, pest management goals, and an insider's view of the social, educational, and organizational factors influencing IPM adoption and implementation.

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I wanted to know what pest management practices schools that reported adopting "IPM" were using, and how these compare to the academic view of IPM. I compiled a short-list of "essential IPM practices" based on a review of the school IPM literature. I chose these factors because they were central to the philosophy and science of IPM in schools: using monitoring to determine the need for treatments instead of routine preventative applications. Also, trying non-chemical methods prior to pesticide use, and identifying pests before applications are made. I evaluated use of these IPM practices among schools that reported using full IPM, some IPM or no IPM, performing a Chi square analysis to test for significance. I did this for both indoor and outdoor IPM practices, but here **present only my results for indoors.**

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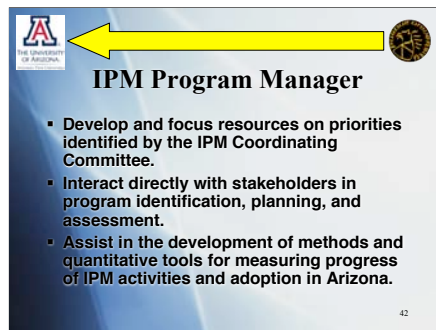
**Reported IPM use versus  
key “Indoor” IPM practices**

Indoor IPM Practice	Chi <sup>2</sup>	Prob. (df=2)	Comment
Pest Sighting Log	21.016	0.000**	Higher than expected in full IPM schools
Monitoring Traps	11.474	0.003**	Higher than expected in full IPM schools
Routine Preventative Applications	4.371	0.112	Yes = 60.5% overall Full IPM = 50.8% No IPM = 64.1%
Only after Non-Chemical	22.423	0.000**	Higher than expected in full IPM schools
Pest Identification	2.168	0.338	Yes = 43.7% overall Full IPM = 50.8% No IPM = 38.5%

These data show that “IPM adoption” and “IPM implementation” are not the same in schools. IPM programs did not exactly match even the key practices of IPM. This shows “partial adoption” or “reinvention” of IPM by adopters. There was a higher adoption of practices that school administrators were likely to perceive as new, such as monitoring and non-chemical controls, but many did not abandon preventative pesticide use, a core policy goal of IPM in schools.

This is just a small portion of my PhD research project, but can give you a flavor for how quantitative and qualitative data can be used to measure program outcomes. Some of the same methods—surveys, focus groups, and interviews—can be used in the area of needs assessment.

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The slide features the University of Arizona logo on the left and a circular seal on the right. A large yellow arrow points from the seal towards the text. The text is as follows:

**IPM Program Manager**

- **Develop and focus resources on priorities identified by the IPM Coordinating Committee.**
- **Interact directly with stakeholders in program identification, planning, and assessment.**
- **Assist in the development of methods and quantitative tools for measuring progress of IPM activities and adoption in Arizona.**

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When I saw the position description for the IPM Program Manager at UA, as I was finishing up my dissertation, I was thrilled. I was this as a way for me to bring forward my program evaluation interests and skills without giving up my subject expertise and interest in IPM.

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**Addressing Trends in Competitive Federal Funding**

- Stakeholder needs & involvement
- Multidisciplinary & regional collaboration
- Evaluating outcomes and impact

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The slide features a blue and white abstract background with a circular logo in the top right corner that reads "ARIZONA AGRICULTURAL CENTER".

Coming back to the theme for today, how has the APMC so far (since May 2005) helped UA IPM programs to better compete under this new research paradigm? I'd like to mention a few examples of activities and projects in each of these three areas.

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**Addressing Trends in Competitive Federal Funding**

- Stakeholder needs & involvement
- Multidisciplinary & regional collaboration
- Evaluating outcomes and impact

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This slide is identical to slide 43, but the first bullet point, "Stakeholder needs & involvement", is highlighted in orange text.

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## Stakeholder Needs & Involvement

- **APMC Summit (June 2006)**
  - Diverse stakeholders
  - **IPM priorities: Agriculture, School IPM, Urban Horticulture, Noxious & Invasive weeds**
  - **APMC website: [cals.arizona.edu/apmc](http://cals.arizona.edu/apmc)**
- **Pest Management Strategic Plans**
  - **School IPM, Desert Cotton, Desert turf**

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The APMC Summit brought together over 100 UA research and Extension faculty with stakeholders from throughout the state to develop IPM priorities in 4 major areas: Agricultural and cross-commodity IPM; school & community IPM; urban horticulture and noxious & invasive weeds. The proceedings (<http://cals.arizona.edu/apmc/Summit.html>) serve as a source of documented stakeholder needs that can be cited in grant applications (and already has). The APMC was instrumental in initiating the first national PMSP for IPM in schools, now nearing completion. We also organized a PMSP for desert cotton, including AZ and SE CA; our working group met last May and we are continuing to work on finalizing the document. We are in the process of applying for funds to do a Desert Turfgrass PMSP that will focus on recreational and

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## Addressing Trends in Competitive Federal Funding


- Stakeholder needs & involvement
- **Multidisciplinary & Regional collaboration**
- Evaluating outcomes and impact

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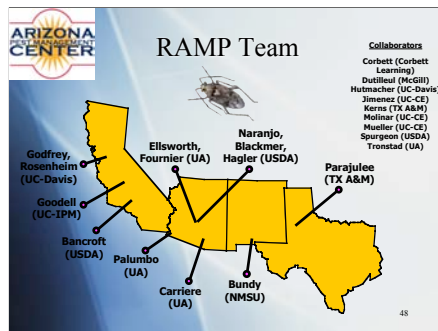
### RAMP: Lygus Management

- USDA-CSREES, Risk Avoidance & Mitigation Program (RAMP)
- \$2,500,000 over 4 years
- *“Developing and implementing field and landscape level reduced-risk management strategies for Lygus in Western cropping systems”*
- Upland & Pima cottons, seed alfalfa, vegetable & vegetable seed crops, eggplant, chiles, guayule, lesquerella, dry beans



A \$2.5mil USDA-RAMP project organized by Peter Ellsworth provides a good example of integrated collaboration.

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**RAMP Team**

**Collaborators**

- Corbett (Corbett Learning)
- Dutilleul (McGill)
- Hutmacher (UC-Davis)
- Jimenez (UC-CE)
- Karas (TX A&M)
- Molnar (UC-CE)
- Mudler (UC-CE)
- Spurgeon (USDA)
- Tronstad (UA)

Map locations and names:

- Godfrey, Rosenheim (UC-Davis)
- Goodell (UC-IPM)
- Bancroft (USDA)
- Palumbo (UA)
- Carriere (UA)
- Ellsworth, Fournier (UA)
- Naranjo, Blackmer, Hagler (USDA)
- Bundy (NMSU)
- Parajulee (TX A&M)

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This is the project team for the \$2.5M grant rec'd from USDA-CSREES Risk Avoidance & Mitigation Program. Ellsworth is lead PI and UA the lead institution for this 4-year 4-state project. There are 13 PIs cooperating and a number of public and private cooperators.

The goal is to develop a comprehensive research and outreach approach that will allow us to develop areawide suppression of Lygus bugs through improved field practices and landscape manipulation. This requires a gamut of fundamental and applied investigations into the movement potential and control of Lygus in at least 10 crops.

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### Addressing Trends in Competitive Federal Funding

- Stakeholder needs & involvement
- Multidisciplinary & regional collaboration
- **Evaluating outcomes and impact**

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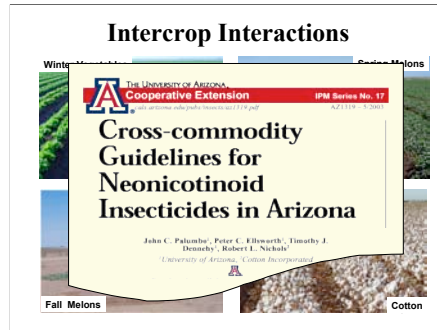
### Regional IPM Competitive Grant

- Ellsworth, Palumbo, Carrière, Fournier
- *“Spatially Explicit Approaches for Measuring and Implementing Higher Level, Multi-Crop, Multi-Pest IPM”*
- Measuring group adoption of cross-commodity guidelines for whitefly control

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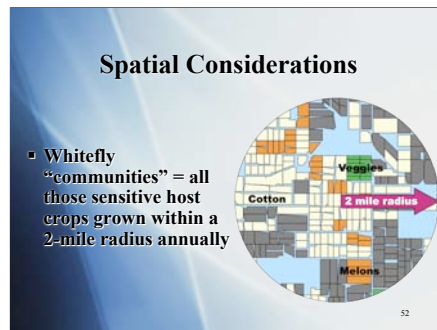
I am involved in a Regional IPM Competitive grant with Peter Ellsworth, Yves Carriere, Christa Kirk and John Palumbo to do a quantitative spatially analysis of group adoption of cross-commodity IPM guidelines for the use of neonicotinoid insecticides in Arizona.

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AZ's year round growing season provides for a sequence of crop plants, winter vegetables like broccoli, lettuce, other cole crops, spring melons (esp. cantaloupes), summer cotton, and fall melons. These crop islands provide for perfect habitat for whiteflies, and our focus was on the intercrop interactions that were possible with this pest and that demanded a high level of integration in our IPM programs. A set of guidelines, published and disseminated in 2003, were the result of a year-long, stakeholder-engaged process spear-headed and led by Dr. John Palumbo. By engaging clientele directly in the development of these guidelines, we were able to forge a very simple set of rules for neonicotinoid usage. The fear was that, with new registrations for neonics on cotton, this chemistry now had the potential to be used nearly year-round, and there was concern that this could lead to development of resistance.

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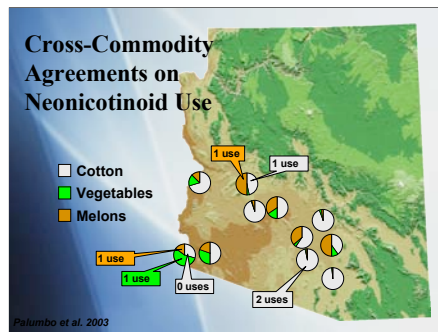


These guidelines have a spatial component. Without discussing the details today, the guidelines defined whitefly “communities” (areas of potentially interbreeding and moving whiteflies) as all those sensitive host crops grown within a 2-mile radius annually. This happens to be an area that we believed that crop consultants (PCAs) could readily identify and anticipate production and insecticide use in a local area.

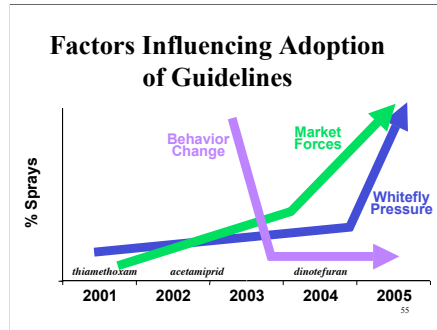
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All cropping systems in AZ are not equal. We have instances like in Yuma which are very complex and include significant acreages grown in melons, cotton and vegetables. We call this a “Multi-Crop” community. In other areas, the system is relatively simple and resembles a cotton monoculture as far as whiteflies are concerned, a “Cotton-Intensive” community. Then there are some places where a melon / cotton bi-culture exists, “Cotton/Melon” community. Hundreds of whitefly “communities” or ecosystems exist throughout the state.

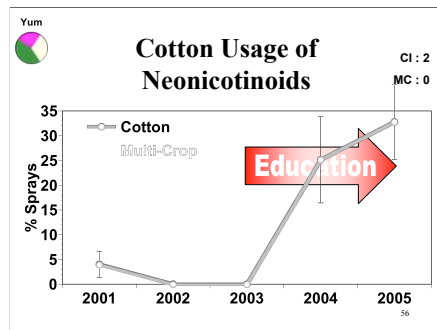


The group attempted to develop guidelines that could be applied differentially according to cropping community and proportional to the inherent risks of whitefly problems and resistance. A set of guidelines were developed that, in its simplest form, restricts neonicotinoids as a class to just two uses per cropping community. (1) In a cotton-intensive community, growers of cotton there can use up to 2 non-consecutive neonicotinoids per season; (2) in cotton/melon communities, those two uses are shared between the cotton and melon grower; (3) in the multi-crop community, the cotton growers there forego any usage of this chemical class, reserving the two uses to melon and vegetable growers there who are so dependent on this class for their whitefly control. A simplified preliminary analysis has been conducted by Peter and John, and I want to share a bit of what we’ve learned so far.



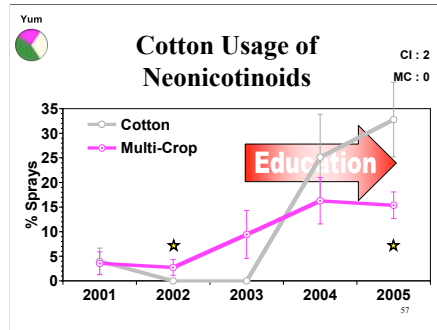
The question we want to ask is, has there been any impact of an intense grower education program on the use of neonicotinoids? This is a complex question, in part because the education program that promoted adoption of the cross-commodity guidelines is only one of several factors that might influence growers/PCA use of neonicotinoids. Other factors include market factors: new introductions of neonicotinoid products. A second factor is pest pressure. Whitefly pest pressure in Yuma was on the increase from 2003 through 2005, when it peaked. So there is more pressure on growers to apply *something* to control these whiteflies. The guidelines were issued in 2003 along with intensive workshops and other communications. The hypothesis, in it's simplest form, is that cotton growers in cotton intensive communities are allowed 2 neonic applications, while cotton growers in multicrop communities should forego the use of neonics altogether.

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Getting to the heart of the matter, we can examine cotton neonicotinoid usage in the more complex region of Yuma County by "whitefly community". Here we see the percentage of neonicotinoid-containing sprays applied in the Cotton-Intensive communities located in Yuma County. Our guidelines were issued in 2003 along with intensive workshops and other communications. Educational intensity was reduced in 2004 but then re-intensified in 2005 as this was a difficult wf year.

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Cotton growers in Cotton-Intensive communities of Yuma actually used significantly lower amounts of neonicotinoids in 2002 than the comparative cotton-growers in “Multi-Crop” communities. Usage increased as Intruder gained in popularity, at least to a point in 2004. Then, in 2005, we see the result we are looking for. That is, a cotton-grower growing in a more complex system (Multi-Crop) elected to use neonicotinoids with lower frequency than a comparable cotton-grower growing in the simpler Cotton-Intensive community. So this suggests that clients are listening and trying to follow the guidelines, even in one of the worst whitefly years in a decade. At the same time, it does show that some growers use neonicotinoids in cotton even in multi-cropped areas. I want to emphasize that this analysis is preliminary.

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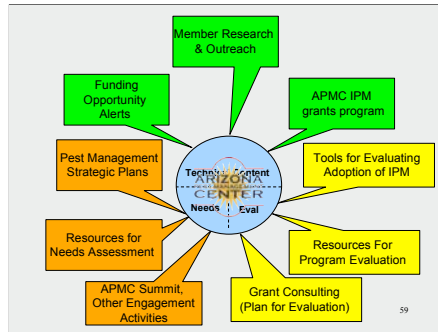
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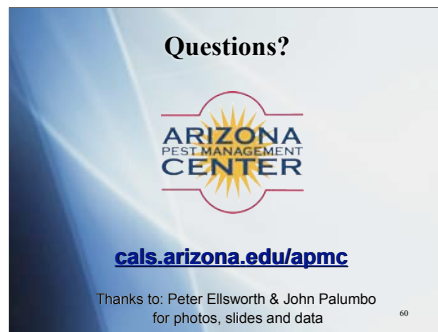
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The rules for success in IPM research and outreach have changed. I hope you will consider what I’ve presented here today the next time you put together a competitive grant. And remember the Arizona Pest Management Center is here to help all of us focus our time and resources on what is most important to the end-users of IPM in Arizona and beyond.

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The APMC represents a unique and innovative approach to organizing limited IPM resources in way that we believe will support faculty success and achievement in IPM. This model is designed with the new paradigm for research success in mind. We can provide limited faculty support for these required activities of needs assessment and program evaluation, on a one-on-one basis and through professional development resources and presentations.



I want to thank John Palumbo and Peter Ellsworth for the use of some of their slides and photos. Thank you.